

## **EXHIBIT 3**

### **TECHNICAL SPECIFICATIONS**

**for**

**DESIGN/BUILD SERVICES AT SCOTT CANDLER WATER  
TREATMENT PLANT HIGH SERVICE PUMP STATION HEADER  
REPLACEMENT AND TRANSFER PUMPS  
DEKALB COUNTY, GEORGIA**

**RFP: 17-500472**

**DeKalb County  
Department of Watershed Management  
4572 Memorial Drive  
Decatur, GA 30032**

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## SECTION 01001 SUMMARY OF WORK

### PART 1 – GENERAL

#### 1.01 SCOPE

- A. The Work to be performed under this Contract shall consist of furnishing plants, tools, equipment, materials, supplies, and manufactured articles and furnishing labor, transportation, and services, including fuel, power, water, and essential communications, and performing work, or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and any work, materials, and services not expressly indicated or called for in the Contract Documents that may be necessary for the complete and proper construction of the Work in good faith, shall be provided by the **Contractor** as though originally so indicated, at no increase in cost to the **County**.
- B. The quantities shown on the bid form are estimates for the Work, including the intended construction method based upon the available information. The assigned means, methods, and quantities described herein are subject to revision by the **County** for various reasons including but not limited to, unforeseen utility conflicts/ground water, discovery of subsurface rock strata, unforeseen pipeline encasement, etc. As such, a unit price contract type has been selected to prosecute the Work and is not intended to be a guarantee for a minimum amount of work.

#### 1.02 PROJECT LOCATION

The Work is required at the locations shown on the Approved Drawings.

#### 1.03 WORK COVERED BY THE CONTRACT DOCUMENTS

Work shall be performed according to the requirements of the Contract Documents.

#### 1.04 WORK COORDINATION

- A. The **Contractor** shall coordinate the Work with third parties (such as public utilities and the telephone company) in areas where such parties may have rights to underground property or facilities; and request maps or other descriptive information as to the nature and location of such underground facilities or property.
- B. The **Contractor** shall coordinate the Work with owners of private and public property where access is required for the performance of the Work.
- C. The **County** will work with the **Contractor** to assign and schedule the Work in a logical and efficient format. However, the items in this contract shall be priced such that each item may be assigned independently or combined with other items at the **County's** sole discretion in regard to both quantity and scope. The **Contractor** shall perform only those work items directed by the **County** at the prices specified herein. (For example, if the **County** determines that a line segment shall be cleaned but not televised, the same unit price for cleaning shall apply.)

## 1.05 CONDITIONS AT THE SITES

- A. The **Contractor** shall make necessary investigations to determine the existence and location of underground utilities.
- B. The **Contractor** shall be responsible for damage to and for maintenance and protection of existing utilities, structures, and personal property.
- C. These Contract Documents do not guarantee such utilities are in the location indicated or that they actually exist, or that other utilities are not within the area of the operations.
- D. The **Contractor** is responsible for safety at no additional cost to the **County**.
- E. The **Contractor** shall report hazardous conditions to the **County**.

+++ END OF SECTION 01001 +++

## SECTION 01010 - PROJECT PROCEDURES

### PART 1 - GENERAL

#### 1.01 SUMMARY

Section includes:

- A. Lands and Rights-of-Way/Easements, and Permits
- B. Access to and **Contractor's** use of the site
- C. Coordination requirements
- D. Construction procedures

#### 1.02 LANDS AND RIGHTS-OF-WAY: EASEMENTS AND PERMITS

- A. **Contractor** shall, within 30 days of Notice To Proceed, submit to the **County** an Easement and Permit Plan listing easements and permits obtained, permits and easements yet to be obtained, the timing for obtaining required easements and permits, and conditions and mitigations associated with the easements and permits. The **Contractor** shall coordinate the acquiring of easements and permits within the accepted Construction Schedule.

The timing of acquiring easements and permits is the responsibility of the **Contractor**. Delays and rescheduling of the Work to maintain the Construction Schedule shall be mitigated by the **Contractor** at the **Contractor's** sole cost and expense.

- B. Access to the Work shall be limited to the right-of-way or easement area provided for execution of the Work. The **Contractor** shall not enter any adjacent private property without prior written approval from the property owner. Proof of such approval shall be furnished to the **County** upon request. Additional permitting and easements required shall be obtained by the **Contractor** and the **Contractor** shall bear the cost.
- C. If the **Contractor** performs any work or service for any property owner outside the specified scope of the **Contractor's** agreement with the **County** or has any agreements with a private property owner for access to or for temporary use of property outside of the right-of-way or easement area, a written agreement shall be entered into with the private property owner(s) prior to any work or service being performed or prior to any use by **Contractor** of the private property and such agreement shall be provided to the **County**. The agreement shall contain the following language, in addition to the terms agreed to between the **Contractor** and the property owner:

"The Property Owner understands that DeKalb **County** is not a party to this Agreement, exercises no control over the means, methods, and execution of this agreement, and that DeKalb **County** assumes no responsibility for the **Contractor's** compliance with the terms of this agreement. The **Contractor** shall be solely liable for any and all claims, demands, and judgments related to loss or damage to property or person (including death) arising from or in any way related to the **Contractor's** acts or omissions related to the agreement."

### 1.03 ACCESS TO AND CONTRACTOR'S USE OF THE SITE

- A. The space available to the **Contractor** for the performance of the Work, either exclusively or in conjunction with others performing other construction as part of the project, is shown on the drawings.
- B. The **County** shall continue to utilize the existing wastewater collection system and water system during assessment and construction.
  - 1. The **County** will endeavor to cooperate with the **Contractor's** operations when the **Contractor** has notified the **County** in advance of need for changes in operations in order to accommodate construction operations.
  - 2. The **Contractor** shall conduct the Work to cause the least interference with the **County's** operations.
- C. Equipment and vehicles used by the **Contractor** on the project shall be marked with the **Contractor's** name and telephone number.

### 1.04 COORDINATION REQUIREMENTS

- A. Coordination with **County**:
  - 1. Limit access through occupied areas to those days and times the **County** approves. Occupied areas include areas in which the **County's** regular operations will be going on or to which the **County** requires access during the construction period.
  - 2. When the following must be modified, provide alternate facilities acceptable to the **County**:
    - a. Emergency means of egress
    - b. Utilities that must remain in operation
    - c. Informational signage
  - 3. The **Contractor** shall notify the **County** immediately of any circumstances that may jeopardize or that have interrupted utility service.
- B. Security Procedures:
  - 1. Limit access to the site to persons involved in the work.
  - 2. Provide secure storage for materials.
  - 3. Secure completed work as required to prevent loss.
- C. Coordination of Construction:
  - 1. Inform each party involved, in writing, of procedures required for coordination of the Work; include requirements for giving notice, submitting reports, and attending meetings.
  - 2. Inform the **County** in advance, with ample time, when coordination of Work is required.
- D. Utilities Notification Prior to Construction:

1. Georgia law mandates that, before beginning mechanical digging or excavation work, **Contractor** shall contact Georgia 811 by using eRequest on [www.Georgia811.com](http://www.Georgia811.com) or by calling 811 or 1-800-282-7411.
2. **Contractor** may utilize EDEN (Excavation Digging Event Notification) web application that enables Members and Professional Excavators to create, manage, respond to, and edit Georgia 811 Locate Request Tickets.
3. **Contractor** shall retain records of notification and responses during the course of the project until final Payment.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### **3.01 CONSTRUCTION**

#### **A. General Examination Requirements:**

1. Prior to performing work, examine the applicable substrates and the conditions under which the work is to be performed.
2. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding.
3. Notify the **County** promptly of type modifications required.
4. Before starting work that might affect existing construction, verify the existence and location of underground utilities and other underground construction.
5. Prepare preconstruction photographic documentation in conformance with the requirements of Section 01380 of these specifications.

#### **B. General Preparation Requirements:**

1. The **Contractor** shall obtain, maintain, and pay for required permits.
2. The **Contractor** shall take field measurements as required to properly conduct the work.

#### **C. Cleaning and Protection: Keep installed work clean, and clean again when soiled by other operations.**

#### **D. Final Cleaning:**

1. Remove materials and equipment that are not part of the work and any debris from the site prior to substantial completion.
2. Dispose of debris in a lawful manner.
3. Perform final cleaning after substantial completion has been certified, but before final payment.
4. Clean entire project site and grounds.

#### **E. Substantial Completion:**

1. Requirements for the **Contractor** achieving Substantial Completion are defined in the Contract Documents in GR-1 of the General Requirements.
2. Substantial Completion is typically defined to include:
  - a. Completion of Work required by the Contract Documents

- b. Operation of components and systems of the Work, including acceptance of testing and startup requirements
  - c. Closeout of quality deficiencies and non-conformances
  - d. Delivery and acceptance of spare parts, operations manuals, and vendor documentation
  - e. Completion of vendor training
  - f. Completion and delivery of “red-line” as built drawings
2. When the **Contractor** believes substantial completion has been achieved, **Contractor** shall notify the **County** in writing, requesting Substantial Completion. The **County** will verify that the contractual documentation requirements for Substantial Completion have been completed, including closeout of open NCRs. If verified, the **County** will schedule a Substantial Completion inspection and walk-through with the **Contractor**, DWM Operations, and the Designer, or will notify the **Contractor** in writing of acceptance or the reason(s) for denying Substantial Completion.
- F. Final Completion:
1. Requirements for the **Contractor** achieving Final Completion are defined in the Contract Documents in GR-9 of the General Requirements.
  2. After Substantial Completion, **Contractor** shall meet additional requirements for Final Completion and release of final payment. These requirements will be defined in the Contract and typically include:
    - a. Completion of punch list items by the **Contractor**
    - b. Demobilization from the project site
    - c. Submittal of warranties
    - d. Release of subcontractor or vendor liens
    - e. Turnover of remaining project documents required by the Contract, including final as-built drawings by the Design Consultant

### 3.02 CHANGE MANAGEMENT

#### A. Contract Change Process

Any firm under contract with the **County** may submit a Change Request (CR) to the **County** following the requirements of the contract. A CR may address requested changes in cost and/or schedule, as well as contract terms or scope that do not result in cost or schedule impacts.

Changes may also be initiated by the **County** in the form of a Field Order (FO). The **Contractor** shall proceed with the change unless they believe the FO entitles them to a change in contract price, time, and/or term. If so, the **Contractor** shall submit a CR within 15 days of receiving the FO.

The CR from the **Contractor** is to be accompanied by a detailed proposal describing the **Contractor**'s opinion of the CR's cost, schedule, and/or contract term impacts.

If the CR is acceptable to the **County**, the **Contractor** will be directed to submit a CO to the **County** to process. If the CR is not acceptable to the **County** then the **Contractor** may negotiate the CR. If the cost and/or schedule impacts cannot be



agreed, then the **County** will either instruct the **Contractor** to proceed with the change using a Unilateral Change Directive (UCD), if the change is deemed by the **County** to be needed, or the change can be terminated if the change is deemed to be not needed. If the **County** issues a UCD after failing to agree on the price of a CO, then the pricing of the change is per the contract terms.

A UCD can be initiated by the **County** only when there is an imminent threat to public safety or health, or a potential shutdown of a vital **County** function.

B. Amendment to the Contract

If the approval of a CO requires a written, formal amendment to the contract, the **County** will process the formal amendment.

C. Project Scope Change Impacts

A change to a Design /Build contract may materially change the scope of the project, including greater impact on the construction scope than the design scope. A design scope change may also materially impact the project configuration even if it is a no-cost change. Additionally, a change to one project's scope may have impacts to another project's scope.

So that a CO is not approved without understanding its full impacts beyond the affected contract scope, project scope change impacts shall be approved by the **County**. These must consider changes through every phase of the project, and/or impacts to other projects.

D. Baseline

If a CO is approved, the **Contractor** will prepare a Project Baseline Change Instruction Form to formally change the project scope, baseline schedule, and baseline budget.

E. Change Monitoring

The **Contractor** is responsible for monitoring changes to the contract. The **Contractor** will maintain a Design Change Log for each project, and will maintain a Construction Change Log that includes the change description, change status, category of change, contract, estimate of cost, estimate of schedule impact, and current process step. Change logs are updated each month and included with the Project Progress Report.

Responding to and processing changes in a timely manner is a priority. Change backlogs will be vigorously monitored and managed. Change status reports will be developed by the **Contractor** from the Change Logs to provide current status of each open change, which process step is active, and how many days remain in the process step. "Overdue" reports will be elevated to the **County** for follow-up and closure.

F. Change Status

Changes will be identified by one of the four following status descriptions:

Proposed Change is a change that has been submitted as a CR or FO, but has not yet been negotiated. Proposed changes require closure if they are deemed to be not required, or must be resolved in a timely manner if they are deemed required. The cost estimate and/or schedule impact of a proposed change will usually change as it goes through the contract change process. These changes must be reflected in the Change Log as they occur and included in monthly cost and schedule forecasts.

Pending Change is a change that has been negotiated, but has not yet received final **County** approval. These changes must be included in monthly cost and schedule forecasts.

Approved Change is a change that has received final **County** approval. The contract scope, budget, and/or schedule will be amended to include approved changes. Approved changes will be included in monthly cost and schedule forecasts until a formal re-baselining of the project schedule and/or budget is approved.

Closed Change is a change that has been formally rejected and closed by the **County**, or withdrawn by the originator.

#### G. Category of Change

Changes will be categorized as follows to track the types of changes that occur over the life of the project:

- **County** Requests: any change initiated by the **County**.
- Differing Site Conditions: new information not reasonably available during design, or considered “unforeseeable” through due diligence on the part of the **Contractor**.
- Design Errors: changes due to errors or deficiencies in the design.
- Design Omissions: items omitted from the design that would have been included in the original bid, had they been known.
- Regulatory Requirements: changes mandated by regulatory agencies that are different from approved permit conditions at the time the contract was approved.
- Other: changes required for all other reasons, including emergency work, adjustment of bid quantities, force majeure events, incentive payments, accepted substitutions, and changes identified during value engineering.

### 3.03 HEALTH AND SAFETY CONSIDERATIONS

- A. Take precautions to prevent fires and to facilitate firefighting operations.
- B. Take precautions to prevent accidents due to physical hazards.
- C. Maintain working conditions in order to keep the site and adjacent public ways free of hazardous and unsanitary conditions and public nuisances.
- D. Maintain working conditions to control rodents and other pests; prevent infestation of adjacent sites and buildings due to pests on this site.
- E. Keep public streets free of debris from this Work.

- F. Provide adequate traffic control in accordance with current MUTCD standards and the approved traffic permit.
- G. When using trenches/excavations, follow OSHA standards 29 CFR 1926.650, 29CFR 1926.651, and 29 CFR 1926.652.

### 3.04 ENVIRONMENTAL PROTECTION

#### A. General

**Contractor** shall conduct its operation in a manner to prevent pollution of the environment surrounding the area of work and shall be responsible for furnishing necessary items for fulfilling the work described herein.

#### B. Material Transport

**Contractor** shall comply with the Official Code **County** of DeKalb Georgia pertaining to the duties of the **Contractor** in hauling material over **County**-owned rights-of-way. This includes, but is not limited to, approval of proposed haul routes, prevention of dropping of materials or debris on the streets from trucks arriving and leaving the site, providing a suitable vehicle inspection and cleaning installation with permanent crew, and the removal of material spilled in public areas at no additional cost to the local government agency.

#### C. Waste Materials

No waste or erosion materials shall enter natural or manmade water, wastewater collection systems, or stormwater drains. Erosion materials from excavations, borrow areas, or stockpiled fill shall be contained within the work area. **Contractor** shall develop methods for control of waste and erosion, which shall include filtration, settlement, and manual removal to satisfy the above requirements.

#### D. Burning

No burning of waste shall be allowed.

#### E. Dust Control

The **Contractor** shall control the generation of dust by its operations. Control of dust shall be accomplished by water sprinkling or by other methods approved by the **County**.

#### F. Noise Control

The **Contractor** shall minimize the noise caused by its operations.

When required by agencies having jurisdiction, noise-producing work shall be performed in less sensitive hours of the day or week as directed by the **County**.

The **Contractor** shall provide equipment that operates with the least

possible noise. The use of noisy equipment is prohibited. Hoists and compressor plants shall be electrically operated unless otherwise permitted. The air intake of compressors shall be equipped with silencers, and machinery operated by gearing shall be provided with a type of gearing designed to reduce noise. Internal combustion engines shall be equipped with mufflers in good order.

Noise generated by mobile construction equipment, stationary construction equipment, and other equipment involved in the construction of the Work shall not exceed the decibel levels indicated below. Noise generated by mobile and stationary construction equipment will be measured 3 to 6 feet from building lines, and on the A-weighting network of Type 2 general purpose sound level meter set at fast response.

|  | Combined Residential and Commercial                    |
|--|--|
| Allowable sound levels of mobile construction equipment:<br>- From 7 a.m. to 10 p.m., Monday thru Saturday, except legal holidays<br>- At times other than those listed above    | 85 dBA<br><br>70 dBA                                   |
| Allowable sound levels of stationary construction equipment:<br>- From 7 a.m. to 10 p.m., Monday thru Saturday, except legal holidays<br>- At times other than those noted above | 70 dBA<br><br>60 dBA                                   |
| Night work from 10 p.m. until 7 a.m. shall require an approved special permit from the <b>County</b> .   | The dBA level will be included in the approved permit. |

#### G. Use of Chemicals

Chemicals used during construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, shall show approval of either EPA or FDA. Use of such chemicals and disposal of residues shall be in conformance with instructions.

#### H. Bypassing During Construction

No wastewater shall be bypassed at sewage collection or treatment facilities during project construction unless a bypassing schedule has been approved by the **County**. It shall be the responsibility of the **Contractor** to prepare and secure the approval of bypassing not specifically identified in

the Contract Documents.

I. Responsibility for Spills and Accidental Discharges

In the event the **Contractor** causes or has a spill or accidental discharge for which the **County** is fined by the State of Georgia Department of Natural Resources Environmental Protection Division (EPD), the **Contractor** agrees to remediate the spill or discharge immediately in accordance with current EPD regulations and to pay fines assessed against the **County** and/or **Contractor**, and pay for the **County's** cost associated with efforts to remediate the situation. The **County** shall be notified immediately of such an event.

J. Odor Control

**Contractor** shall provide approved temporary odor control measures as required to control objectionable odors resulting from its cleaning and/or bypass pumping operations. Approved temporary odor control measures, when required, shall include odor control filters, additional ventilation, and/or covering of manholes.

### 3.05 PROTECTION OF THE WORK

- A. Conduct construction operations so no part of the Work is subjected to damaging operations or influences that are in excess of those to be expected during normal occupancy conditions.
- B. Execute work and stockpile spoils and materials to prevent flooding of excavations, below grade construction, and adjacent properties due to rainwater runoff.
- C. Protect existing property not indicated to be removed.
- D. Provide temporary supports as required to prevent movement and structural failure as designed by a Registered Professional Engineer in the state of Georgia at the **Contractor's** cost.
- E. Equipment and vehicles used on DWM projects shall be clearly marked with the **Contractor's** name and telephone number. The identifying markings may be in the form of magnetic signs, decals, or painted lettering and shall be located on both sides of the equipment/vehicle. The lettering shall be legible, of a contrasting color to the background surface, and at least two inches in height. Markings shall be in place upon initiation of the work on the project site.
- F. A copy of the Project Notice to Proceed letter issued by the **County** shall be available on the job site as proof of the contractual relationship of the **Contractor** with the **County**. The letter shall be presented for review upon request by regulatory agencies or other **County** departments that visit the job site.
- G. If removal and replacement of a paved private driveway is required, the replacement shall be performed within 2 weeks of removal. The required permanent pavement replacement for public roadways shall be performed within 30 days or within 7 days if the roadway is a state highway or major **County** arterial roadway.

Temporary surface maintenance is the **Contractor's** responsibility and shall be adequate for the volume and type of traffic loads imposed. Temporary asphalt cold mix application, steel traffic plates, etc. shall be utilized as necessary.

- H. The **Contractor** shall always maintain copies of permits and approved plans on the project site.

### 3.06 NOTIFICATION OF SERVICE INTERRUPTION

During progress of work under this Contract, it may be necessary to temporarily interrupt water, sewer, or other utility service to a limited number of customers in the vicinity of the work. It shall be the **Contractor's** responsibility to coordinate the service outage with the utility and to provide proper advance notification (a minimum of 48 hours) to the affected customers.

Due to the nature of businesses and traffic in certain projects' areas, water outages for connections, service changeovers, and other Work may not be allowed during normal work hours. The **Contractor** shall factor these considerations into bid price submitted. Coordination, special lighting, traffic control, employee overtime, special customer notification, etc. shall be included in these considerations by the **Contractor**.

++++END OF SECTION 01010++++

## SECTION 01011 UNIQUE REQUIREMENTS

### PART 1 - GENERAL

#### 1.01 SCOPE

- A. This Section conveys to the **Contractor** unique and unusual stipulations and requirements established for this Project. Some of the stipulations and requirements are a result of negotiations with various entities and organizations, which have an interest in this Project. Some requirements are based on technical aspects of the Project, which are not otherwise conveyed to the **Contractor**. The provisions of this Section shall supersede the provisions of the Division 1 through 17 Specifications, but shall not supersede the Bidding Requirements, Contract Forms, or Conditions of the Contract.
- B. If Owner Controlled Insurance Program (OCIP) is implemented in the contract, then OCIP shall govern as follows: In connection with the Work, and for the **Contractor** and those subcontractors deemed eligible by the **County** for participation, the **County** shall implement an OCIP, providing certain insurance coverages as detailed herein. The insurance coverages provided by the OCIP apply only to the Work performed on the Project site. The **Contractor** and its subcontractors shall provide their own insurance for off-site activities. The Builder's Risk/All Risk Property Insurance component of the OCIP shall expressly exclude coverage on **Contractor's** and subcontractors' machinery, tools, and equipment not destined to become a part of the Project Work.

#### 1.02 EXISTING FACILITY OPERATIONS

- A. The existing facilities shall remain in operation while the new construction is in progress.
- B. The **Contractor** shall coordinate the Work with the **County** so that the construction shall not restrain or hinder the operation of the existing facilities.
- C. After having coordinated the Work with the **County**, the **Contractor** shall prepare a submittal in accordance with Specification Section 01014 and 01300 to include the time, time limits, and methods of each connection or alteration and have the approval of the **County** before Work is undertaken on the connections or alterations.

#### 1.03 SEQUENCING

- A. General: The **Contractor** shall be solely responsible for all construction sequencing.
- B. Notify the **County** at least 48 hours prior to relocating piping or diverting flows.
- C. Sequence Submittal:
  - 1. The **Contractor** shall submit to the **County** for review a proposed sequence with appropriate times of starting and completion of tasks.

2. The **Contractor** may propose alternatives to the sequencing constraints shown in this Section in an attempt to reduce the disruption of the operation of the existing facility or streamline the tasks of this Contract. The **County** is not obligated to accept these alternatives.
  - A. Parking for **Contractor** personnel shall be fully contained within the site boundaries. No parking is permitted on public roads or on streets within the neighborhood. If necessary, the **Contractor** shall make arrangements for remote parking for its personnel, at no additional cost to the **County**.
  - B. **Contractor** is advised there are numerous pressurized pipes, energized conduits and duct banks, overhead utilities, and gravity flow systems on the site. The **Contractor** shall be responsible for protecting the existing utility lines and shall be responsible for the repair, damages and all cost resulting from construction activities to these systems. In addition to these requirements, the **Contractor** is required to verify the actual locations of various buried lines shown in the Drawings by carefully excavated test pits and other direct means before starting Work in given areas at no additional cost to the **County**. Special care shall be taken during excavation to mitigate damage potential from previously unknown and active systems. Overhead utilities may require raising or relocation to access site.
  - C. Unless shown otherwise on the Drawings, the **Contractor** shall restore the site to its original grade. Fill placed at the site to return it to its original grade shall be controlled fill, approved by the **County**. The site shall be grassed, strawed, and mowable. Final landscaping, including trees and shrubs, but not including grassing, shall be paid separately.
  - D. The **Contractor** shall be responsible for maintaining and cleaning the Site Access Road from the date it occupies the Construction Site through the final completion of the construction period.
  - E. **Contractor** shall grade site, relocate, set up, and connect utilities, including telephone and internet services for office facilities.

END OF SECTION 01011



## SECTION 01014 WORK SEQUENCE

### PART 1 - GENERAL

#### 1.01 SCOPE

- A. Work under this Section includes construction sequencing and providing temporary facilities as necessary to operate the (wastewater collection) (water distribution) facilities and prevent (wastewater) (potable water) bypasses during the Work. Work shall be scheduled and conducted by the **Contractor** so as to neither impede nor adversely affect any **County** or utility operations.
- B. The existing (wastewater collection system) (water distribution system) is currently and continuously receiving (wastewater) (potable water). Those functions shall not be interrupted except as specified herein. The **Contractor** shall coordinate the Work to avoid any interference with normal operation of the (collection) (distribution) system. The **Contractor** shall comply with the following general requirements:
1. Provide temporary pumps and other facilities necessary to meet the requirements of this Section.
  2. Notify the **County** at least 48 hours before starting to relocate piping or taking existing components out of service.
  3. Never bypass untreated or partially treated sewage to surface waters or drainage courses. This is strictly prohibited during construction. If the **Contractor's** operations cause accidental bypassing, the **County** shall immediately be entitled to employ others to stop the bypassing, and shall be entitled to do so without written notice to the **Contractor**.
- C. Penalties imposed on the **County** because of any bypass caused by the actions of the **Contractor**, its employees, or subcontractors, shall be borne in full by the **Contractor**. This includes legal fees, cleanup, remediation, and other **County** expenses resulting directly or indirectly from the bypass.

#### 1.02 SUBMITTALS

- A. Outage Plan: In accordance with the General Conditions, the **Contractor** shall submit a detailed outage plan and schedule for any operations that necessitate removing a pipeline or structure from service. The schedule shall be coordinated with the construction schedule specified in this Section and shall meet the restrictions and conditions specified herein. The detailed plan shall describe the **Contractor's** method for preventing bypassing, the length of time required to complete said operation, the affected facility(ies), and the equipment the **Contractor** shall provide in order to prevent bypassing.

- B. Sequence Submittal: The sequence provided in Part 3 of this Section is offered as a suggestion to the **Contractor**. The **Contractor** shall submit to the **County** for review and approval a proposed detailed sequence with appropriate times of starting and completion of tasks.
- C. Alternate Sequences: The **Contractor** may propose alternate sequences to those shown in Part 3 of this Section if they would reduce disruption of the existing facility's operation or streamline the tasks of this Contract.

### 1.03 QUALITY ASSURANCE

At least two weeks prior to any proposed activity that will require any portion of the (wastewater collection) (water distribution) system to be removed from operation, require bypassing, or interrupt flow, the **Contractor** shall schedule a meeting with DWM operating personnel to discuss the **Contractor's** detailed plan for the proposed operation. The plan shall meet the following minimum requirements:

- A. Plan shall be written in outline form and presented in a format that shows the progression of events in sequential and/or concurrent order of activity, along with the duration of each activity.
- B. The written plan shall be supplemented by understandable drawings, sketches, and details as required to show the logic of the plan.
- C. The plan shall delineate the responsibilities of the DWM operating personnel and the **Contractor**, to eliminate delays from conflicting viewpoints about responsibilities when the plan is plan implemented.
- D. After discussion of the plan at the meeting, any agreed changes shall be incorporated into the plan and a copy of the plan and details shall be distributed to DWM operating personnel, the **County**, and **Contractor** at least one week prior to commencement of activities. On the day prior to the commencement of activity, a brief meeting of involved parties shall convene to establish the starting time and initial activity of DWM operating personnel and **Contractor's** personnel.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.01 GENERAL

The sequence of construction is outlined for the major items of Work required. The **Contractor** shall coordinate its Work with the DWM operating personnel to minimize disruptions of system operation. The **Contractor** shall ascertain that existing facilities are protected and shall not be damaged as a result of this construction. No settlement of existing facilities shall be acceptable. All work shall be performed in a safe manner.

Unless otherwise permitted, no existing valves or equipment shall be operated by the **Contractor**.

### 3.02 PROPOSED CONSTRUCTION SEQUENCE

The project shall be constructed in five stages to allow continuous operation of the facilities and provide treatment of wastewater to a quality equivalent to the existing secondary treatment plant or better. The five stages of construction shall generally be performed in sequence, with overlap as required to maintain the treatment facilities in service. The five stages are:

Stage 1 - Preparatory

Stage 2 - Bypass Facilities

Stage 3 - New Pipe, Structures, Valves, and Connections

Stage 4 - Modification to Existing Facilities

Stage 5 - Cleanup and Final Restoration

### **3.03 REQUIRED SEQUENCES**

The following items define the sequence of certain construction steps that shall occur in order to properly and safely operate and maintain the treatment facilities.

### **3.04 COORDINATION WITH OTHER CONTRACTORS**

The performance of the project shall be coordinated with other work going on at the same time on the project site. Certain portions of the project are required to be completed so others can perform their work in a timely manner. The construction schedule prepared by the **Contractor** shall take into account the intermediate requirements depicted on the sequence diagram. The **Contractor** shall bear the responsibility for Work delays that cause delay and damages to other contractors requiring connection to Work under this contract.

### **3.05 LIMITS OF CONSTRUCTION**

Due to the need for other contractors to be performing work on the site, the **Contractor's** access to the site may be limited. The **Contractor** shall have access to some areas of the site only during certain steps during construction. The **Contractor** shall have access to the property defined within the construction limits throughout the project. Additionally, the **Contractor** shall have access to areas within the construction limit of others for only the periods of time required to perform the work.

- A. Except where indicated otherwise on the drawings, pipeline and underground construction shall terminate at the construction limit lines indicated on the drawings. The **Contractor** reaching the construction limit first shall be responsible for adequately capping the line to allow both for testing and for easy continuation of or connection to the line by the **Contractor** continuing the line.
- B. The **Contractor** may be responsible for performing work within the construction limits of other contractors.

### **3.06 MISCELLANEOUS CONSTRUCTION**

Miscellaneous Work necessary to complete any flow diversion required may include piping, electrical work, diversion plugs, bulkheads, equipment installation, easements, permits, and other activities. The cost for these items shall be included in the **Contractor's** base bid.

END OF SECTION 01014

## SECTION 01040 COORDINATION

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. The **Contractor** shall coordinate execution of the Work with subcontractors, other contractors working on related **County** projects, and the **County**, as required, to maintain operation of the existing facilities and satisfactory progress of the Work.
- B. Requirements of this Section shall be in addition to those stated in the General Requirements.
- C. The **County** requires a written explanation of the **Contractor's** plan for coordinating and accomplishing separate phases of the Work, supplemental to the details provided under Section 01310 - Construction Schedule.

#### 1.02 EXISTING UTILITIES

- A. Consult with the **County** on a daily basis while the **Contractor** performs demolition, excavation, or any other alteration activity. No water or sewer function, utility, or structure is to be altered, shut off, or removed unless approved in advance, and in writing, by the **County**. The **Contractor** shall give the **County** at least 48 hours advanced notice, in writing, of the need to alter, shut off, or remove such function.
- B. Coordinate the Work with the **County** and revise daily activities to avoid adversely affecting system operations. Such revisions in the proposed work schedule shall be accomplished with no additional compensation to the **Contractor**.

END OF SECTION 01040

## **SECTION 01045 CUTTING AND PATCHING**

### **PART 1 - GENERAL**

#### **1.01 DEFINITIONS**

"Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other Work and subsequent fitting and patching required to restore surfaces to their original conditions.

- A. Cutting and patching is performed for coordination of the Work, to uncover Work for access or inspection, to obtain samples for testing, to perform alterations, or for similar purposes.
- B. Cutting and patching performed during the manufacture of products, or during the initial fabrication, erection or installation processes is not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered "cutting and patching."
- C. "Demolition" and "Selective Demolition" are recognized as related, but separate categories of Work, which may or may not require cutting and patching as defined in this section, refer to "Demolition" and "Selective Demolition" sections of Division 2.

#### **1.02 SECTION INCLUDES**

Unless otherwise specified, requirements of this section apply to mechanical and electrical Work. Refer to Divisions 15 and 16 for additional requirements and limitations on cutting and patching of mechanical and electrical work. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of Work.

This Section includes:

- A. Administrative and procedural requirements for cutting and patching
- B. Reference to other sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work

#### **1.03 RELATED SECTIONS**

- A. Drawings and general provisions of Contract, including General Requirements and other Division 1 Specification Sections.
- B. Requirements for mechanical and electrical installations and reference to Sections in Divisions and 16 for other requirements and limitations applicable to cutting and patching mechanical and electrical installations

## 1.04 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce the load-carrying capacity or load-deflection ratio.

Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems.

1. Primary operational systems and equipment
2. Air or smoke barriers
3. Water, moisture, or vapor barriers
4. Fire Protection Systems
5. Control Systems
6. Communication systems
7. Conveying systems
8. Noise and vibration control elements and systems

- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would reduce capacity to perform as intended, or result in increased maintenance, or decrease operational life or safety.

- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in visually unsatisfactory manner.

Retain the original installer or fabricator, if possible, to cut and patch the exposed Work listed below. If it is impossible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.

- A. Stonework and stone masonry
- B. Window wall systems
- C. Ornamental metal
- D. Firestopping
- E. Stucco and ornamental plaster
- F. Carpeting
- G. Wall coverings

- C. Approval: Obtain approval to proceed before temporary or permanent cutting and patching of the following categories:

1. Structural steel
2. Miscellaneous structural metals, including lintels, equipment supports, stair systems, and similar categories of Work
3. Structural concrete
4. Foundation construction
5. Steel

6. Lintels
  7. Bearing and retaining walls
  8. Structural decking
  9. Exterior curtain wall construction
  10. Equipment Supports
  11. Piping, ductwork, vessels, and equipment
  12. Structural systems of special construction, as specified by Division 13 sections
  13. Shoring, bracing, and sheeting
  14. Primary operational systems and equipment
  15. Water/moisture/vapor/air/smoke barriers, membranes, and flashings
  16. Noise and vibration control elements and systems
  17. Control, communication, conveying, and electrical wiring systems
- E. Installer Qualifications: Company specializing in performing the Work of this section with minimum 5 years of experience
- F. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated

#### **1.05 SUBMITTALS**

Procedural Proposal for Cutting and Patching: Submit proposed procedures for this Work well in advance of the time Work shall be performed, and request approval to proceed. Include the following information, as applicable, in the submittal:

- A. Describe nature of the Work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe anticipated results of the Work in terms of changes to existing Work, including structural, operational, and visual changes as well as other significant elements.
- B. List products to be used and firms, including their qualifications, that shall perform the Work.
- C. Give dates when Work is expected to be performed.
- D. List utilities that will be disturbed or otherwise affected by Work, including those that will be relocated and those that will be out of service temporarily. Indicate how long utility service shall be disrupted.
- E. Acknowledge that the Architect's approval to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory Work.
- F. Submit details and engineering calculations to show how reinforcement is integrated with original structure to satisfy requirements when cutting and patching of structural Work involves the addition of reinforcement.
- G. List certified welder who shall perform structural welding.



## 1.06 WARRANTY

Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. General: Except as otherwise indicated, or as directed by the Contracting Officer, use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use compatible materials matching existing adjacent surfaces to the fullest extent possible also with regard to visual effect. Use materials for cutting and patching to result in equal-or-better performance characteristics.
- B. Trade Name: The use of a trade name and supplier's name and address shall indicate a possible source of the product. Products of the same type from other sources shall not be excluded provided they possess like physical and functional characteristics.
- C. Identical Materials: Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials with installed performance equal to or surpassing that of existing materials.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Corrective Action: Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
- B. Trade Meeting: Before the start of cutting Work, meet at the Work site with the parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate layout of the Work and resolve potential conflicts before proceeding with the Work.

### 3.02 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut. If the cut is on a structural member, a PE registered in the state of Georgia shall submit a temporary support design plan to the **County** for approval.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

- C. Interference: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Precautions: Take necessary precautions to protect existing pipe conduit, or ductwork serving the building, and schedule to remove or relocate conduits until bypass provisions have been made.

### **3.03 PERFORMANCE**

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
- B. Existing Construction: Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original conditions.
- C. Damage Control: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Review proposed procedures with the original installer, where possible; comply with the original installer's recommendations.
  - 1. Use hand or small tools designed for sawing or grinding, where cutting is required. Do not hammer and chop. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Cut the exposed or finished side into concealed surfaces to avoid marring existing finish.
  - 3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
  - 4. Comply with requirements of applicable Sections or Division 2 where cutting and patching require excavating and backfilling.
  - 5. Bypass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated, or abandoned. Cut off pipe or conduit in walls or partitions to be removed. Cap valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after bypassing and cutting.
- D. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
  - 1. Inspect and test patched areas to demonstrate integrity of the installation, where feasible.
  - 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that shall eliminate evidence of patching and refinishing.

3. Patch, and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance when removal extends one finish area into another. Remove existing floor and wall coverings and replace with new materials, as necessary to achieve uniform color and appearance.

Extend final paint coat over entire unbroken area containing the patch, where patching occurs in a smooth painted surface, after the patched area has received primer and second coat.

4. Patch, repair, or rehang existing ceiling as necessary to provide an even surface of uniform appearance.

### **3.04 CLEANING**

- A. **Clean Thoroughly:** Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Completely remove paint, mortar, oils, putty, and items of similar nature. Thoroughly clean piping, conduit, and similar features before paint or other finishing is applied. Restore damaged pipe covering to its original conditions.
- B. **Traffic:** Do not permit traffic over unprotected floor surface.

END OF SECTION 01045

## **SECTION 01060 REGULATORY REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.01 SCOPE**

- A. The **Contractor** shall, without additional expense to the **County**, be responsible for obtaining National Pollutant Discharge Elimination System (NPDES) permits for discharges from this project to stormwater systems or watercourses, and for complying with any applicable federal, state, county, and municipal laws, codes, and regulations, in connection with the prosecution of the Work.
- B. The **Contractor** shall take proper safety and health precautions to protect the Work, the workers, the public, and the property of others.
- C. The **Contractor** shall be responsible for materials delivered and Work performed until completion and acceptance of the Work, except for any completed unit of construction thereof that may heretofore have been accepted.

#### **1.02 NPDES PERMITS FOR STORMWATER DISCHARGES**

- A. The Federal Water Pollution Control Act (also known as the Clean Water Act, or CWA), as amended in 1987, requires NPDES permits for stormwater discharges associated with industrial activity.
- B. On November 16, 1990, (55 FR 47990), the U.S. Environmental Protection Agency (EPA) issued regulations establishing permit application requirements for stormwater discharges associated with industrial activity. These are in Section 122.26 of Section 40 of the Code of Federal Regulations (40 CFR Part 122.26).
- C. The November 16, 1990 regulation established the following definition of "stormwater discharge associated with industrial activity" at 40 CFR 122.26(b) (14):

"Stormwater discharge associated with industrial activity" means the discharge from any conveyance that is used for collecting and conveying stormwater and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. For the categories of industries identified in subparagraphs (i) through (x) of this subsection, the term includes, but is not limited to, stormwater discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to stormwater. The following categories of facilities are considered engaging in "industrial activity" for purposes

of this subsection:

- (x) Construction activity including clearing, grading, and excavation activities except: operations that result in the disturbance of less than five acres of total land area, which are not part of a larger common plan of development or sale
- D. These regulations are effective for activities covered by the regulation on or after October 1, 1992.
- E. The **Contractor** shall complete EPA Form 3510-2F. A "Guidance Manual for the Preparation of NPDES Permit Applications for Stormwater Discharges Associated with Industrial Activity," as published by EPA, is available to assist the **Contractor** in the application process.

END OF SECTION 01060

## **SECTION 01100 SPECIAL PROJECT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.01 CONNECTIONS TO EXISTING SYSTEMS**

The **Contractor** shall perform the Work necessary to locate, excavate, and prepare for connections to the terminus of the existing systems as shown on the Drawings. The cost for this Work and for the actual connection to the existing systems shall be included in the bid price for the project and shall not result in any additional cost to the **County**. Connections shall be made only after approval by the **County**.

#### **1.02 RELOCATIONS**

The **Contractor** shall be responsible for the relocation of structures, including but not limited to light poles, signs, sign poles, fences, piping, conduits, and drains that interfere with the positioning of the Work as set out on the Drawings. The cost of such relocations shall be included in the bid price.

#### **1.03 EXISTING UNDERGROUND PIPING, STRUCTURES, AND UTILITIES**

- A. The **Contractor** shall exercise extreme care before and during excavation to locate and flag various sewer, water, gas, telephone, electrical, or other utility lines not shown on the Drawings to avoid damage. Should damage occur to an existing line, the **Contractor** shall bear the costs associated with the damage and repair the line at no cost to the **County**.
- B. The **Contractor** shall note that the locations of existing underground piping structures and utilities are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping to be encountered.
- C. The **Contractor** shall notify the **County** of existing piping and utilities that interfere with new construction and shall reroute or relocate the pipeline or utility as directed before any piping and utilities not shown on the Drawings are disturbed. .
- D. The **Contractor** shall exercise care in any excavation to locate existing piping and utilities. Utilities that do not interfere with complete Work shall be carefully protected against damage. Any existing utilities damaged in any way by the **Contractor** shall be restored or replaced at the **Contractor's** expense as directed by the **County**.

#### **1.04 HAZARDOUS LOCATIONS**

The **Contractor** shall check existing wet wells, manholes, and related areas that are hazardous locations, to determine whether adequate oxygen is available whenever personnel are working in these areas. The **Contractor** shall exercise caution because explosive concentrations of sewage gas may be present and the wet well may be deficient in oxygen.

**1.05 CONNECTIONS TO WORK BY OTHERS** (Revise or delete as needed for this project)

- A. Under this Contract, and as shown on the Drawings, the **Contractor** shall construct pipelines that are to be connected to pipelines constructed by others.
- B. The **Contractor** shall connect pipelines built under this Contract to pipelines constructed by others by removing the plugs and making the connection.
- C. The **Contractor** shall lay any pipelines (under this Contract) not constructed by others to the required line and grade, terminated with a plugged connection precisely at the location indicated on the Drawings, and then backfilled and marked with a yellow stake exposed a minimum of 3 feet above grade.

**1.06 WATER FOR CONSTRUCTION PURPOSES**

The Contractor shall be responsible for any cost of water used on the Project. A water meter and backflow device shall be obtained from the DeKalb County DWM main office for recording water used for cleaning and other Work items requiring water.

**PART 2 - PRODUCTS** (NOT USED)

**PART 3 - EXECUTION** (NOT USED)

END OF SECTION 01100

## **SECTION 01200 PROJECT MEETINGS**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. The **County** shall schedule and administer a preconstruction meeting, and may schedule periodic progress meetings, and specially called meetings throughout progress of the Work. The **County** shall set the agenda for the meetings and preside at the meetings. The **Contractor** shall make physical arrangements for the meetings pursuant to the **County's** requirements. Meetings are not a pay item.
- B. Representatives of the **Contractor**, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

#### **1.02 PRECONSTRUCTION MEETING**

- A. The **County** shall schedule a Preconstruction Meeting prior to the start of construction.
- B. The Preconstruction Meeting shall be attended by the following:
  - 1. **County's** representative(s)
  - 2. **Contractor's** Project Manager and Superintendent
  - 3. Others as appropriate or required by the **County**
- C. The Preconstruction Meeting will generally have the following agenda:
  - 1. Designation of responsible personnel
  - 2. Distribution and discussion of list of major subcontractors and suppliers
  - 3. Projected construction schedule with critical Work sequencing
  - 4. Major equipment deliveries and priorities
  - 5. Procedures and processing of:
    - a. Submittals
    - b. Requests for Information (RFIs)
    - c. Change Documents
      - 1. Requests for Proposals (RFPs)
      - 2. Work Authorizations
      - 3. Proposed Change Order Requests (CORs)
    - d. Field Decisions and Clarification Memos
    - e. Applications for Payment
    - f. Change Orders
  - 6. Procedures for maintaining Record Documents (Section 01350 - Project Document Tracking and Control Systems)



7. Periodic Meeting Schedule
8. Mobilization Form Submittal – **Contractor** shall complete and submit a Mobilizations Request form after the following have been completed:
  - a. NTP Received
  - b. Preconstruction Meeting completed and minutes reviewed and accepted
  - c. Safety Plan, Construction Quality Plan, and Permit/ Easement Plan submitted to and approved by **County**

### 1.03 PERIODIC PROGRESS MEETINGS

- A. Project Progress Meetings shall be held monthly throughout the project duration. The **County** may alter the timing of, or add supplemental, scheduled periodic progress meetings, at its discretion.
- B. The Project Progress Meetings shall be attended by the following:
  1. **County's** representative(s)
  2. **Contractor's** Project Manager, Superintendent, and other appropriate representative(s)
  3. Others as appropriate or required by the **County**
- C. The Progress Meetings will generally have the following agenda:
  1. Review Work progress since last meeting
  2. Discussion of Construction Schedule for next period
  3. Status of major equipment and material deliveries
  4. Construction problems affecting progress
  5. Field observations, including Safety Report(s)
  6. Status of pending RFIs and changes
  7. Stakeholder complaints/public outreach
  8. Status of permits and easements
  9. Status of invoicing
  10. Other business

### 1.04 OTHER MEETINGS

- A. Schedule Progress Meetings

As per Section 01310 - Construction Schedule, during weekly progress meetings, the **Contractor** shall submit a Look-Ahead Schedule. This schedule shall cover four weeks: the immediate past week, the current week, and the forthcoming two weeks. This schedule shall include activities that are complete, started, incomplete or underway, or scheduled to be performed during this four-week timeframe. Results of the Progress meetings shall be reported in the Project Progress Meetings.

- B. Specially-called meetings may be requested by either party or by other affected entities. Requests shall be made through the **County**, which shall coordinate the meeting schedule. Specially-called meetings shall be held as warranted by:
1. Unforeseen developments during construction or as needed to coordinate special events, such as tie-ins or system shutdowns
  2. Concerns regarding individual project performance and adherence to the schedule of construction

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

END OF SECTION 01200

## **SECTION 01210 MEASUREMENT AND PAYMENT**

### **PART 1 – GENERAL**

#### **1.01 BASE BID**

Payment for Work under this item shall be based on the lump sum bid and shall include the labor, materials, equipment, and incidentals, including the temporary facilities, required to construct the Project as shown on the Drawings and as specified.

#### **1.02 UNIT PRICE ITEMS**

Measurement for payment for Work performed under these items shall be for permanent facilities. Payment shall be based on the actual quantity installed, and shall be based on the unit price bid for the particular item. Payments made shall include labor, materials, equipment, and incidentals required to construct the Work in accordance with the Drawings and Specifications. Any unexpended portion of these Bid Items shall be credited to the **County** on the Final Pay Estimate.

#### **1.03 ALLOWANCES**

Measurement and payment for Work performed under this item, when authorized by the **County**, the **County** shall determine the method of payment for any Work so authorized. Any unexpended portion of the Allowance amount shall be credited to the **County** on the Final Pay Estimate.

END OF SECTION 01210

## SECTION 01300 SUBMITTALS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes:
  - 1. Preparing and processing of submittals for review and action.
  - 2. Preparing and processing of informational submittals.
- B. Submit the following for the **County's** review and action:
  - 1. Shop drawings
  - 2. Product data
  - 3. Samples
  - 4. Submittals indicated as "for approval"
- C. Submit the following as informational submittals:
  - 1. Structural design information required by the contract documents
  - 2. Certificates
  - 3. Coordination drawings
  - 4. Reports
  - 5. Qualification statements for manufacturers/installers
  - 6. Submittals indicated as "for information only"
- D. Specific submittals are described in individual sections.
- E. Do not commence Work that requires review of any submittals until receipt of returned submittals with an acceptable action.
- F. Do not allow submittals without an acceptable action marking to be used for the project.
- G. Submittals shall be submitted to the **County** by a flash or jump drive. No email submittals shall be allowed for approval. One copy of each submittal shall be uploaded by the **Contractor** into the software program named by the **County**. The **County** may determine that certain submittals also shall be submitted in hard copy form.

#### 1.02 DEFINITIONS

- A. "Shop drawings" are drawings and other data prepared by the entity that is to do the Work, specifically to show a portion of the Work.
- B. "Product data submittals" are standard printed data that show or otherwise describe

a product or system, or some other portion of the Work.

- C. "Samples" are actual examples of the products or Work to be installed.
- D. "Informational submittals" are those identified in the Contract Documents as for information only.

### 1.03 FORM OF SUBMITTALS

- A. Sheets larger than 8-1/2 by 14 Inches:
  - 1. Maximum sheet size: 24 by 36 inches (except for full-size pattern or template drawings).
  - 2. Number of copies:
    - a. Submittals for review: Three blue or blackline prints
    - b. Informational submittals: Three blue or blackline prints
- B. Small sheets or pages:
  - 1. Minimum sheet size: 8-1/2 by 11 inches
  - 2. Maximum sheet size for opaque copies: 11 by 17 inches
  - 3. Number of copies shall be the same as for larger sheets
- C. Samples:
  - 1. Two sets of each shall be submitted with the original submittal.
  - 2. One set shall be returned.
  - 3. If additional sets are needed by other entities involved in Work represented by the samples, these shall be submitted with original submittal.

### 1.04 COORDINATION OF SUBMITTALS

Coordinate submittals and activities that shall be performed in sequence or of different types for the same product or system so that the **County** has enough information to properly review each submittal.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.01 TIMING OF SUBMITTALS

- A. Transmit each submittal at the time indicated on the approved construction schedule.
- B. Deliver each submittal requiring approval in time to allow for adequate review and processing time, including resubmittals if necessary; failure of the **Contractor** in this respect shall not be considered as grounds for an extension of the contract time.
- C. Deliver each informational submittal prior to start of the Work involved, unless the

submittal is of a type that cannot be prepared until after completion of the Work; submit promptly.

- D. If a submittal must be processed within a certain time in order to maintain the progress of the Work, state so clearly on the submittal.
- E. If a submittal must be delayed for coordination with other submittals not yet submitted, the **County** may, at its option, either return the submittal with no action or notify the **Contractor** of the other submittals that shall be received before the submittal can be reviewed.

### 3.02 SUBMITTAL PROCEDURES - GENERAL

- A. **Contractor** review: Sign each copy of each submittal certifying compliance with the requirements of the contract documents.
- B. Notify the **County**, in writing and at time of submittal, of points upon which the submittal does not conform to the requirements of the contract documents, if any.
- C. Preparation of submittals:
  - 1. Label each copy of each submittal with the following information:
    - a. Project name
    - b. Date of submittal
    - c. **Contractor's** name and address
    - d. Supplier's name and address
    - e. Manufacturer's name
    - f. Specification section where the submittal is specified
    - g. Numbers of applicable drawings and details
    - h. Other necessary identifying information
  - 2. Submittals to receive **County's** action marking: Provide blank space on the label or on the submittal itself for action marking: minimum 4 inches wide by 5 inches high.
- D. Transmittal of submittals:
  - 1. Submittals shall be accepted from the **Contractor** only.
  - 2. Submittals received without a transmittal form shall be returned without review or action.
  - 3. Transmittal form: The **Contractor** shall use a form acceptable to the **County**, with space provided on the form for:
    - a. Project name
    - b. Submittal date
    - c. Transmittal number
    - d. Specification section number
    - e. To:
    - f. From:
    - g. **Contractor's** name

- h. Subcontractor's and supplier's names
  - i. Manufacturer's name
  - j. Submittal type (shop drawing, product data, sample, informational submittal).
  - k. Description of submittal
  - l. Action marking
  - m. Comments
4. The **Contractor** shall complete a separate transmittal form for each submittal, also including the following:
- a. Other relevant information
  - b. Requests for additional information

### 3.03 SHOP DRAWINGS

- A. Content: Include the following information:
1. Dimensions, at accurate scale
  2. All field measurements that have been taken, at accurate scale
  3. Names of specific products and materials used
  4. Details, identified by contract document sheet and detail numbers
  5. Compliance with the specific standards referenced
  6. Coordination requirements, including the relationship to adjacent or critical Work
  7. Name of preparing firm
  8. Design calculations
- B. Preparation:
1. Reproductions of contract documents are not acceptable as shop drawings.
  2. Copies of standard printed documents are not acceptable as shop drawings.
  3. Documents shall be identified as indicated for submittals.
  4. Space for **County's** action marking shall be adjacent to the title block.

### 3.04 PRODUCT DATA

- A. Submit product data submittals for each system or unit of Work as one submittal.
- B. When product data submittals are prepared specifically for this Project (in the absence of standard printed information), submit such information as shop drawings, and not as product data submittals.
- C. Content:
1. Submit manufacturer's standard printed data sheets.
  2. Identify the particular product being submitted; submit only pertinent pages.
  3. Show compliance with properties specified.

4. Identify which options and accessories are applicable.
5. Include recommendations for application and use.
6. Show compliance with the specific standards referenced.
7. Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
8. Identify dimensions, which have been verified by field measurement.
9. Show special coordination requirements for the product.

### 3.05 SAMPLES

- A. Samples:
1. Provide samples that are the same as the proposed product.
  2. Where selection is required, provide the full set of options.
- B. Preparation:
1. Attach a description to each sample.
  2. Attach name of manufacturer or source to each sample.
  3. Where compliance with specified properties is required, attach documentation showing compliance.
  4. Where there are limitations in availability, deliveries, or other similar characteristics, attach descriptions of such limitations.
  5. Where selection is required, the first submittal may be a single set of options; after return of submittal with selection indicated, submit standard number of sets of selected item.
- C. Keep final sample set(s) at the Project Site, available for use during progress of the Work.

### 3.06 REVIEW OF SUBMITTALS

- A. Submittals for approval shall be reviewed, marked with appropriate action, and returned. Submittals are reviewed for conformance with project design concept and for compliance with standard of quality established in the Contract Documents. This review shall not relieve the **Contractor** from responsibilities for correctness of detail and dimension, nor from deviation from Contract Document requirements, except as noted and accepted in writing by the **County** at the time of submittal.
- B. Informational submittals shall be reviewed.
- C. Action markings for submittals for approval shall be as follows:
1. NO EXCEPTIONS TAKEN (NET): Indicate that the submitted item is released for manufacture
  2. MAKE CORRECTIONS NOTED (MCN): Indicate that the submitted item is released for manufacture with the submittal complying with the comments
  3. AMEND AND RESUBMIT (AAR): Indicates that the submittal shall be revised



or a new submittal complying with the comments made shall be prepared.

4. REJECTED (REJ): Indicates that the submitted item does not comply with contract requirements and that another selection shall be made and the submittal process repeated.
5. SUBMIT SPECIFIED ITEM(s) (SSI): Indicates that the submittal shall submit specified item(s) based on the specifications or as stated by the County

### 3.07 RETURN, RESUBMITTAL, AND DISTRIBUTION

- A. Submittals shall be returned to the **Contractor** by mail.
- B. The **Contractor** shall address resubmittals in the same manner as original submittals, with changes other than those requested by the **County**, clearly indicated.
  1. Exception: Transmittal number for resubmittal shall be the number of the original submittal plus a letter suffix.
  2. Resubmittals shall be submitted within 14 days of **Contractor's** receipt of rejected submittal.
- C. Distribution: The **Contractor** shall make one copy for project record documents.

END OF SECTION 01300

## SECTION 01310 CONSTRUCTION SCHEDULE (Large Project)

### PART 1 – GENERAL

#### 1.01 SCOPE

- A. Timely performance is of the essence on this Project. The **Contractor** may schedule its Work to complete the Project or any part of the Project earlier than is stipulated in the Contract and the milestone requirements. However, under no circumstances shall the **Contractor** be entitled to added compensation for delays that occur during the originally stipulated contract period.
- B. The **County** has purchased the **Contractor's** entire scheduled time period by virtue of this Contract and further stipulates that only those delays that meet the tests set forth in GR-6 of the General Requirements shall be considered for adjustment and only to the extent that they delay the Work past the originally contractually stipulated milestones.

#### 1.02 PROCEDURES

- A. The Work under this Contract shall be planned, scheduled, executed, reported, and accomplished using the Precedence Diagramming Critical Path Method (CPM). The Work required by this section includes the requirement to prepare, maintain, and update the detailed schedules as described in this section. The CPM schedules shall be prepared in such a manner as to permit the orderly planning, organization, and execution of the Work and be sufficiently detailed to accurately depict all the Work required by the Contract. **Contractor** shall resource (labor, material, and equipment) and cost load its schedule as specified herein.
- B. **Contractor** hereby agrees that in the process of preparing its baseline schedule and monthly updates, it shall consult with all key subcontractors and suppliers to obtain concurrence with the feasibility and achievability of **Contractor's** planned start dates, sequencing, durations, and completion dates. A copy of the computer input files, in PRX or XER format, shall be submitted on USB flash drive(s) containing fully detailed logs with each submittal. The procedures, technical details, and **Contractor's** participation and responsibilities shall be as hereinafter described.
- C. **Contractor** is responsible for determining the sequence of activities; the time estimates for the detailed construction activities; and the means, methods, techniques and procedures to be employed. The schedules identified herein shall represent the **Contractor's** best judgment of how it shall prosecute the Work in compliance with the Contract requirements. **Contractor** shall maintain a current and accurate schedule that is properly and timely monitored, updated, and revised as Project conditions may require and as required by the Contract Documents.
- D. **Contractor's** Construction Schedule shall be prepared using the latest version of Oracle Primavera P6 Enterprise Project Portfolio Management (P6) Release 8. Any and all costs incurred by the **Contractor** in researching, training, and/or educating

its personnel in CPM and/or P6 (or the utilization of outside consultants) shall be part of the **Contractor's** bid price and not reimbursed separately by the **County**

1. The Project Network Schedule Diagram, mathematical analyses, written narrative, and monthly updates will be reviewed by the **County**. Items will be reviewed for compliance with these Specifications and accurate reporting by the **Contractor** of Work in place, resource loading, and Work activity durations.
2. The **Contractor** shall submit to the **County** an accepted final CPM construction schedule and final schedule of values, including allowance Items, allocated to the CPM schedule activities within 45 days of Notice to Proceed. Requirements for the final CPM construction and final schedule of values are further described hereinafter. **Contractor's** Application for Payment shall not be approved until the final CPM Schedule and Schedule of Values have been accepted. The Contract Baseline Schedule submittal shall not show any progress until it is accepted by the **County**

### 1.03 STANDARDS

- A. Definition: CPM, as required by this Section, shall comply with the standards outlined in the Associated General **Contractors'** publication, "Construction Planning and Scheduling," unless specifically changed by this Section.
- B. PM Construction Schedule: The **Contractor's** CPM Construction Schedule shall include a graphic time scaled logic network, computerized tabular reports, and resource loading as described below. To be acceptable, the schedule shall demonstrate the following:
  1. A logical succession of Work from start to finish. This logical succession, when accepted, is the **Contractor's** Work plan and, contrary to normal CPM standards, is designated as early start/early finish solely to accommodate the P6 software.
  2. Clear definition of each activity including cost, manpower, equipment, and material quantities as resources. The assigned dollar value (cost loading) of each activity shall cumulatively equal the contract price.
  3. Proper interfacing of related activities including submittals, major material and equipment deliveries, procurement, required permits, and other constraints, such as equipment or manpower/crew availability. Submittal dates shall include review periods and permit schedules shall include agency review and issue dates. The narrative shall explain the rationale for all constraints, lags, and unusual relationships.
  4. Agreement with the interim milestones, schedule coordination requirements, and completion dates shall be as indicated in the Contract Documents.
- C. CPM Graphic Logic Network
  1. The CPM graphic logic network or diagram shall be in the form of a time-scaled diagram of the customary precedence diagram and may be divided into a number of separate pages with suitable notation relating the interface

points among the pages. Individual pages shall not exceed 34 inches by 44 inches. At a minimum, notation on each activity line shall include activity descriptions, total float, and durations.

2. All construction activities and procurement shall be indicated in a time-scaled format, and a calendar shall be shown on all sheets along the entire sheet length. Each activity shall be plotted so the beginning and completion dates of said activity can be determined graphically by comparison with the calendar scale. A legend shall be included to clearly distinguish between critical and non-critical path activities and progress to date.
- D. Duration: The duration indicated for each activity shall be in units of whole working days and shall represent the single best time considering the scope of the Work and resources planned for the activity including time for holidays and inclement weather. The calendar for the network shall be in calendar days. Except for certain non-labor activities, such as submittal preparation and review, curing concrete, delivering and fabrication of materials, or other activities described specifically in the Contract, activity durations shall not exceed 14 days, be less than one day, nor exceed \$50,000 in value, unless otherwise accepted by the **County**.
- E. The Interim Schedule and Contract Baseline Schedule shall show dependencies (or relationships) between each activity. Each activity shall have a successor and predecessor, except for the project start and finish milestone. The use of date constraints shall be limited to Contract milestones and Contract completion dates only, unless approved by the **County**.
- F. Contract Baseline Schedule shall contain or be able to demonstrate that the following items have been addressed: 1) the Project's name; 2) the **Contractor's** name; 3) revision or edition number; 4) activities of completed Work; e) activities relating to different areas of responsibility, such as subcontracted Work that is distinctly separated from that being done by the **Contractor** directly; 5) labor resources distinguished by craft or crew requirements; 6) equipment and material resources distinguished by equipment and material requirements; 7) distinct and identifiable subdivisions of Work, such as cleaning, pre-liner installation inspection, CIPP installation; 8) locations of Work within the contract limit lines that necessitate different times or crews to perform; 9) outage schedules for existing utility services that will be interrupted during the performance of the Work; 10) phases; and 11) interim milestones and the Contract completion dates.
- G. Computerized Tabular Reports: Reports shall include the following for each activity depicted in the schedule.
1. Activity ID
  2. Activity description
  3. Duration (original and remaining)
  4. Early start date
  5. Early finish date
  6. Total float

7. Percent complete
  8. Activity cost and resources
  9. Actual start date
  10. Actual finish date
- H. Project Information: Each report shall be prefaced with the following summary data:
1. Project name
  2. **Contractor**
  3. Type of tabulation (initial or updated)
  4. Project duration
  5. Project scheduled completion date
  6. Projected completion date

#### 1.04 ACCEPTANCE

- A. The finalized CPM Construction Schedule shall be acceptable to the **County** when it provides an orderly progression of the Work from Notice to Proceed to Final Completion in accordance with the Contract requirements, adequately defines the **Contractor's** Work plan, provides a workable arrangement for processing submittals in accordance with the requirements, and properly allocates resource values for manpower, major materials, equipment and costs to each activity (free of unbalances in resources) as determined by the **County**. Manpower may be represented as composite crews in the CPM construction schedule. The network diagram and tabular reports, when accepted by the **County**, shall constitute the CPM construction schedule until revised and re-accepted.
- B. When the CPM Construction Schedule has been accepted, the **Contractor** shall submit to the **County**:
1. Three copies of the CPM graphic logic network
  2. Three copies of a computerized, tabular report in which activities have been sequenced by early starting date
  3. Two copies of the schedule on a USB Flash Drive
  4. Three copies of the narrative
- C. The **County's** review and acceptance of the **Contractor's** CPM Construction Schedule is for conformance to the requirements of the Contract Documents only. Review and acceptance by the **County** of the **Contractor's** CPM Construction Schedule does not relieve the **Contractor** of any of its responsibility whatsoever for the accuracy or feasibility of the CPM Construction Schedule, or of the **Contractor's** ability to meet interim milestone dates and the Contract completion date, nor does such review and acceptance expressly or impliedly warrant, acknowledge, or admit the reasonableness of the logic, durations, and resource value loading of the **Contractor's** CPM Construction Schedule.

- D. The **Contractor** shall participate in a conference with the **County** to review the **County's** comments on the schedule and evaluation of the proposed network diagram, mathematical analyses, and monetary value of activities. The intent is to reach a clearer understanding of the CPM and achieve consensus on any revisions to be made. Any revisions necessary as a result of this review shall be resubmitted to the **County** within 10 calendar days after the conference. The accepted schedule shall then be used by the **Contractor** for planning, organizing, and directing the Work, and for reporting progress. If the **Contractor** desires to make changes in its method of performing the Work, it shall notify the **County** in writing, stating the reason for the changes. The **Contractor** shall receive written acceptance of the change prior to putting the change into the accepted schedule.

## 1.05 QUALIFICATIONS

- A. The **Contractor** shall demonstrate competence in the use of CPM scheduling through the submission of a fully compliant CPM construction schedule with the initial CPM submission. In the event the **Contractor** fails to so demonstrate competence in the CPM scheduling, the **County** may direct the **Contractor** to employ the services of a scheduling firm that can demonstrate competence. The **Contractor** shall comply with such directive.
- B. The **Contractor** shall use the services of a scheduler who has verifiable training and credentials in preparing and maintaining computerized CPM Construction Schedules using P6 software as specified herein. The scheduler shall qualify within the planning period.
1. Required Experience: Performed CPM scheduling on at least two completed construction projects of value at least 75 percent as large as this one and having at least 75 percent as many schedule items as this one. Scheduling of both projects shall have been done using the latest version of P6 Release 8 or equal.
  2. Submit to the **County** the following:
    - a. Descriptions of at least two projects of the value and complexity above.
    - b. Copy of a CPM schedule from one of the previous projects.
    - c. Names and telephone numbers of facility **County** representative, design engineer, and construction manager for each project.
    - d. Evidence supporting the above qualifications.

## 1.06 SUBMITTAL REQUIREMENTS

- A. Initial submittal, revisions, and monthly updates of the network diagram, mathematical analyses, and written narrative shall be submitted in three hard copies and two data copies on a USB flash drive. Submittals shall not be accepted unless they are complete as described herein.
- B. The **Contractor** shall submit the following:
1. A CPM time scaled logic network, computer generated using the latest version of P6 Release 8.

2. Computerized tabular reports:
  - a. Activity sort by early start, organized by facility or area
  - b. Predecessor/successor listing
  - c. Activity code dictionary
  - d. Resource code dictionary
3. Basis of schedule narrative describing the logic and reasoning of the schedule. The narrative shall summarize the overall approach to construction sequencing, including but not limited to: 1) anticipated lost days due to weather; 2) the rationale for all constraints, lags, and unusual relationships; 3) the definition of labor and crews; 4) a list and durations for all major pieces of equipment and resources; and 5) Work proposed to be performed on any other than single-shift 5-day workweek basis
4. Resource value allocation by activity.
5. Breakdown of specific cost amount for each component of multi-component activities in the CPM schedule in spreadsheet format (using Microsoft Excel) showing component unit quantities as well as costs. Such breakdown, when accepted by the **County**, shall constitute the schedule of values for the Project.
6. USB flash drive copy of entire schedule, narrative, and spreadsheet.

## **PART 2 – PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### **3.01 SCHEDULE ORIENTATION SESSION**

- A. **Contractor** shall, upon notification from the **County**, attend a Schedule Orientation Session relating to the schedules and reports requirements for this Contract. The Schedule Orientation Session is designed to review in detail, the objectives of the schedules and reports requirements and the requirements. **Contractor** shall arrange for its Project Manager, Superintendent, and Scheduler to attend the Schedule Orientation Session.
- B. The following items shall be discussed during the Schedule Orientation Session: 1) the procedures and requirements for the preparation of the Contract Baseline Schedule, and monthly updates by **Contractor**; b) how the requirements of the Contract Documents will be monitored and enforced by the **County**; c) how long-lead items and time requirements for the Work by subcontractors shall be identified and included in the Contract Baseline Schedule; d) testing and startup; e) coding and logic for the Contract Baseline Schedule; and f) identification and scheduling of shop drawings and other submittals.

### **3.02 SCHEDULE OF VALUES**

- A. Submittals

1. **Contractor** shall allocate a dollar value for each activity on the Contract Baseline Schedule. The dollar value for the activity shall be the cost of the Work, including labor, materials, and equipment. Allowances shall be loaded on activities specifically included for this purpose. No activity on the Contract Baseline Schedule shall exceed a value of \$50,000, unless approved by the **County**. The sum of all activity costs shall equal the Contract Price. **Contractor** shall revise the resource and value loading as necessary to gain the acceptance of the **County**
  2. The final schedule of values shall incorporate all comments associated with the **Contractor's** schedule/schedule of values submittals.
  3. Submit documentation to support the values with data that shall substantiate their correctness, as requested by the **County**.
  4. The schedule of values, when accepted by the **County**, shall be used as the only basis for the **Contractor's** applications for payment. The total price paid for mobilization shall be as approved by the **County**, but in no case shall it exceed 4 percent of the total Part I and Part 2 bid amount.
  5. The schedule of values shall be derived from the assigned progress schedule activity values and identified by activity ID.
- B. Form and content of Schedule of Values
1. Identify the schedule of values submittal with:
    - a. Title of Contract and location
    - b. Contract Number
    - c. Name and address of **Contractor**
    - d. Date of submission
  2. The **Contractor's** Schedule of Values shall list the installed value of the component parts of the Work in sufficient detail to serve as the basis for computing values for progress payments during construction.
  3. Identify accounts with the location code and area code as defined in the P6 Release 8 format and list the number and title of the respective major Section of the Specifications.
  4. All accounts in the Schedule of Values shall be derived from the activities in the progress schedule. Account data pertaining to the Schedule of Values shall, at a minimum, include the following for each account:
    - a. CPM Activity number
    - b. **County's** Standard Code listed on the Bid Schedule
    - c. Account representative quantities (linear feet of CIPP, linear feet of cleaning, tons of debris, etc.), unit costs, person-hours, item and account dollar value
    - d. WBS code (as used by Primavera Project Planner scheduling software), including location, responsibility and area codes.
    - e. Specification Section Number



- f. Account Type: Lump Sum (LS), Unit Price (UP), Allowance (AL), or Change Order (CO)
- C. Unit Price Accounts (UP): Payment for Unit Price Accounts shall be based upon actual quantities of Work performed in compliance with the Contract Documents, as verified and accepted by the **County**. Whenever the actual quantity differs from the estimated quantity on the Unit Price Accounts, the **Contractor** shall notify the **County** in writing. Quantity over- and under-runs shall be tracked on the Schedule of Values.
- D. Allowance Accounts (AL): Payment for Allowance Accounts shall be based upon invoices submitted by the **Contractor** subject to conditions and limitations of the Contract Documents. Refer to Section 01210 - Measurement, and Payment, for requirements. The Allowance shall be adjusted to the actual amount paid for such services, and adjusted by CO, either at the end of that phase of the Work or at the completion of the Work. The **County** shall have sole discretion on determining when to make adjustments to the Allowance.
- E. A new account shall be added to the Schedule of Values for approved CO work. Payment for Time and Expense CO work shall be based upon the General and Supplementary Conditions of these Specifications.
- F. The sum of all Account Values listed in the Schedule of Values shall equal the total Contract Price, excluding allowance Items.

### 3.03 MONTHLY APPLICATION FOR PAYMENT

- A. Monthly Application for Payment: **Contractor** shall provide monthly Schedule Update, monthly Payment Report, and monthly Narrative Report as its monthly Application for Payment package.
- B. Monthly Schedule Update: The **Contractor** shall submit, at intervals of 30 calendar days, an update of all activities in the as-planned CPM schedule. Update shall be created by updating the mathematical analyses and the corresponding computerized network diagram of the Schedule.
  - 1. The schedule shall be updated by entering the following: Actual start and completion dates of completed activities and the actual start date and remaining duration of activities in progress.
  - 2. The updated network diagram shall be submitted in the same format as noted in Section 1.02 - Procedures, with the calendar starting from the date of the update.
  - 3. The updated mathematical analysis shall be submitted in the same format noted in Section 1.02 - Procedures.
  - 4. The schedule update shall include an update of the cash flow projections in the same format as the original approved submittal.
  - 5. The schedule update shall state the percentage of the Work actually completed and scheduled as of the report date.

- C. The Monthly Payment Report shall show the activities or portions of activities completed during the reporting period, their total monetary values and the monetary values earned as a basis for the **Contractor's** Application for Payment. A mutually agreed upon percent complete shall be assigned to each completed and partially completed activity to be used for calculating the monetary value earned to date. For activities underway, the percent complete shall not be related to the remaining duration.
- D. A monthly narrative report shall be submitted, including, but not limited to, the following:
  - 1. Description of Work accomplished.
  - 2. Summary of safety and quality issues occurring during the month and corrective actions taken.
  - 3. **Contractor** evaluation of actual progress versus progress planned.
  - 4. If the project is behind schedule, progress along all paths with negative float, along with the reasons for the delay.
  - 5. A description of all revisions made to the schedule, including: all accepted added, deleted, and revised activities; all logic revisions; and all duration revisions.
  - 6. A description of the problem areas, current and anticipated delaying factors and their impact, and an explanation of corrective actions taken or proposed.
- E. If the **Contractor** fails to submit any of the required components of the Application for Payment, the **County** shall withhold approval of the Application for Payment until such time as the **Contractor** submits the required components.

### 3.04 PROGRESS MEETINGS AND LOOK-AHEAD SCHEDULES

- A. For the weekly progress meetings, the **Contractor** shall submit a Look-Ahead Schedule. This schedule shall cover 4 weeks: the immediate past week, the current week, and the forthcoming 2 weeks. This schedule shall include all activities that are complete, started, are incomplete or underway, or scheduled to be worked during this 4-week timeframe. This schedule shall list all activities from the accepted CPM construction schedule that are complete, are scheduled for Work during the period, are currently planned to be worked, even if out of sequence, and Work that is unfinished but scheduled to be finished. Actual start and completion dates shall be provided for the Work that has been completed the prior week; forecast start and finish dates shall be provided for the Work that is in process or upcoming.
- B. The **Contractor** shall review the Project Schedule and progress of Work and comparison with the latest approved baseline schedule. This shall include an analysis of Work accomplished since previous meeting, offsite fabrication status and issues, material delivery status and issues, actual and potential schedule slippage, problems arising from proposed changes, and other factors that might affect the Work

- C. Each activity noted above shall be identified by activity number corresponding to the accepted CPM Construction Schedule and detailed description of the activity.
- D. The Look-Ahead Schedule shall be delivered to the **County** 24 hours prior to the weekly progress meeting.
- E. The Look-Ahead Schedule shall be in a format approved by the **County**.
- F. Tabular reports for manpower and equipment resources shall be provided for and with each Look-Ahead Schedule.

### 3.05 CPM CONSTRUCTION SCHEDULE REVISIONS

- A. Contract Baseline Schedule shall not change, except as noted below:
  - 1. Significant changes in scope requiring redesign of major project elements and additional time to incorporate the changes
  - 2. Budget constraints deferring construction funding, resulting in placing the project on hold
  - 3. A significant variance in the actual construction contract NTP date and the construction NTP date at the time of award
  - 4. Any approved change orders that result in significant Project Scope Changes, as determined by the **County**
  - 5. Any baseline change shall be accompanied with a Baseline Change Directive.
- B. The **County** may direct and, if so directed, the **Contractor** shall propose, revisions to the CPM construction schedule upon occurrence of any of the following instances:
  - 1. The actual physical progress of the Work falls more than 5 percent behind the accepted CPM Construction Schedule, as demonstrated by comparison to the accepted monthly CPM Construction Schedule updates or as determined by the **County** if a current accepted CPM Construction Schedule does not exist.
  - 2. The **County** considers milestone or completion dates to be in jeopardy because of "activities behind schedule." "Activities behind schedule" are those that have not or cannot be started or completed by the dates shown in the CPM Construction Schedule, regardless of the existence of positive float on the activity.
  - 3. A CO has been issued that changes, adds, or deletes scheduled activities, or that affects the time for completion of scheduled activities.
- C. When instances requiring revision to the CPM construction schedule occur, the **Contractor** shall submit the proposed revised CPM Construction Schedule within 10 working days after receiving direction from the **County** to provide such schedule. No additional payment shall be made to the **Contractor** for preparation

and submittal of proposed revised CPM Construction Schedules. However, if the **County** accepts the proposed revised CPM Construction Schedule, it shall replace and supersede all previous CPM Construction Schedules and substitute for the next monthly CPM Construction Schedule update that would otherwise be required.

- D. Revisions to the CPM Construction Schedule shall comply with all of the same requirements applicable to the original schedule.

### 3.06 SCHEDULE RECOVERY

- A. If a revised CPM Construction Schedule accepted by the **County** requires the **Contractor** to employ additional manpower, equipment, hours of Work or Work shifts, or to accelerate procurement of materials or equipment, or any combination thereof, as schedule recovery measures to meet Contract milestones, the **Contractor** shall implement such schedule recovery measures without additional charge to the **County**.
- B. Furthermore, if efforts to recover are not deemed effective as determined by the **County**, or if prior to submittal of the recovery schedule, the **County** determines that critical milestones are in jeopardy, the **County** may direct the **Contractor** to implement the above or any other recovery efforts at no additional costs to the **County**.

### 3.07 TIME IMPACT ANALYSIS REQUIREMENT

- A. When the **Contractor** experiences delays and a time extension is requested, the **Contractor** shall submit to the **County** a written Time Impact Analysis illustrating the influence of all changes or all delays on the current Project completion date. The time impact analysis shall be constructed on an As-Built Schedule Analysis approach. The As-Built Schedule that is created shall incorporate all actual start and finish dates, actual durations of activities, and actual sequences of construction (referred to as the As-Built Logic) current as of the time the Time Impact Analysis is performed. This Time Impact Analysis shall incorporate all delays (including **County**, **Contractor**, and third party delays without exception) in the timeframe that they actually occurred with actual logic ties.

The As-Built Schedule data shall be obtained from the most recent approved monthly schedule update. The As-Built Schedule shall be created as an early start schedule with the actual start and finish dates coinciding with the early start and finish dates from the most recent approved monthly schedule update. The As-Built Schedule shall show the original activity durations equal to the actual duration and the actual logic driving all activities. The **County** shall validate this As-Built Schedule. All requests for time extension shall be based upon an analysis of this As-Built Schedule. The critical path shall be established and all **County**-caused delays on the critical path shall be identified. The time extension shall be based solely upon the cumulative duration of all **County** and third-party-caused delays that are on the critical path. Any time extensions to the project's Interim Milestone Dates, if any, shall be non-compensable time extensions only.

- B. Each Time Impact Analysis shall demonstrate the estimated time impact based on the events of delay, the status of construction at that point in time, and the event time computation of all activities affected by the change or delay. The event times used in the analysis shall be those included in the latest approved update of the project schedule, in effect at the time the change or delay was encountered.

END OF SECTION 01310

## SECTION 01350 PROJECT DOCUMENT TRACKING AND CONTROL SYSTEM

### 1.01 SCOPE

- A. The **Contractor** shall utilize the **County's** Project Document Tracking and Control System (DTCS). **(Rename as appropriate to match DWM's System)** The primary function of the system is to facilitate timely processing and approval of contract documentation in coordination with the overall Project Schedule established by these Specifications and the **Contractor**. The **Contractor** shall utilize this system for document tracking and control, including use of Lynx Photo Management software. The software will:
1. Facilitate communication between the **County** and **Contractor**.
  2. Support turnaround time with regard to responses and approvals.
  3. Provide a central location for Project information to support Project participants in performing their tasks based on the latest Project data.
  4. Provide a standard system of project administration with accountability.
- B. The **Contractor** shall utilize the web-based system that resides on the DWM server to generate documents in the proper format for submission to the **County**. The **Contractor** shall access the system using a compatible web browser from the **Contractor's** administrative field office location, and/or other locations where Work associated with the Project is being performed.
- C. The **Contractor** shall be required to generate Project documents and records utilizing the aforementioned system. The **Contractor** shall be required to transmit and submit the Project documents within the system to the **County**.
- D. The **Contractor** shall utilize a high-capacity scanner capable of scanning 11 x 17 documents, double-sided, onsite for the entire duration of the Project. Documents shall be scanned in and attached to the appropriate Contract Manager document, including submittals, shop drawings, operations & maintenance manuals, and other documents requested by the **County**.
- E. The **Contractor** shall utilize the document control system to create and maintain Project documents, including, but not limited to the following:
1. Company Directory: Addresses, Phone Numbers, Personnel Contacts, etc.
  2. Drawings Log: Current Drawing revision log
  3. Submittals Integrated with Project Schedule through Activity codes
  4. Transmittals
  5. Risk Register
  6. Requests for Information (RFIs)
  7. Requests for Proposal (RFPs)
  8. Work Authorization Requests (WARs)
  9. Work Authorizations (WAs)

10. Change Order Requests (CORs)
11. Change Orders (COs)
12. Daily Reports (Daily Diaries)
13. Field Decisions, Field Orders (FOs), and Clarification Memos
14. Notice of Non-Compliance
15. Construction issue memos
16. Punch lists
17. Meeting Minutes and agendas
18. Correspondence
19. Work Plans
20. Startup Plans
21. Equipment Operations & Maintenance training
22. Spare parts lists

F. The **Contractor** shall utilize the complete capabilities of the DTCS to meet the requirements of this Section. The **Contractor** shall provide a highly trained and experienced construction project controls person knowledgeable in construction Work sequencing, productivity, scheduling, and application of the Primavera P6 software system. This person, along with the **Contractor's** management team, shall work closely with the **County** to deliver the documents outlined in this Section.

G. Software Support

The **Contractor** shall be required to establish an internet connection using DSL or better to connect to the DTCS to permit the forwarding and receipt of documents.

1. The Contract Manager software supports and the **Contractor** shall utilize Microsoft Outlook .
2. The **Contractor** shall also provide 2 days of consulting services in the base bid for troubleshooting and maintenance of the DTCS at any location designated by the **County** or at the **Contractor's** administrative field office (if authorized by the **County**). Troubleshooting, maintenance, upgrade, configuration, and setup shall be performed by a **County** approved project management system implementation company based on a scope pre-defined by the **County**. The **Contractor** shall utilize the custom data fields, dictionaries, and coding systems as required by the **County**.

H. The **Contractor's** staff shall be required to attend a 2-day training session on the operation of the **County's** DTCS, provided by an Authorized Trainer. The **Contractor** shall provide the training session for 10 participants (fee for the Primavera Authorized Trainer). The training session shall be held at the Evans Technology, Roswell, Georgia, facility and shall be attended by the **Contractor** (limited to three participants) as well as DWM representatives (seven participants). The **Contractor** shall be responsible for the cost of training for additional members of its firm or future retraining, as may be deemed necessary by the **Contractor**.

I. The **Contractor** shall meet with the **County** within 15 days after the Contract is awarded to discuss access requirements and the **Contractor's** plan to utilize

DTCS and execute the document control functions herein.

- J. Access through the internet to the DTCS shall be operational within 30 days following the pre-construction meeting date. This shall be operational from the **Contractor's** administrative field office location.

## 1.02 COMPANY DIRECTORY

The **Contractor** and the **County** shall monitor and manage the Company Directory. The directory shall include Company name, Company abbreviation, contact names, address, phone numbers, and e-mail addresses.

## 1.03 DRAWING LOG

The **County** will maintain a log of initial "issued for construction" drawings in the DTCS. Information shall include drawing number, title and revision number. In addition to logging the initial project drawing list, the **County** will maintain a log on the DTCS of subsequent revisions to these drawings and any sketches resulting from clarification memos, RFPs, WARs, WAs, RFIs, Field Orders, and Change Orders (COs). It shall be the **Contractor's** responsibility to utilize the latest drawings and sketches in the performance of the Work.

## 1.04 SUBMITTALS/SHOP DRAWINGS

- A. Requirements: This section specifies supplemental requirements to GR-24 and Section 01300, Submittals, related to the processing of submittals and shop drawings. The **Contractor** shall utilize the DTCS to log and track submittals, as well as generate associated transmittal letters.
- B. Submittals and Product Data: A list of required submittals shall be entered into the DTCS by the **Contractor**. Submittals shall be incorporated into packages, with numbering as follows: **XXXXX-YYY**, where X denotes the applicable specification section and Y denotes the individual submittal number for that particular specification section, beginning with 001. The **Contractor** shall log and track submittals utilizing the DTCS. Each review cycle shall be entered into the DTCS. The **Contractor** shall identify as activities in the CPM schedule, to include data submittals, as well as those involving complex reviews and long lead deliveries, and procurement items required for construction activities. Submittal schedule information shall be updated monthly with the **Contractor's** updated project CPM schedule.
- C. Samples: A list of required sample submittals shall be entered into the DTCS by the **Contractor**. Sample submittals shall be identified as individual submittals within the submittal packages, with numbering as specified above.
- D. Guarantees/Warranties: A list of required Guarantee/Warranty submittals shall be entered into the DTCS by the **Contractor**. These submittals shall be identified as individual submittals within the submittal packages with numbering as specified above.
- E. Work Plans, Startup Plans, O&M Submittals, and Spare Parts: Testing, Startup,



and O&M submittals shall be entered into the DTCS by the **Contractor**. These submittals shall be identified as individual submittals within the submittal packages identified with numbering as specified above.

- F. Submittal Procedures: The **Contractor** shall prepare submittal packages utilizing the submittal numbering system, description, and packaging conventions described above. Submittals prepared by the **Contractor** that fail to follow the conventions described above, will be returned “amend and resubmit.” Should the **Contractor** determine that a submittal is required and is not covered by the listing within the DTCS, the **Contractor** shall consult with the **County** to determine the submittal number, description, and packaging that shall be required.

### 1.05 CORRESPONDENCE

The **County** shall monitor and manage the correspondence, Non-Compliance Notices, Field Decisions and Clarification Memos, and Construction Issue Memo logs. The **Contractor** shall generate Project correspondence within the DTCS, and forward the correspondence to the **County**.

### 1.06 TRANSMITTAL LOG

The **Contractor** and the **County** will monitor and manage the transmittal log. Project transmittals shall be created electronically, automatically sequentially numbered, and logged into the DTCS system as they are created. The **Contractor** shall utilize the system to create transmittals for items transmitted to the **County**, Resident Inspection Staff, and other contractors.

### 1.07 RISK MANAGEMENT PLAN AND RISK REGISTER

**Contractor** shall provide a detailed and specific description of their approach to the management of risks associated with the Project, including permitting, design, construction, and testing and the **County's** operation and maintenance of the Project. Such risks shall include those allocated under the Contract to the County as well as those allocated to the **Contractor**.

**Contractor** is to develop and maintain a Risk Management Plan that can be used by the **County** to understand and evaluate the **Contractor's** understanding of the biggest risks and challenges to the Project, and how it intends to mitigate such risks. The **Contractor** shall provide sufficient information to enable the **County** to understand this evaluation. The Risk Management Plan shall include:

- A. A detailed risk register that identifies Project risk, the likelihood of such risk manifesting itself on the Project, the severity of such risk and a mitigation plan for such risk.
- B. An identification of and elaboration upon features of the **Contractor's** Design (if Design-Build type delivery) and Construction Plan that the **Contractor** considers unique and/or innovative relative to reducing or eliminating Project risk.

The **Contractor, County and Construction Manager** will review the Risk Register during the Project's progress meetings. The **Contractor** shall update the project Risk Register and provide these updates to the project team through the DTCS system on a monthly basis.

#### 1.08 REQUEST FOR INFORMATION & ANSWERS

The **Contractor** shall be responsible for generating RFIs on the DTCS system. The **Contractor** shall notify the **County** when an RFI is submitted. The **County** will monitor and manage the RFI log. The **County** will generate an Answer document in response to each RFI and forward them to the **Contractor**. The DTCS shall track "Ball in Court" for RFIs and Answers, as well as date of original generation and response date. In addition, the RFIs shall reference the relative Specification Section and Drawings. The DTCS shall identify the date of the request and the originator, responsible party for a response and the date of the response.

#### 1.09 CHANGE DOCUMENTS

Change documents include Request for Proposals (RFPs), Work Authorization Requests (WARs), Work Authorizations (WAs), Change Orders Requests (CORs), and Change Orders (COs). Change documents will be monitored and managed by the **County** utilizing the DTCS. The DTCS shall track "Ball in Court" status of change documents.

#### 1.10 DAILY REPORTS

The **Contractor** is responsible for creating daily reports (daily diaries) utilizing the DTCS. The **Contractor** shall enter the Daily Reports into the DTCS by 10:00 a.m. of the subsequent day that the **Contractor** or any subcontractor performs Work. Daily reports shall be logged into the DTCS by the **Contractor**. The **Contractor** shall also provide one signed hard copy of daily reports on a weekly basis. Required information shall include the **Contractor**, Date, Day, Temperature, Precipitation, Sky, Wind, Work Activity, Equipment, Field Force, Visitors, Materials, and Scheduled Activities utilizing the Primavera schedule activity codes. Daily reports that fail to link Work activities to the active Project schedule shall not be acceptable.

#### 1.11 PUNCH LISTS

The **County** will monitor and manage punch lists, and will create punch lists to be forwarded to the **Contractor**. The **Contractor** shall address the punch list items that have been assigned to the **Contractor** and forward updates to the **County**. Once accepted as complete, the **County** will access the punch list in the DTCS and close it out.

#### 1.12 MEETING MINUTES AND AGENDA

The **County** will monitor and manage the meeting minute process. The **County** will forward meeting minutes to the **Contractor** electronically. The **County** will log the meeting minute items into the DTCS within 3 days of the meeting date.

#### 1.13 PROGRESS PAYMENTS /REQUISITIONS FOR PAYMENT

The **Contractor** is responsible for creating progress payment applications directly from the project scheduling software and then forwarding them to the **County** electronically, along with hard copies, by 4:00 p.m. at the end of each update/billing period. The **Contractor** shall also simultaneously provide a separate submittal of the updated progress schedule (P6 or latest version at the time of purchase), as specified in Section 01310.- Progress Payments, Schedule of values shall be developed as defined in Section 01310 within the Pay Application and shall be coordinated with the **County's** Project Manager. Maintenance of the "As-Built" record documents by the **Contractor** shall be verified before processing shall be approved. Failure of a **Contractor** to maintain project record documents, maintain current and properly prepared daily reports, or submit the project schedule update per Section 01310 shall be just cause for withholding the monthly or final payment.

#### 1.14 LYNX PHOTO MANAGEMENT SOFTWARE

The Lynx PM software shall be utilized by the **County** and the **Contractor** for the duration of the project. The daily construction photographs shall be the permanent visual record of the pre-construction conditions, daily construction site activities, and the completion of construction Work. The **Contractor** shall submit to the **County** no less than four record photos for each activity ID listed in the project schedule per the last schedule update. Applicable photos shall accompany each Pay Application.

+++END OF SECTION 01350+++

## SECTION 01380 - PHOTOGRAPHIC DOCUMENTATION

### PART 1 - GENERAL

#### 1.01 SCOPE OF WORK

The **Contractor** shall clearly document site conditions along the entire project site prior to the start and upon the completion of the project/contract by use of digital video recording. The cost of the photographic documentation shall be included in the Contract Price.

The **Contractor** shall submit monthly color progress photos along the entire line of the active Work site. Monthly record progress photographs shall be submitted with monthly payment requisition. Photographs shall document construction within roadways, rights-of-way, and easements,

The **Contractor** shall engage the services of an experienced professional photographer, approved by the **County**, to take videos, color photographs of the site as directed by the **County**.

#### 1.02 PROCEDURES

- A. The digital video recording and periodic still photographs shall be taken from identifiable reference points along the Work corridor. The same reference points shall be used through the life of the project/contract to achieve an accurate record of construction.
- B. The **Contractor** shall adequately document areas of sensitivity such as landscaped areas, lake or stream banks, or areas surrounding existing structures.
- C. Each photograph, video, or digital file of such submitted shall be dated, identified, and captioned, referencing the location, project name, project number, and pertinent information to clearly describe the scene.
- D. Recording shall be done with adequate lighting. Written authorization by the **County** to proceed with video documentation at any areas shall be done with consideration of existing environmental conditions. The designee of the **County** will accompany the photographer during the video and photo sessions.
- E. **Contractor** shall notify **County** of the time and place for video recording and digital photography. **Contractor** shall provide access and accommodation to the **County** representative during the photographic documentation process. The **County** reserves the right to reject any photograph that is not clear or definitive. Any photograph so rejected shall be subtracted from the total exposures required under this Contract.
- F. The Lynx Photo Management software shall be utilized by the **County** and the **Contractor** for the duration of the Project. The daily construction photographs shall be the permanent visual record of the pre-construction conditions, daily construction site activities, and the completion of construction Work. The **Contractor** shall submit to the **County** no fewer than four record photos for each

activity ID listed in the project schedule per the last schedule update. Applicable photos shall accompany each Pay Application.

### 1.03 VIDEOS

- A. The project corridor shall be documented by digital video recordings.
- B. All digital video recordings shall be in color and shot with a 1080 HD (1920 x 1080) using MPEG-4 program stream encoding (ISO-IEC 14496-14) camera and shall be a clear, stable image with no interference. Black and white recordings shall not be accepted. The video shall be provided on Digital Video Discs (DVDs) or USB Flash Drives and shall conform to currently recognized standards for video recordings. Specifically, the recordings shall be in focus and properly illuminated with good contrast. The picture shall be clear and possess accurate color levels and balance (tint) without outside interference. All recordings shall also include a clear and distortion free audio narration that clearly identifies all, important features of the project, including stationing along pipeline construction, and is in synchronization with the video. The recording shall bear a continuous "date and time stamp" that is electronically recorded by the camera.
- C. A record of the contents of each recording shall be provided on a run sheet, identifying each chapter segment of the recording. The run sheet shall be provided in paper copy as well as on the flash drive or hard drive.

### 1.04 PHOTOGRAPHS

- A. The file format for digital photographs shall be Tagged Image File Format (TIFF).
- B. Digital cameras shall produce records with true optical resolution. Images shall not be resized or interpolated to a higher resolution from a lower resolution.
- C. Photographic images shall be provided as 8 bit per channel RGB color images.
- D. Digital camera files shall be captured as 12 megapixel files or greater in size with a minimum pixel array of 5,000 pixels by 3,500 pixels.
- E. Three color 8" x 10" (or 8-1/2" x 11") glossy prints of each photograph shall be produced. One set of digital images shall be furnished on a DVD along with the glossy prints. All disks shall have a label that includes project information as well as the date, and whether these are pre-construction, construction, or post-construction photographs.
- F. The prints shall have indelibly printed on their reverse side the information listed below. The same information shall be printed on a sheet of paper in a clear sleeve to be included in the binder holding the prints and DVD+R. The information shall also be provided in a Microsoft Excel spreadsheet that shall be included on the DVD. Additionally, this information shall be embedded in each digital photo file using the IPTC/XMP (International Press Telecommunications Council's/Adobe Extensible Metadata Platform) Standard.
  - 1. Project number

2. Project name
  3. Contract number and description
  4. Photo number
  5. View and description, indicating:
    - a. Location of camera
    - b. General description of what the photograph represents
  6. Whether this is a pre-construction, construction or post-construction photograph
  7. Date picture was taken
  8. Name of photographer
  9. **County** witness
- G. The **Contractor** shall transmit one electronic copy of each photo to the Engineer for use in preparing descriptions. The photos with descriptions will be returned to the **Contractor** for printing and mounting.
- H. The prints shall be suitably mounted and labeled in loose-leaf type binders with protective covers for the prints. The binders shall be equipped with a pocket suitable for storing the DVDs. The materials shall meet the requirements of ISO 18902:2013 "Imaging materials - Processed Imaging Materials – Albums, Framing and Storage Materials."

#### 1.05 SUBMITTALS

- A. The **Contractor** shall furnish to the **County** for approval one copy of the video digital file taken of existing conditions prior to start of the Project and before the submittal of the first request for payment. The video digital file shall be assembled upon completion of the Project and shall be furnished to the **County** for approval prior to submittal of the final request for payment. No pay requests shall be processed before the submittal of the respective video records.
- B. **Contractor** shall utilize **County** Lynx Photo Management Software to submit videos and progress photographs in electronic format for the duration of the project in accordance with Section 01350.

#### PART 2 - PRODUCTS (NOT USED)

#### PART 3 – EXECUTION

### 3.01 USE OF PHOTOGRAPHS AND VIDEOS

- A. Upon their creation, the photographs, prints, DVDs, and videos resulting from the Work under this Contract shall become the exclusive property of the **County**.
- B. Neither the **Contractor** nor the photographer nor the video recording firm shall retain any rights pertaining to the photographs, prints, CDs/DVDs, or videos, nor shall they reproduce or otherwise publish or disseminate any of the photographs, aerials, prints, CDs/DVDs, or videos taken under this Contract without the prior written approval of the **County**.
- C. The photographs, prints, CDs/DVDs, and videos shall be considered "Work made for hire" under applicable provisions of the Copyright Act, and the **County** shall be the copyright owner thereof and of the aspects, elements, and components thereof in which copyright protection might subsist. To the extent that such materials do not qualify as "Work made for hire," the **Contractor** hereby irrevocably transfers, assigns, and conveys exclusive copyright ownership in and to such materials to the **County**, free and clear of any liens, claims, or other encumbrances. The agreements between the **Contractor** and the photographer and videotaping firm shall include a provision containing these requirements.

+++END OF SECTION 01380+++

## SECTION 01400 Contractor's Work Quality

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. **Contractor's** Quality Assurance / Quality Control Requirements
- B. Experience and Qualifications of Supply and Service Companies
- C. Quality of Materials, Equipment, and Work
- D. Defective Work, Equipment, or Materials
- E. Welding Certification and Welding Inspection
- F. **Contractor's** Surveyor
- G. Field Measurements

#### 1.02 PAYMENT

No separate payment shall be made for performing any Work of this Section and costs thereof shall be deemed incidental to the Work and included in the prices bid for the Contract, unless otherwise specified in the Detailed Specifications.

#### 1.03 RELATED SECTIONS

Detailed Specification 01410.

#### 1.04 DESCRIPTION

- A. Experience and Qualifications of Supply and Service Companies: The **Contractor** shall require subcontractors, materialmen, and equipment service providers to comply with the accepted Health, Safety & Security Plan, and Quality Assurance requirements under the Contract.
- B. Quality of Materials, Equipment and Work
  - 1. All materials, fixtures, fittings, supplies, and equipment furnished under this Contract shall be new, of standard first grade quality, of the best workmanship, correctly designed, and be intended for the use for which they are offered. Materials or equipment that, in the opinion of the **County**, are inferior or of a lower grade than indicated, specified or required, or are obsolete, shall not be accepted.
  - 2. All Work of assembly, installation, and construction shall be done in a neat, first-class, and skillful manner. If the quality of the material, fixtures, fittings, supplies, equipment or Work required by the Drawings does not agree with that required by the Specifications, the better quality shall be supplied. In asking for prices on, or placing orders for, materials, fixtures, fittings, supplies, and equipment intended for use or installation under this



Contract, the **Contractor** shall provide the manufacturer or dealer with such complete information from these Specifications as may in any case be necessary. In every case, it shall quote in full to each such manufacturer or dealer the text of this subparagraph, as well as the text of such other portions of the Specifications, as are appropriate.

3. At all times while Work under this Contract is being performed, the **County** shall have access to all parts of the **Contractor's** or manufacturers' plants or other locations where the forgings, plates, materials, fixtures, fittings, supplies, or any other articles required under this Contract are manufactured, assembled, tested, or inspected. The **County** shall be permitted to witness any or all of these operations, as the **County** may deem necessary to determine that the Work is being performed in accordance with the Specifications and the approved shop drawings. The cost, if any, of providing such access shall be considered part of the normal expense of conducting business and therefore non-reimbursable.
4. The **County** shall be furnished with full facilities for inspecting the Work and ascertaining that it is being done strictly in accordance with the requirements of the Specifications, Drawings, and the intent of this Contract.
5. The **Contractor** shall provide a suitable space for the **County** and the **County's** authorized representatives conveniently located near that part of each plant where materials or equipment to be furnished under this Contract are being manufactured, assembled, or shop tested. Each space shall be furnished with facilities for the making and the keeping of records and correspondence. The reasonable use of a photocopier, telephone, and fax shall be provided, as required by the **County**. Long distance communications shall be made using **County** mobile telephones at no cost to the **Contractor**.

6. The **Contractor** shall give notice in writing to the **County** sufficiently in advance of its intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction in the event that the **County** intends to perform Witness Shop Testing and Quality Assurance Inspection. Such notice shall contain the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the **County** will: decide upon its intent to inspect the Work or notify the **Contractor** that inspection will be waived. In those instances where the **County** inspector(s) arrive at the agreed-upon location, at the agreed-upon date and time, and find that the article(s) to be inspected are not ready for inspection, the inspector(s) shall return to their home office and the expenses incurred shall be borne by the **Contractor** and shall be deducted from the **Contractor's** next payment, unless otherwise determined by **County**.
  7. Inspection of the Work by the **County** is made solely for the benefit of the **County**. The inspection of the Work shall not relieve the **Contractor** of any of its obligations to fulfill the Contract as herein prescribed, and defective Work shall be repaired or replaced at the **Contractor's** sole expense.
- C. Defective Work, Equipment, or Materials
1. All defective or imperfect Work, equipment, or materials furnished by the **Contractor** that is discovered before the Final Acceptance of the Work, or during a warranty period, shall be removed immediately even though it may have been overlooked by the **County** and approved for payment. The **Contractor** shall repair such defect, without compensation, in a manner satisfactory to the **County**.
  2. Unsuitable materials and equipment shall be rejected, notwithstanding that such defective Work, materials, and equipment may have been previously overlooked by the **County** and accepted or approved for payment.
  3. If any workmanship, materials, or equipment are rejected by the **County** as unsuitable or not in conformity with the Specifications or Drawings, the **Contractor** shall promptly replace such materials and equipment with acceptable materials and equipment at no additional cost to the **County**. Equipment or materials rejected by the **County** shall be tagged as such and shall be immediately removed from the site.
  4. The **County** may order tests of imperfect or damaged Work equipment, or materials to determine the required functional capability for possible acceptance, if there is no other reason for rejection. The cost of such tests shall be borne by the **Contractor**, and the nature, tester, extent, and supervision of the tests shall be as determined by the **County**. If the results of the tests indicate

that the required functional capability of the Work, equipment, or material was not impaired, the Work, equipment, or materials may be deemed acceptable, in the discretion of the **County**. If the results of such tests reveal that the required functional capability of the questionable Work, equipment, or materials has been impaired, then such Work, equipment, or materials shall be deemed imperfect and shall be replaced. The **Contractor** may elect to replace the imperfect Work, equipment, or material instead of performing the tests.

5. If, in the making of any test, it is ascertained by the **County** that the material or equipment does not comply with the Contract, the **Contractor** will be notified thereof, and it will be directed to refrain from delivering said material or equipment, or to promptly remove it from the site or from the Work and replace it with acceptable material without cost to the **County**. Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Contract, the **Contractor** shall immediately proceed to furnish the named material or equipment.

D. Welding Certification and Welding Inspection

1. For Work performed within the limits of the **County**, field welding required under this Contract shall be performed by certified welders:
  - a. Certification for Welding – For field and shop welding, the following welding qualification provisions shall apply:
    - i. For field welding, required permits and safety plans shall be in place and adhered to.
    - ii. For shop welding: welding shall be performed in accordance with the relevant Work-specific requirements in the Specifications and Drawings.
    - iii. If existing certification is not approved or not submitted, then the welders/welding shop/tack welders shall be qualified in accordance with the above procedures and tests, as administered by an inspection agency approved by the **County**. The costs associated with the required tests for certification and/or retests, if any, shall be borne by the **Contractor**. The **County** shall be given a notice of not less than 5 business days prior to such tests and may elect to witness any or all of these tests. The costs associated with witnessing these tests shall be borne by the **Contractor**.
  - b. Any deviation from the above shall not be permitted without a written waiver from the **County** or its designee.
2. All welding, including welder certification, shall be performed in accordance with the requirements of AWS D1, ASME IX (and the applicable construction code), and as approved by the **County**.

3. Welding inspection shall be in accordance with the latest rules of the American Welding Society, and the following shall apply:
  - a. All welds shall be inspected visually in accordance with Section V of the ASME Code.
  - b. All stainless steel partial penetration groove welds shall be inspected and approved by means of Liquid Penetrant Examination (PT) in accordance with Appendix 8 of Section VIII, Division 1 of the ASME Code. Welds failing the inspection shall be made good and re-inspected by PT.
  - c. All carbon steel partial penetration groove welds shall be inspected and approved by means of Magnetic Particle Examination (MT) in accordance with Appendix 6 of Section VIII, Division 1, of the ASME Code. Welds failing the inspection shall be made good and re-inspected by MT.
  - d. On full penetration welds, both the root pass and the final weldment shall be inspected by means of MT or PT as applicable.
  - e. Unless otherwise approved, inspection of welds shall be conducted by an inspection agency approved by the **County**.
  - f. Unless waived by the **County**, full-penetration welds shall be inspected by Radiographic Examination (RT) in accordance with ASME Code, Section VIII, Division I, Paragraph UW-51.
  - g. The **County** may elect to witness any or all of the welding inspection. Notice shall be given to the **County** not less than 5 business days prior to welding and inspection of those items specifically designated by the **County**. The costs associated with the welding inspection by the **County** inspectors and any additional testing required by the **County** shall be borne by the **Contractor**.

E. **Contractor's** Surveyor

1. The **Contractor** shall retain the services of a licensed land surveyor to perform survey Work, including, but not limited to, establishing line and grade, in advance of the construction; and to perform other surveying services for the Work included under the Contract. The surveyor shall be subject to the approval of the **County**. Survey drawings shall be submitted to the **County** for approval.
2. The **Contractor** shall erect, install, and maintain survey platforms, targets, benchmarks, and similar facilities to be used by the **County** in the performance of its inspection services; and shall perform survey Work required before, during, and after construction.

F. Field Measurements

1. The **Contractor** shall take the necessary measurements in the field to determine the exact dimensions for Work and verify pertinent data and dimensions shown on the Contract Drawings.

1.05 QUALITY ASSURANCE / QUALITY CONTROL PLAN

- A. The **Contractor** shall establish and execute a Quality Assurance/Quality Control (QA/QC) Plan for the services and equipment that will be supplied under this Contract. The plan shall provide the **Contractor** with adequate measures for verification and conformance to defined requirements by its personnel and subcontractors, fabricators, suppliers, and vendors. The **County's** review and acceptance of the **Contractor's** QA/QC plan shall not relieve the **Contractor** from any of its obligations for the performance of the Work. The **Contractor's** assigned QA/QC personnel are subject to the **County's** review and continued acceptance. No Work covered by the QA/QC plan shall start until the **County's** written acceptance of the **Contractor's** QA/QC plan has been obtained.
- B. The **Contractor's** quality control organization with lines of authority and reporting structure. The Construction Quality staffing shall include a Construction Quality Manager and a supporting staff as applicable to the project. The reporting structure shall clearly provide for direct reporting access by the Construction Quality Manager to the **Contractor's** principal officers.
- C. The names, qualifications (in resume format), duties, responsibilities, and authorities of the Construction Quality Manager and staff. Construction Quality personnel qualifications (in resume form), including copies of each member's applicable certificates of training and/or qualification.
- D. A copy of a letter to the Construction Quality Manager signed by a principal officer of the **Contractor's** firm that describes the responsibilities of the Construction Quality Manager and establishes his/her authority, including authority to stop Work that does not conform with the Contract Documents. The Construction Quality Manager shall issue letters of direction to other Construction Quality staff outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the CIP PMT and CM.
- E. A copy of a letter to the Construction Quality Manager signed by a principal officer of the **Contractor's** firm that describes the responsibilities of the Construction Quality Manager and establishes his/her authority, including authority to stop Work that does not conform with the Contract Documents. The Construction Quality Manager shall issue letters of direction to other Construction Quality staff outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the CIP PMT and CM.

## 1.06 SUBMITTALS

- A. Within 15 days after the commence Work date given in the Notice to Proceed (NTP), the **Contractor** shall provide its QA/QC plan to the **County** for approval. At a minimum, the plan shall consist of the following quality elements:
1. Responsibilities
  2. Management and Production Instructions
  3. Material Control
  4. Marking and Material Identification
  5. Setup and Operational Procedures
  6. Non-Conformances
  7. Painting
- B. Additionally, when required by the **County**, the **Contractor** shall submit the following information prior to his entering into a supply or service subcontracts:
1. Contract number, supplies or services to be provided and a general description of the proposed item(s), such as trade name, type, etc.
  2. The name and address of the manufacturer or service company and the location of the plant where supplies will be manufactured and tested as required, or at which the services will be performed.
  3. Experimental and test data required to support the claimed performance of the supplies.
  4. A description of the testing plant, including the hydraulic, electrical and other facilities, in sufficient detail to show that the plant is adequately equipped for performing the tests, if such testing is required.
  5. All additional information that the **County** may deem necessary in order to determine the ability of the supply or service company to produce the item as called for by the Specifications.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION

### 1.01 Quality Deficiency and Non-Conformance Documentation

Quality Deficiencies and Non-Conformances are defined as documentation, drawings, material, and equipment or Work not conforming to the specified requirements or procedures. The **County** will implement and maintain a three-tier non-conformance process, as follows:

- A. Deficiency Notice (DN) – The lowest level of non-conformance reporting. It documents the deficient condition and provides the **Contractor** 72 hours, or before the Work is covered, to correct the issue before it is elevated to the next

level of reporting. It is issued for deficiencies that can be easily corrected without an engineering resolution. An example would be incorrect formwork dimensions observed prior to placement of concrete.

- B. Non-Conformance Report (NCR) - The second level is an NCR that documents deficient Work that has not been corrected, or that would require an engineering solution to remedy. NCRs shall be answered in writing by the **Contractor** within 24 hours. The **Contractor** shall not be allowed to progress items for payment if it has open NCRs.
- C. Corrective Action Request (CAR) – The highest level of non-compliant reporting. CARs are issued for programmatic and repetitive non-compliant conditions. Examples of CARs would be using the wrong drawing revision in the field (programmatic) and a condition where the same type of Work has multiple NCR issues over a short period of time (repetitive). CARs cannot be answered by the **Contractor** field staff. They shall be transmitted to the **Contractor's** senior level management for response.

+++END OF SECTION 01400+++

## **SECTION 01410 TESTING LABORATORY SERVICES**

### **PART 1 - GENERAL**

#### **1.01 SCOPE**

- A. Testing shall be performed to determine that materials provided for the Work meet the specified requirements, in accordance with the requirements of the Specifications. Such testing includes, but is not necessarily limited to:
1. Cement
  2. Aggregate
  3. Concrete
  4. Concrete block
  5. Pipe
  6. Steel and metals
  7. Welding
  8. Soil compaction
  9. Bituminous pavement
- B. Requirements for testing may be described in various sections of these Specifications; where no testing requirements are described, however if the **County** decides that testing is required to demonstrate compliance with specified material or performance standards, the **County** shall require testing to be performed under current pertinent standards for testing.
- C. Employment of a testing laboratory shall in no way relieve the **Contractor** of its obligation to perform Work meeting the requirements of the Contract.
- D. The independent testing laboratory shall be selected and paid by the **Contractor** and approved in writing by the **County** before any testing services are performed.
- E. The **Contractor** shall pay directly for the services of the independent testing laboratory, approved by the **County**, for all testing required under this Contract.

#### **1.02 LABORATORY DUTIES**

- A. Cooperate with **County** and **Contractor**.
- B. Provide qualified personnel promptly on notice.
- C. Perform specified inspections, sampling, and testing of materials and methods of construction.
1. Comply with specified standards, ASTM, other recognized authorities and as specified.
  2. Ascertain compliance with requirements of Contract Documents.
- D. Promptly notify the **County** and **Contractor** of irregularity or deficiency of Work that is



observed during performance of services.

- E. Promptly submit three copies (two copies to **County** and one copy to **Contractor**) of report of inspections and tests in addition to those additional copies required by the **Contractor**, including:
  - 1. Date issued
  - 2. Project title and number
  - 3. Testing laboratory name and address
  - 4. Name and signature of inspector
  - 5. Date of inspection or sampling
  - 6. Record of temperature and weather
  - 7. Date of test
  - 8. Identification of product and Specification section
  - 9. Location of Project and test
  - 10. Type of inspection or test
  - 11. Results of test
  - 12. Observations regarding compliance with Contract Documents
- F. Perform additional services as required.
- G. Laboratory shall not be authorized to:
  - 1. Release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Approve or accept any portion of Work.

### 1.03 CONTRACTOR RESPONSIBILITIES

- A. Cooperate with laboratory personnel; provide access to Work and/or manufacturer's requirements. **Contractor** shall not charge for downtime due to required testing.
- B. Provide to laboratory, preliminary representative samples, in required quantities, of materials to be tested.
- C. Furnish copies of mill test reports.
- D. Furnish required labor and facilities:
  - 1. To provide access to Work to be tested
  - 2. To obtain and handle samples at the site
  - 3. To facilitate inspections and tests
  - 4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory
- E. Notify laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.
- F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample or samples shall be selected by such

laboratory or agency or the **County** and shipped to the laboratory by the **Contractor** at **Contractor's** expense.

- G. Copies of the correspondence between the **Contractor** and testing agencies shall be provided to the **County**.

#### 1.04 QUALITY ASSURANCE

Testing, when required, shall be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

#### 1.05 PRODUCT HANDLING

Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in progress of the Work.

#### 1.06 FURNISHING MATERIALS

The **Contractor** shall be responsible for furnishing all materials necessary for testing.

#### 1.07 CODE COMPLIANCE TESTING

Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the **Contractor**, unless otherwise provided in the Contract Documents.

#### 1.08 CONTRACTOR'S CONVENIENCE TESTING

Inspection or testing performed exclusively for the **Contractor's** convenience shall be the sole responsibility of the **Contractor**.

#### 1.09 SCHEDULES FOR TESTING

A. Establishing Schedule

1. The **Contractor** shall, by advance discussion with the testing laboratory, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be onsite to provide the required testing.
2. Provide all required time within the construction schedule.

- B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

#### 1.10 TEST AND CERTIFICATIONS

- A. General: As a minimum, the following tests shall be performed and the following certifications provided:

1. Cement: Certified test results by cement manufacturer or by independent laboratory shall be furnished as required by the **County**.
  2. Aggregate and Mortar Sand: Certified test results by aggregate producer or by independent laboratory shall be furnished as required by the **County**.
  3. Concrete
    - a. At least five standard 6-inch cylinders shall be taken each day for each 100 cubic yards or fraction thereof for each class of concrete used.
    - b. The number of cylinders, the point of sampling, and the method of securing the samples shall be determined by the **County**.
    - c. All samples shall be taken to the testing laboratory for laboratory curing.
    - d. Two of the laboratory cured samples shall be tested at 7 days, two samples tested at 28 days; one sample held in reserve.
    - e. Test all concrete in accordance with ASTM C31-69, C39-71, and C-172.
    - f. Slump Tests
      - (1) Perform slump tests on the job in accordance with ASTM standards.
      - (2) One slump test shall be performed for each 25 cubic yards of concrete.
      - (3) More slump tests shall be performed if deemed necessary by the **County**.
    - g. Perform air entrainment tests in accordance with the following standards:
      - (1) Field tests - ASTM C 173
      - (2) Laboratory tests - ASTM C 231
- B. Precast and Concrete Block for Buildings
1. Block and precast may be visually inspected on the site by the **County**.
  2. The **County** reserves the right to have the concrete block tested by an independent laboratory.
- C. Steel and Miscellaneous Metal: Reinforcing steel, structural steel, and miscellaneous metal may be inspected visually on the site by the **County**.
- D. Welding: 1 percent minimum of all structural welds during construction shall be inspected either visually or by an independent laboratory as required by the **County**.
- E. Compaction of Earthwork
1. The compaction shall be tested by the **County** or by an independent laboratory.
  2. The testing shall be performed in a manner in accordance with these Specifications.
- F. Bituminous Concrete: The material testing for the bituminous concrete shall be performed by an independent laboratory as deemed necessary by the **County**.

## 1.11 TAKING SPECIMENS

Unless otherwise provided in the Contract Documents, all specimens and samples for tests shall be taken by the testing laboratory or the **County**.

## 1.12 TRANSPORTING SAMPLES

The **Contractor** shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

+++END OF SECTION 01410+++

## SECTION 01550 TRAFFIC REGULATION

### PART 1 - GENERAL

#### 1.01 SCOPE

The Work specified in this section includes the provision of products, permits, services, procedures, and personnel by the **Contractor** to effect traffic control during the Work.

#### 1.02 TRAFFIC CONTROL MANAGER REQUIREMENTS

- A. The **Contractor** shall designate a qualified individual as the Traffic Control Manager (TCM) who shall be responsible for selecting, installing, and maintaining traffic control devices in accordance with the Plans and Specifications and the Manual of Uniform Traffic Control Devices (MUTCD). A written resume documenting the experience and credentials of the TCM shall be submitted and accepted by the **County** prior to beginning any Work that involves traffic control. The TCM shall be available on a 24-hour basis to perform his or her duties. If the Work requires traffic control activities to be performed during the daylight and nighttime hours, it shall be necessary for the **Contractor** to designate an alternate TCM. An alternate TCM shall meet the same requirements and qualifications as the primary TCM and be accepted by the **County** prior to beginning any traffic control duties. The TCM's traffic control responsibilities shall have priority over other assigned duties.
- B. As the representative of the **Contractor**, the TCM shall have full authority to act on behalf of the **Contractor** in administering the Traffic Control Plan. The TCM shall have appropriate training in safe traffic control practices in accordance with Part VI of the MUTCD. In addition to the TCM, other individuals making decisions regarding traffic control shall meet the training requirements of Part VI of the MUTCD. The TCMs shall supervise the initial installation of traffic control devices. The **County**, prior to the beginning of construction, will review the initial installation. Modifications to traffic control devices as required by sequence of operations or staged construction shall be reviewed by the TCMs.

### PART 2 - PRODUCTS

#### 2.01 SIGNS, SIGNALS, AND DEVICES

- A. The **Contractor** shall provide post-mounted and wall-mounted traffic control and informational signs as specified and required by local jurisdictions.
- B. The **Contractor** shall provide automatic traffic control signals as approved by local jurisdictions.
- C. The **Contractor** shall provide traffic cones and drums, and flashing lights as approved by local jurisdictions.
- D. The **Contractor** shall provide flagmen equipment as required by local jurisdictions.

## PART 3 - EXECUTION

### 3.01 PERMITS

- A. The **Contractor** shall obtain permits from authorities having jurisdiction over road closures before closing any road. The **Contractor** shall use forms provided by authorities having jurisdiction (DeKalb County Department of Public Works, Georgia Department of Transportation, etc.).
- B. The **Contractor** shall either fax or hand carry any permit applications to the DeKalb County Department of Public Works. Permit applications shall indicate the time (in days); length (in feet); the number of lanes; and the purpose of the closure.
- C. All permits are approved for operations during off-peak hours, 9:00 a.m. to 4:00 p.m., unless special approval is received from the **County**.
- D. Operations between the hours of 6:00 p.m. and 10:00 p.m. and Saturdays, and Sundays shall require approval by the **County**.
- E. Full street closure permits shall require 96 hours' advance notice prior to road closure. The following additional information shall be provided by the **Contractor** prior to approval:
  - 1. The recommended detour route with signage and Traffic Management Plan as per the MUTCD.
  - 2. A copy of the resident and/or business notification letters about the closure. The residents/businesses located between the detour routes shall be notified about the closure at least 5 business days prior to the proposed closure.
- F. The DeKalb County Department of Public Works will return full road closure permit applications to the **Contractor**. The Fire Chief, Chief of Police, DeKalb Hospital, MARTA, and the DeKalb County Board of Education shall be notified in writing at least 72 hours before commencing road closure activities.

Lane closure permits are issued during operating hours Mondays through Fridays. The DeKalb County Department of Public Works will return lane closure permit applications to the **Contractor**. The **Contractor** shall provide a minimum of 48-hour notice prior to closure. The **Contractor** shall continuously maintain the safety of the traveling public during lane closures in accordance with the requirements of the MUTCD and as stipulated by public officers.

### 3.02 PREPARATION OF TRAFFIC CONTROL PLANS

The Traffic Control Plan drawings included with the Contract Documents shall only be considered as a guide and are not intended to contain the traffic regulation details that shall be required by the specifications, permitting agencies, and the MUTCD. The **Contractor** shall develop detailed staging and traffic control plans for performing specific areas of the Work including, but not limited to: requirements for certified flagmen, additional traffic control devices, traffic shifts, detours, paces, lane closures, or other activities that disrupt traffic flow. The **Contractor** shall submit these plans in accordance with the Specifications to receive final approvals from permitting agencies and provide required traffic control devices as required by both the permitting agencies and these specifications at no additional cost to the **County**.

### 3.03 CONSTRUCTION PARKING CONTROL

- A. The **Contractor** shall control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and **County's** operations.
- B. The **Contractor** shall monitor parking of construction personnel's vehicles in existing facilities and maintain vehicular access to and through parking areas.
- C. The **Contractor** shall prevent parking on or adjacent to access roads or in non-designated areas.

### 3.04 MAINTENANCE OF TRAFFIC

- A. Whenever and wherever, in the **County's** opinion, traffic is sufficiently congested or public safety is endangered, the **Contractor** shall furnish uniformed officers to direct traffic and to keep traffic off the highway area affected by construction operations.
- B. When the Contract requires the maintenance of vehicular traffic on an existing road, street, or highway during the **Contractor's** performance of Work that is otherwise provided for in the Plans and these Specifications, the **Contractor** shall keep such road, street, or highway open to traffic and shall provide such maintenance as may be required to safely accommodate traffic. The **Contractor** shall furnish, erect, and maintain barricades, warning signs, flagmen, and other traffic control devices in conformity with the requirements of the Georgia Department of Transportation and other local jurisdictions. The **Contractor** shall also construct and maintain in a safe condition any temporary connections necessary to ingress to and egress from abutting property or intersecting roads, streets, or highways. The **Contractor** shall maintain traffic in accordance with any traffic control plans furnished with and made a part of the Plan assembly.
- C. The **Contractor** shall make its own estimate of labor, materials, equipment, and incidentals necessary for providing the maintenance of traffic as specified in this section.
- D. Unless specified in the Plans or these Specifications, and subject to the approval of the **County**, the cost of maintaining traffic specified in this section shall be considered incidental to the Work and no separate measurement or payment shall be made.

### 3.05 UNIFORMED POLICE OFFICER FOR TRAFFIC CONTROL

- A. The **Contractor** shall provide uniformed police officers to regulate traffic when construction operations encroach on public traffic lanes, as approved by the **County**.
- B. Officers shall be currently employed by a local jurisdiction, be in full uniform and have full arrest power while working.
- C. Officers shall be employed and paid by the **Contractor**.
- D. Officers' shall be responsible for directing traffic within the construction site.

### 3.06 FLAGMEN

The **Contractor** shall provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroaches into public traffic lanes.

### 3.07 FLASHING LIGHTS

The **Contractor** shall use flashing lights during hours of low visibility to delineate traffic lanes and to guide traffic.

### 3.08 HAUL ROUTES

- A. The **Contractor** shall consult with authorities and establish public thoroughfares to be used for haul routes and site access.
- B. The **Contractor** shall confine construction traffic to designated haul routes.
- C. The **Contractor** shall provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

### 3.09 ROAD CLOSURES ON COUNTY ROADS

- A. No street, road, or highway shall be closed without the permission of the owner of any street, road, or highway and the fire department having jurisdiction. Prior to closing a street, road, or highway, signs shall be posted for a minimum of 7 days prior to actual closing, forewarning of the imminent closing. The **County** shall determine the information to be placed upon the signs by the **Contractor**. Where traffic is diverted from the Work, the **Contractor** shall provide materials and perform Work for the construction and maintenance of required temporary roadways, structures, barricades, signs, and signalization.
- B. To obtain approval to close a road or street maintained by the **County**, the **Contractor** shall proceed as follows:
  - 1. The **Contractor** shall obtain approval of the traffic plan from the **County**. The traffic plan shall be in accordance with the requirements of the Georgia Department of Transportation and DeKalb County.
  - 2. The **Contractor** shall obtain a utility permit.
  - 3. The **Contractor** shall apply in writing to the **County** and obtain a permit to close the road on a specific date.
  - 4. The **Contractor** shall obtain a permit from the **County** before posting closure signs. Signs shall be posted for 7 days prior to the first day of closure. Signs shall be acceptable to the **County**.
  - 5. The **County** will handle emergency road closures.

### 3.10 PROCEDURES FOR TRAFFIC DETOUR ROUTE PLAN

- A. The **Contractor** shall provide a sketch map to the **County**, showing the traffic detour route plan. The sketch map need not be drawn to scale, but should resemble, as closely as possible, the actual location. The sketch map shall be drawn in a manner so as to provide emergency agencies a better understanding of



the detour for quick response. The sketch map shall include directional arrows showing the flow of traffic.

- B. The **Contractor** shall erect "Road Closed Ahead" signs before the start point of the detour indicating the name of the street closed.
- C. The **Contractor** shall erect "Detour" signs with appropriate directional arrows at intersection along the detour route until the end of the detour, when the traffic is back to the original street.
- D. The **Contractor** shall erect an "End Detour" sign at the end of the detour.
- E. The **Contractor** shall erect an accessory plate indicating the name of the street being detoured to accompany each "Detour" and "End Detour" sign.
- F. The **Contractor** shall apply appropriate traffic control measures in accordance with the requirements of the MUTCD and **County** codes.

### 3.10 BARRICADES AND WARNING SIGNS

- A. The **Contractor** shall furnish, erect, and maintain barricades and warning signs for hazards necessary to protect the public and the Work. When used during periods of darkness, such barricades, warning signs, and hazard markings shall be suitably illuminated or reflectorized.
- B. For vehicular and pedestrian traffic, the **Contractor** shall furnish, erect, and maintain barricades, warning signs, lights, and other traffic control devices in conformity with the requirements of the Georgia Department of Transportation and DeKalb County.
- C. The **Contractor** shall furnish and erect barricades and warning signs for hazards prior to commencing Work that requires such erection and shall maintain the barricades and warning signs for hazards until their dismantling is directed by the **County**.

### 3.11 REMOVAL

The **Contractor** shall remove equipment and devices when no longer required and repair damage caused by installation.

END OF SECTION 01550

## **SECTION 01640 MANUFACTURERS' SERVICES**

### **PART 1 - GENERAL**

#### **1.01 SCOPE OF WORK**

The **Contractor** shall require manufacturers to provide Operations & Maintenance Manuals, onsite services of experienced technicians, and trainers to provide the services detailed hereinafter.

The **Contractor** shall submit approved Operations & Maintenance Manuals at least 30 days prior to scheduling training of **County** Operations Personnel.

#### **1.01 DEFINITIONS**

- A. Reference Section 01650 - Facility Startup.
- B. Man-Day: One person for 8 hours within regular **Contractor** working hours.

#### **1.02 SUBMITTALS**

- A. Submittals shall be made in accordance with the requirements of the General Conditions of the Contract Documents. In addition, the following specific information shall be provided:
  - 1. Preliminary Training Plan: Submit within 120 days after Notice to Proceed.
  - 2. Training Schedule: Submit not less than 30 days prior to start of equipment installation and revise as necessary for acceptance.
  - 3. Final Training Plan: Submit after training coordination meeting.
  - 4. Training Materials:
    - a. Submit written outlines of proposed training sessions not less than 30 days prior to scheduled training.
    - b. Furnish complete training materials, to include operation and maintenance data as required in this section. Provide 12 extra copies of training materials to **County**.
    - c. Quality Control Submittals: When specified in the individual Specifications, submit:
      - i. Qualifications and resume of Manufacturer's Representative performing specified services
      - ii. Manufacturer's authorized representative's signature on the Certificate of Proper Installation form appended to this section

#### **1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE**

- A. Authorized representative of the manufacturer shall be factory trained and experienced in the technical applications, installation, operation, and maintenance of

respective equipment, subsystem, or system. Additional qualifications may be specified elsewhere.

- B. Representative is subject to acceptance by the **County**. No substitute representatives shall be allowed unless prior written approval by the **County** has been given.

#### 1.04 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

- A. Manufacturers' qualified representative services are required for operating equipment furnished under the Contract. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, additional time required to perform the specified services shall be considered incidental Work.

- B. Schedule manufacturer's services to avoid conflicting with other onsite testing or other manufacturer's onsite services.

1. Determine that conditions necessary to allow successful testing have been met before scheduling services.
2. Only those days of service approved by the **County** shall be credited to fulfill the specified minimum services.
3. If specified, manufacturer's onsite services shall be 8 hours minimum and include as a minimum:
  - i. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of **Contractor's** assembly, erection, installation, or application procedures.
  - ii. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish written approval of installation.
  - iii. Revisiting the Site as required to correct problems and until installation and operation are acceptable to **County**.
  - iv. Resolution of assembly or installation problems attributable to, or associated with, the respective manufacturer's products and systems.
  - v. Assistance during functional and performance testing and startup demonstration, and until product acceptance by the **County**.
  - vi. Training of **County's** personnel in the operation and maintenance of respective product as required.
  - vii. Completion of Manufacturer's Certificate of Proper Installation (form enclosed at end of this section) with applicable certificates for proper installation and initial, interim, and final test or service.

viii. Additional requirements that may be specified elsewhere.

### 1.05 TRAINING PLAN

A. Preliminary Training Plan: If specified, and within 120 days after Notice of Award, the **Contractor** shall submit for each proposed course:

1. Title and objectives
2. Training schedule
3. Prerequisite training and experience of attendees
4. Recommended types of attendees (e.g., managers, **County's** operators, maintenance)
5. Course description and outline of course content
6. Duration
7. Location (e.g., training center or site)
8. Format (e.g., lecture, self-study, demonstration, hands-on)
9. Instruction materials and equipment requirements

B. Final Training Plan: the **Contractor** shall submit the following after training coordination meeting, if specified:

1. Updated versions of course descriptions from preliminary training plan
2. Who will attend each course
3. Schedule of training courses including dates, durations, and locations of each class
4. Detailed course schedule for each day showing time allocated to each topic
5. Resumes of instructors providing the training

### 1.06 TRAINING SCHEDULE

A. The **Contractor** shall list specified equipment and systems with respective manufacturers that require training services of manufacturers' representatives and show:

1. Estimated dates for installation completion
2. Estimated training dates to allow for multiple sessions when several shifts are involved

B. The **Contractor** shall adjust training schedule to train appropriate personnel as deemed necessary by **County**, and to allow full participation by manufacturers' representatives. The **Contractor** shall adjust schedule for interruptions in operability of equipment.

C. The **Contractor** shall coordinate with Progress Schedules as specified in Special Conditions and Section 01650 - Facility Startup.

### 1.07 TRAINING COUNTY'S PERSONNEL

A. The **Contractor** shall furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with the **County**, and familiar with Operations & Maintenance manual information.

- B. The **Contractor** shall furnish manufacturers' representatives for detailed classroom and hands-on training to **County's** personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
- C. Manufacturer's Representative shall be familiar with plant operation and maintenance requirements as well as with specified equipment.
- D. Pre-startup Training:
  - 1. The **Contractor** shall coordinate training sessions with **County's** operating personnel and manufacturers' representatives.
  - 2. Training shall be complete at least 7 days, but no more than 14 days, prior to actual startup.
- E. Post-Startup Training:
  - 1. Respective manufacturers' representatives shall furnish and coordinate training of **County's** operating personnel.
  - 2. Manufacturers' representatives shall be required for a follow-up visit of one day.
- F. Taping of Training Sessions:
  - 1. The **County** will provide audio/video taping of training sessions.
  - 2. Manufacturer's trainer shall provide appropriate props, such as charts, photographs, and samples in large enough sizes to be videotaped.
  - 3. Trainers shall provide their full cooperation to the **County's** video technician.

## 1.08 SUPPLEMENTS

The supplements listed below, following "END OF SECTION," are part of this Specification.

- A. Manufacturer's Certificate of Proper Installation
- B. Manufacturer's Instruction Certification Form

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION (NOT USED)

+++END OF SECTION 01640+++

**DEKALB COUNTY (Spec Writer - Insert Project Name)**  
**MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION**

COUNTY \_\_\_\_\_

EQPT SERIAL NO: \_\_\_\_\_

EQPT TAG NO: \_\_\_\_\_

EQPT/SYSTEM: \_\_\_\_\_

PROJECT NO: \_\_\_\_\_

SPEC. SECTION: \_\_\_\_\_

SITE LOCATION: \_\_\_\_\_

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

|                          |   |
|--------------------------|---|
| <input type="checkbox"/> | Installed in accordance with Manufacturer's recommendations.  |
| <input type="checkbox"/> | Inspected, checked, and adjusted.   |
| <input type="checkbox"/> | Serviced with proper initial lubricants.  |
| <input type="checkbox"/> | Electrical and mechanical connections meet quality and safety standards.  |
| <input type="checkbox"/> | All applicable safety equipment has been properly installed.  |
| <input type="checkbox"/> | System has been performance tested, and meets or exceeds specified performance requirements (when complete system of one manufacturer). |
| <input type="checkbox"/> | System has been started up and meets or exceeds performance requirements.   |

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate his equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: \_\_\_\_\_

Manufacturer: \_\_\_\_\_

By Manufacturer's Authorized Representative: \_\_\_\_\_

(Authorized Signature)

RFP# 17500472 DBS for Scott Candler Water Treatment Plant  
HSPS Header and Transfer Pumps Replacement  
DEKALB COUNTY (Spec Writer - Insert Project Name)  
MANUFACTURER'S INSTRUCTION CERTIFICATION FORM

Contract No.: \_\_\_\_\_

Specification Section: \_\_\_\_\_

Equipment Name: \_\_\_\_\_

Contractor: \_\_\_\_\_

Manufacturer of Equipment Item: \_\_\_\_\_

The undersigned manufacturer certifies that a service expert has instructed the **County** operating personnel in the proper maintenance and operation of the equipment designated herein.

Operations Check List (check appropriate spaces)

Startup procedure reviewed \_\_\_\_\_  
Shutdown procedure reviewed \_\_\_\_\_  
Normal operation procedure reviewed \_\_\_\_\_  
Others: \_\_\_\_\_  
\_\_\_\_\_

Maintenance Check List (check appropriate spaces)

Described normal oil changes (frequency) \_\_\_\_\_  
Described special tools required \_\_\_\_\_  
Described normal items to be reviewed for wear \_\_\_\_\_  
Described preventive maintenance instructions \_\_\_\_\_  
Described greasing frequency \_\_\_\_\_  
Others: \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Date                      Manufacturer

\_\_\_\_\_  
Signature of Authorized Representative

\_\_\_\_\_  
Date                      Signature of County's Representative

\_\_\_\_\_  
Date                      Signature of Contractor's Representative

## **SECTION 01700 CONTRACT CLOSEOUT**

### **PART 1 - GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.02 SUMMARY**

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures
  - 2. Final completion procedures
  - 3. Warranties
  - 4. Final cleaning
  - 5. Repair of the Work
  - 6. Specific closeout and special cleaning requirements for the Work in those Sections

#### **1.03 SUBMITTALS**

Submit the following shop drawings in accordance with Section 01300:

- A. Product Data: For cleaning agents.
- B. **Contractor's** List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.
- D. Certificates of Release: From authorities having jurisdiction.
- E. Certificate of Insurance: For continuing coverage.
- F. Field Report: For pest control inspection.
- G. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.



#### 1.04 SUBSTANTIAL COMPLETION PROCEDURES

- A. **Contractor's** List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (**Contractor's** punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following: a minimum of (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting **County** unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
  3. Submit closeout submittals specified in individual Divisions 02 through 16 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Submit maintenance material submittals specified in individual Divisions 02 through 16 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by the **County**. Label with manufacturer's name and model number where applicable.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain the signature of an authorized **County** representative for receipt of submittals.
  5. Submit test/adjust/balance records.
  6. Submit sustainable design submittals required in Division 01 (sustainable design requirements Section) and in individual Division 02 through 16 Sections.
  7. Submit changeover information related to **County's** occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following: a minimum of (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise the **County** of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver the keys to **County**. Advise the **County's** personnel of changeover in security provisions.

3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct **County's** personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section - Training.
  6. Advise **County** of changeover in heat and other utilities.
  7. Participate with **County** in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Remove labels that are not permanent labels.
  10. Complete final cleaning requirements, including touchup painting.
  11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, **County** will either proceed with inspection or notify **Contractor** of unfulfilled requirements. **County** will prepare the Certificate of Substantial Completion after inspection or will notify **Contractor** of items, either on **Contractor's** list or additional items identified by **County**, that shall be completed or corrected before certificate shall be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection shall form the basis of requirements for final completion.

#### **1.05 STARTING OF SYSTEMS**

- A. Conform to the requirements of sections within Division 1.
- B. Coordinate schedule for start-up of various equipment and systems.
- C. Notify **County** (seven) days prior to start-up of each item.
- D. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- E. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

- F. Verify wiring and support components for equipment are complete and tested.
- G. Execute start-up under supervision of applicable manufacturer's representative, **Contractors'** personnel, and **County** in accordance with manufacturers' instructions.
- H. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, approve equipment or system installation prior to start-up, to supervise placing equipment or system in operation, and to train the **County's** staff.

#### **1.06 DEMONSTRATION AND INSTRUCTIONS**

- A. Conform to the requirements of sections 01640 and 01650
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within (six) months.
- C. Utilize operation and maintenance manuals as the basis for instruction. Review contents of manual with **County's** personnel in detail to comprehensively explain the operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at a scheduled and agreed time, for each piece of equipment at each designated location. Time shall be acceptable to the **County**.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual sections.

#### **1.07 TESTING, ADJUSTING, AND BALANCING**

- A. **County** shall appoint and employ services of independent firm to perform testing, adjusting, and balancing to ensure smooth and unhindered equipment operation. **Contractor** shall pay for services and funds shall be within the contract price.

Reports shall be submitted by independent firm to **County** indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

#### **1.08 PROJECT RECORDS DOCUMENTS**

- A. The **Contractor** shall record any actual revisions to the Work and maintain one set of the following Project Record Documents on Site:
  - 1. Contract Drawings, Specifications, and Addenda.
  - 2. Change Orders, Field Orders, and other written notices.
  - 3. Shop drawings, Product data, and samples.

4. Records of surveying and layout Work.
  5. Project Record Drawings.
- B. The **Contractor** shall record information on the Project Record Documents concurrent with construction progress and store these documents separately from the documents used for construction.
1. The **County** will supply a set of Contract Drawings. The **Contractor** shall mark thereon each revision as the Work progresses in order to produce a set of as-built drawings.
  2. The **Contractor** shall note any changes made during construction by any of the **Contractor's** forces or those of any subcontractors.
  3. The **Contractor** shall dimension the locations of buried or concealed Work, especially piping and conduit, with reference to exposed structures.
  4. The **Contractor** shall note the installed locations of concealed service lines on the Site or within the structure by reference from the center line of the service to the structure column lines, to other main finished faces, or to other structural points that are easily identified and located in the finished Work.
  5. Certificates of Substantial Performance and Total Performance shall not be issued until as-built drawings are complete and submitted, and the **Contractor** has fully satisfied the requirements for Substantial Performance and Total Performance of the Work.
- C. For Project Record Documents and Record Shop Drawings, the **Contractor** shall legibly mark each item to record actual construction, including:
1. Field changes of dimensions and details.
  2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  3. Measured locations of internal utilities and appurtenances that are concealed in construction, referenced to visible and accessible features of the Work.
  4. Any Changes in the Work from the contract documents.
  5. The location of concealed mechanical services and electrical main feeders, junction boxes, and pullboxes.
- D. Upon completion of the Work, the **Contractor** shall prepare two CD-ROM sets of the Record Shop Drawings and an index.
- E. The **Contractor**-prepared Record Shop Drawings CD-ROM index shall identify the **County's** project number, project name, and Contract number and the contents of each CD in the format listed below.

1. The index shall include the following columns of information for each Record Shop Drawing:
  - a. CD number
  - b. Specification Section number
  - c. Specification title
  - d. Shop drawing transmittal number
  - e. Shop drawing equipment description including preselected Equipment vendor and supplier.
2. The index shall be printed by the following two sorts:
  - a. Primary sort: Specification Section number. Secondary sort: shop drawing transmittal number.
  - b. Primary sort: CD number. Secondary sort: Specification Section number.
3. The index shall be generated using Microsoft Excel software. A copy of the electronic file shall be furnished to the **County**.
4. The **Contractor** shall provide a set of Project Record Documents on CD-ROM in an electronic format compatible with the plant CD-ROM record standards. All drawings are to be provided electronically on CD-ROM in both AutoCAD (latest version) and Adobe Acrobat PDF (latest version). Also provide a set of CD-ROMs containing the software implemented on this project, including standard software and custom application software. Also provide a set of CD-ROMs containing the various programming tools and files necessary for maintenance, editing, backing up, and restoring programmable equipment implemented on this project.

#### **1.09 EQUIPMENT INVENTORY SPREADSHEET**

- A. As part of the **County's** asset management program, the **Contractor** shall complete each field for the equipment inventory file for each piece of equipment and device provided under this Contract, as a requirement for Substantial Performance. An electronic format of the equipment inventory spreadsheet shall be provided on a CD by the **Contractor**.

#### **1.10 EQUIPMENT PREVENTIVE MAINTENANCE SPREADSHEET**

- A. As part of the **County's** asset management program, the **Contractor** shall complete each field for each piece of equipment and device provided under this Contract, as a requirement for Substantial Completion. The **Contractor** shall transfer the manufacturer's recommended preventive maintenance tasks and frequencies into the spreadsheet. An electronic format of the equipment inventory spreadsheet shall be provided on a CD by the **Contractor**.

### 1.11 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting them with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

### 1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to location as directed by **County**; obtain receipt prior to final payment.
- C. Crate in containers designed for prolonged storage suitable for handling with hoisting equipment containers:
- D. Stencil on containers:
  - 1. Manufacturer/supplier name
  - 2. Unit name
  - 3. Spare part name
  - 4. Manufacturer catalog number
  - 5. Other identifying information
  - 6. Precautionary information

### 1.13 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
  - 1. Submit a final Application for Payment according to Division 1.
  - 2. Certified List of Incomplete Items: Submit certified copy of **County's** Substantial Completion inspection list of items to be completed or corrected (punch list),

endorsed and dated by **County's** representative. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of the request, the **County** will either proceed with inspection or notify the **Contractor** of unfulfilled requirements. The **County** will prepare a final Certificate for Payment after inspection or will notify the **Contractor** of construction that shall be completed or corrected before the certificate will be issued.
- C. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete has been completed or corrected.

#### 1.14 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction, including, if necessary, areas disturbed by the **Contractor** that are outside the limits of construction.
1. Organize the list of spaces in sequential order, starting with exterior areas first, and proceeding from the lowest floor to highest floor.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name
    - b. Date
    - c. Name of **Contractor**
    - d. Page number
  4. Submit list of incomplete items in the following format:
    - a. PDF electronic file. **County** will return annotated file.
    - b. Three paper copies. **County** will return two copies.

#### 1.15 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of the **County** for designated portions of the Work where commencement of warranties other than the date of Substantial Completion is indicated, or when a delay in submittal of warranties might limit the **County's** rights under warranty.

- B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by **County** during the construction period, by separate agreement with **Contractor**.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Contract Documents.
  - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper or as directed by the **County**.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of **Contractor**.
  - 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS:**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the Georgia Code of Regulations maximum allowable volatile organic compound (VOC) levels.

## **PART 3 - EXECUTION**

### **3.01 FINAL CLEANING**

- A. General: Perform final cleaning as directed by the **County**.
- B. Pest Control: Comply with pest control requirements in Division 01, Section, Temporary Facilities and Controls. Prepare and submit a written report to the **County**.



- C. Construction Waste Disposal: Comply with waste disposal requirements in Division 1 and meet local laws.

### **3.02 REPAIR OF THE WORK**

- A. Complete repair and restoration operations before requesting inspection for determining Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration. Do not paint over "UL" or other required labels and identification, including mechanical and electrical nameplates. Remove any paint that has been applied to required labels and identification.
  - 3. Replace parts that have been subjected to operating conditions during construction that could impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

### **3.03 ADJUSTING**

Adjust operating products and equipment to ensure smooth and unhindered operation.

END OF SECTION - 01700

## SECTION 01800 MAINTENANCE

### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. **Contractor** shall maintain stored and installed equipment and materials until Final Acceptance of the Work as defined by the General Requirements. Work includes, but is not limited to:
1. Perform required maintenance.
  2. Repair and maintain protective coatings.
  3. Repair and replace scratched and damaged materials and equipment.
  4. Maintain and operate new equipment placed into service.
- B. Work, per this Section, starts on the date the equipment and materials are received and continues until the Date of Final Acceptance.
- C. **Contractor** shall monitor equipment storage, and subsequently, the operation and material functionality on a continual basis during the specified time period. Deterioration of materials or malfunction of equipment shall be followed by swift repair action to minimize the damage. Such repair shall include repair and technical services by an independent contractor if the **County** deems the **Contractor's** efforts are ineffective at correcting the problem.
- D. All costs for maintenance and repair of stored and installed equipment and materials, including costs from an independent contractor, during the specified time period shall be the sole responsibility of the **Contractor**.

+++END OF SECTION 01800+++

## SECTION 02000 SITE WORK

### PART 1 - GENERAL

#### 1.01 DESCRIPTION

These general site work requirements apply to all site work operations. Refer to specification sections for specific product and execution requirements.

#### 1.02 QUALITY ASSURANCE

- A. Comply with all applicable local, state, and federal requirements regarding materials, methods of work, and disposal of excess and waste materials.
- B. Obtain and pay for all required inspections, permits, and fees. Provide notices required by governmental authorities.

#### 1.03 PROJECT CONDITIONS

- A. Locate and identify existing underground and overhead services and utilities within contract limit work areas. Provide adequate means of protection of utilities and services designated to remain. Repair utilities damaged during site work operations and all cost associated with the damaged utility are the **Contractor's** expense.
- B. Arrange for disconnection disconnect and seal or cap all utilities and services designated to be removed or abandoned before start of site work operations. Perform all work in accordance with the requirements of the applicable utility company or agency involved.
- C. When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the **County** and the applicable utility company immediately to obtain procedure directions. Cooperate with the applicable utility company in maintaining active services in operation.
- D. Locate, protect, and maintain benchmarks, monuments, control points, and project engineering reference points. Reestablish disturbed or destroyed items at the **Contractor's** expense.
- E. Perform site work operations and the removal of debris and waste materials to assure minimum interference with streets, walks, and other adjacent facilities.
- F. Obtain governing authorities' written permission when required to close or obstruct street, walks, and adjacent facilities. Provide alternate routes around closed or obstructed traffic ways when required by governing authorities.
- G. Control dust caused by work. Dampen surfaces as required. Comply with pollution control regulations of governing authorities.
- H. Protect existing buildings, paving, and other services or facilities on site and adjacent to the site from damage caused by site work operations. Cost of repair and all cost associated with the damages including restoration of damaged items are at Contractor's expense.

- I. Protect and maintain streetlights, utility poles and services, traffic signal control boxes, curb boxes, valves and other services, except items designated for removal. Remove or coordinate the removal of traffic signs, parking meters, and postal mailboxes with the applicable governmental agency. Provide for temporary relocation when required to maintain facilities and services in operation during construction work.
- J. Preserve from injury or defacement all vegetation and objects designated to remain.

## **PART 2 - PRODUCTS**

### 2.01 MATERIALS AND EQUIPMENT

Materials and equipment: As selected by the **Contractor**, except as indicated in contract documents.

## **PART 3 - EXECUTION**

### 3.01 PREPARATION

- A. Examine the areas and conditions under which site work is performed. Do not proceed with the work until unsatisfactory conditions are corrected.
- B. Consult the records and drawings of adjacent work and of existing services and utilities that may affect site work operations.

+++ END OF SECTION 02000 +++

## SECTION 02020 USE OF EXPLOSIVES

### PART 1 - GENERAL

#### 1.01 SCOPE

- A. This section covers the use of explosives and blasting. Limit the use of explosives in the work to the practicable minimum by utilizing mechanical means of excavation to the maximum feasible extent. Blasting shall be limited and shall be approved by the **County**.
- B. Related Work Specified Elsewhere:
1. Section 01380 - Photographic Documentation
  2. Section 02000 - Site Work
  3. Section 02140 - Dewatering
  4. Section 02200 - Earthwork
  5. Section 02324 - Trenching and Trench Backfill
- C. Definitions:

Controlled blasting is excavation of rock in which the blast hole size, spacing, depth and burden, and the charge size, depth and delay sequence are carefully planned and controlled to excavate the rock to the required limits. Controlled blasting minimizes overbreak and fracturing of the rock beyond the design lines.

#### 1.02 GENERAL

- A. Perform blasting only with permits from the appropriate jurisdictional agencies. Necessary permits include an Explosives License issued by the Georgia Safety Fire Commissioner, and users' permits obtained from DeKalb County. Obey all local, State, Federal and other Governmental regulations applying to transportation, handling, storage and use of explosives, including the requirements of the DeKalb County Fire Department, the State of Georgia and applicable regulations of the Occupational Safety and Health Administration.
- B. Perform blasting operations in trenches, shafts and other open excavations only during daylight hours. Perform blasting operations only during the hours 7:00 a.m. to 10:00 p.m. No blasting shall be performed on Saturdays, Sundays or on the public holidays observed by the **County**. If an emergency prevents a blast being fired during the permitted hours and the holes are loaded, the blast shall be fired as soon as safety allows. In the event that blasting is found necessary outside the permitted hours, the **Contractor** shall receive approval from the County and inform local residents within hearing and vibration range and the jurisdictional agencies prior to firing.
- C. Furnish, install and operate at each site where blasting is being performed, using electric methods of initiation, an approved short-range, high accuracy thunderstorm monitor and lightning warning system. System shall be constantly

be monitoring the electrical field of the atmosphere for pre-emptive notification of nearby lightning strikes. The system shall connect to system lighting and audible devices to alert of incoming lightning activity. The system shall have the capability to send test messages and email alert notifications. The system shall have adequate provisions for transmitting alarms from the device to all locations where preparation for blasting, using electric initiation, are in progress. Install and maintain the system in accordance with the manufacturer's recommendations. Test the entire monitoring and alarm system for satisfactory operation at intervals not exceeding two (2) weeks, and suspend blasting operations until any defects have been corrected.

- D. Employ the services of a blasting consultant, satisfactory to the **County** and experienced in predicting and evaluating the effects of blasting on nearby structures, such that vibration levels at these structures do not exceed a level that will damage the structures or their contents, or cause undue alarm to their occupants. Employ the blasting consultant to plan and evaluate blasting operations.
- E. Preconstruction Video Survey and Inspections
1. **Contractor** is expressly advised that the protection of buildings, structures, bridges, utilities, and related work adjacent and in the vicinity of its operations, wherever they may be, is solely its responsibility. Existing condition inspection of buildings, bridges or other structures in the immediate vicinity of any blasting operations shall be performed by and be the responsibility of the **Contractor**. The inspection corridor shall extend within a 500-foot radius of all proposed blasting operations. The **Contractor** shall retain an independent consultant, specializing in preconstruction surveys, to conduct the required inspections. The video survey and inspections shall conform to the requirements of Section 01380 - Photographic Documentation.
  2. Prior to the start of blasting operations, the **Contractor** shall have the independent preconstruction survey consultant, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by blasting or other operations. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the owners or agents of adjacent buildings, structures, facilities, etc., and to the satisfaction of the **County**. This does not preclude conforming to the requirements of the insurance underwriters. Two (2) copies of surveys, photographs, videos, reports, etc., shall be submitted to the **County**.
  3. The cost of all pre-construction video surveys and inspections shall be borne by the **Contractor**.

### 1.03 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of the General Requirements Conditions of the Contract Documents and Section 01300. In

addition, the following specific information shall be provided:

1. At least sixty (60) days prior to commencement of blasting operations, a copy of all applicable licenses and permits for the purchase, transportation, storage and use of explosives.
2. At least sixty (60) days prior to commencement of blasting operations, a Blasting Monitoring Plan that shall include:
  - i. Name of the Blasting Vibration Consultant who shall be responsible for establishing the monitoring program and interpreting the vibration readings;
  - ii. Names of the trained personnel provided to operate the monitoring equipment; the type and model of blasting seismograph proposed for use;
  - iii. Number and location of proposed monitoring stations; the methods to be used to coordinate blast detonation with recording of the blast; and
  - iv. Steps to be taken if blasting vibrations exceed or seem likely to exceed the vibration limits.
  - v. Name, make, and model of the short-range, high accuracy thunderstorm monitor and lightning warning system, including details on the alert warning system.
3. At least sixty (60) days prior to any blasting operation, provide:
  - i. Initial blast design for that location including number, location, diameter, depth and inclination of drill holes on a scale drawing of the excavation or heading face;
  - ii. Type and weight of explosive in each hole; delay arrangement showing delay period in each hole; total weight of explosive in the blast and maximum charge per delay; the method of detonation; calculations of peak particle velocities and air blast overpressures; and the precautions to be taken to prevent flying rock or other debris.
  - iii. Manufacturers' data sheets shall be provided for all explosives and accessories to be used.
  - iv. Name and qualifications of the independent preconstruction survey consultant.
  - v. Preconstruction Video Survey and Inspections.
  - vi. Written controlled blasting techniques.
4. At least thirty (30) days prior to any blasting operation, provide Blasting Safety Plan including:
  - i. Health and Safety requirements of all governing legislation;
  - ii. Certificates from all regulating agencies and relevant insurance companies;
  - iii. Outline of safety training program for the **Contractor's** and **County's** personnel;
  - iv. Communication and warning procedures;
  - v. Samples of all report and inspection forms; and lightning protection plan.

5. Within the working day following each blast, the **Contractor** shall provide the blasting records and information for each blast detonated:
  - a. A complete description including the location, date and exact time of the blast; name and signature of person in responsible charge of loading and firing and their blaster permit number; details of each blast as listed above for the initial blast design and any departures from the blast design; comments regarding any misfires, unusual results or unusual effects; any other records required by applicable regulations; and the name and signature of the person preparing the report.
  - b. The monitoring record including the location, date, and exact time of the blast; general weather conditions; the locations of seismographs and type of ground on which they were located, instrument identification and their distances from the blast; the measured peak particle velocities; air blast overpressure records, if appropriate; and the name and signature of the observer.

#### 1.04 QUALITY ASSURANCE

##### Work Experience:

- A. The blasting consultant shall have at least ten (10) years of blasting experience. The blasting consultant shall be on call throughout the entire period that blasting is performed and shall be available at the site within two (2) days at any time that the blasting consultant's services may be necessary as determined by the **County**.
- B. Blasting supervisors shall have a minimum of five (5) years' experience in supervising the loading and firing of charges for the excavation of shafts and trenches and shall have all necessary licenses and permits required by the appropriate jurisdictional agencies.

### **PART 2 - PRODUCTS**

#### 2.01 MATERIALS

- A. Use only non-nitroglycerine explosives.
- B. Store explosives and detonators in the manufacturers' boxes with date codes to allow the **County** to determine their age of the materials. All explosives and detonators used in the work shall be less than one (1) year old. Blasting products shall not be brought onto the site if the date codes are missing. When in the **County's** opinion any blasting product is either of excessive age or in a deteriorated condition, that material shall not be used until its age or quality can be shown to be satisfactory.

#### 2.02 EQUIPMENT

- A. Use dust suppressant measures with air-powered or air-flush rock drilling equipment.



- B. Wet down the muck pile after blasting to control dust during mucking operations.

## **PART 3 - EXECUTION**

### **3.01 GENERAL**

- A. Firing shall be permitted only after the proper precautions have been taken for the protection of all persons, work, and property.
- B. The following limits on peak particle velocities and air blast overpressure, or such lower limits as established by the **Contractor's** Blasting Vibration Consultant, shall apply:
  - 1. At structures and utilities in the vicinity of blasting operations, the peak particle velocity resulting from blasting shall not exceed:
    - a. Frequency < 3 Hz: 0.2 inches/second.
    - b. Frequency 3 - 10 Hz: 0.5 inches/second.
    - c. Frequency 10 - 40 Hz: varying linearly 0.5 to 1.0 inches/second.
    - d. Frequency > 40 Hz: 1.0 inches/second.

The above limits are adopted from modified blasting level criteria given in U.S. Bureau of Mines Recommendations RI-8507.
  - 2. In the permanent concrete work, the peak particle velocities resulting from blasting shall not exceed two (2) inches per second.
  - 3. At the nearest structure subject to damage from air blast overpressure, the mean peak air blast overpressure shall not exceed 0.01 psi. Measure readings for peak particle velocity in three (3) orthogonal directions by equipment approved by the **County** that is either continually recording or triggered by a preset level of vibration. Determine particle velocity in each frequency range by spectral analysis. Zero crossing method to determine frequency is not acceptable.
- C. Blasting within fifty (50) feet of permanent concrete work may be permitted only after approval of the **Contractor's** plans showing the relative positions of the concrete, the area to be blasted and the blasting technique to be employed. All concrete work shall be protected by limiting the size of blasts, covering blasts and by other means until it is established that there is no danger of damage caused by either vibration or flying rock.
- D. Exercise all possible care in drilling and blasting operations to ensure the stability of the remaining rock and to keep overbreak to a minimum. Written controlled blasting techniques to be used shall be submitted to the **County** for approval.
- E. At each work site where blasting is being performed, erect signboards of adequate size stating that blasting operations are taking place in the work site and such signs shall be clearly visible at all points of access to the work site.

- F. Monitor the first blast at each location as a test case, and modify the initial blast design for that location if the monitoring record indicates that the vibration and air blast overpressure limits were exceeded or may be exceeded in subsequent blasts. Resubmit the blast design to the **County**. Continue vibration recording and air blast overpressure monitoring for every blast, and further adjustments to the blast design shall be made when the records indicate vibration or air blast overpressure in excess of the established limits.
- G. Before the firing of any blast where flying material may result in damage to persons, property, or the work, cover the rock to be blasted with suitable matting and overburden to prevent flying debris. After a blast is fired, remove all loose and shattered rock or other loose material that may endanger the structure or the workers, and make the excavation safe before continuing with the work. Carry out similar checks on previously excavated sections at least every 48 hours and recheck the support system, tightening lagging, and blocking, and adding rock dowels, mesh and other support measures as required. Before drilling new blast holes, thoroughly clean the face and examine the face for holes containing undetonated explosive.
- H. In the event that damage occurs due to blasting work, suspend all blasting immediately and make a report to the **County**. Before resuming blasting, adjust the blast design and resubmit it to the **County**, and take any other appropriate measures to control the effects of blasting.
- I. If blasting causes excessive overbreak or excessive fracturing of the surrounding rock, or is otherwise detrimental to the work, modify the blast design as necessary to achieve the desired result, and resubmit it to the **County**.

+++ END OF SECTION 02020 +++

## SECTION 02050 DEMOLITION

### PART 1 - GENERAL

#### 1.01 SCOPE

##### A. General:

1. This section covers the labor, equipment, and materials necessary for the work associated with the demolition or removal of pipes, manholes, catch basins, pavement, houses, and other structures within the construction easements shown on the Plans, including all necessary excavation and backfilling.
2. Where removing structural tile and brick from existing structures, the work shall include all patching and reconditioning to restore the remaining tile or brick to its existing state and to provide a proper joint for joining the existing to new construction.
3. Where concrete is cut from existing structures under this Section to permit setting or inserting pipes, flumes, equipment or appurtenances, the work shall include all re-concreting, dressing and finishing of openings to the required lines and dimensions or as necessary for the placing and fixing of inserts. This repair is to meet all structural and leakage requirements and shall use non – shrink material.
4. The **Contractor** shall remove from existing structures and salvage, store or dispose of as specified hereinafter, all valves and piping, mechanical equipment, plumbing, heating, electrical, and ventilating fixtures, pipes, ducts, wires, and equipment, doors and windows, floor grating and cover plates, steel stairs, pipe railing, and the like that are not to remain in service in the finished work, whether or not shown on the Drawings and/or specified herein.
5. The work specified herein and shown on the Drawings is intended to give a general idea of the scope of this work but shall not be construed as covering it entirely. The **Contractor** shall visit the site and judge the amount of work required and the problems anticipated in the performance of the work.
6. Requirements for removal and abandonment of site utilities are specified in Section 02000.

##### B. Asbestos Abatement:

1. The **Contractor** shall furnish all labor, materials, facilities, equipment, services, employee training and testing, and waste transportation and disposal for the removal of asbestos-containing materials (ACM) at the

site of the Work. Asbestos could possibly be encountered in demolition of houses, structures, and piping to be demolished.

2. All asbestos removal work shall be performed in accordance with the requirements established by the EPA, OSHA, Georgia Department of Transportation, NIOSH and State of Georgia EPD regulations; and any other applicable Federal, State and local regulations governing ACM abatement. Whenever there is a conflict or overlap of the above references, the most stringent provisions shall apply.
3. The **Contractor**, or an asbestos abatement subcontractor acceptable to the **County**, shall be licensed in Georgia to perform asbestos abatement and meet other qualification requirements specified in this section. The **Contractor** shall include a program for protective equipment, breathing apparatus, work area security, and all other aspects dealing with health and safety in his Health, Safety, and Security Plan. This information may be called for elsewhere in these Specifications, however a submittal is required.

C. Related Work Specified Elsewhere:

1. Section 01210 - Measurement and Payment
2. Section 02000 - Site Work
3. Section 02200 - Earthwork

## 1.02 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of the General Requirements of the Contract Documents and Section 01300 Submittals. In addition, the following specific information shall be provided:
1. The **Contractor** shall submit to the **County** a schedule of demolition, detailed methods of demolition to be used for each structure, copies of authorization, and permits to demolish the structures.

## **PART 2 - PRODUCTS**

### 2.01 GENERAL

- A. The **Contractor** shall provide all materials and equipment in suitable and adequate quantities as required to accomplish demolition work.

## **PART 3 - EXECUTION**

### 3.01 SAFETY REQUIREMENTS

- A. All work shall be performed in conformance with the laws and regulations pertaining to safety established by Federal, State, and local governments and other authorities having jurisdiction.

### 3.02 UTILITIES

- A. The **Contractor** shall be responsible for maintaining all appropriate utility services during the demolition operations.
- B. Sewer lines shall be removed or grouted for their entire lengths, and plugged at both ends with concrete to prevent groundwater infiltrating into the sewer line.
- C. Total shutdown of the existing utilities to perform any new construction, to make the required structural or piping modifications, and/or to make or install the required service or system modifications, shall not be permitted, except by written request and approval of the **County**.
- D. Prior to making any piping or connections or modifications to existing facilities, the **Contractor** shall obtain specified timing and schedule approval from the **County**.

### 3.03 EQUIPMENT TO BE SALVAGED BY THE COUNTY

- A. The following is a partial list of materials to be removed and salvaged. The **County** will identify other materials to be salvaged during the course of the Work. Equipment on this list shall be removed by the **Contractor** before the demolition work begins and delivered to a site specified by the **County**.
  - 1. Frames, Grates, and Manhole Covers
  - 2. Fire Hydrants
  - 3. Valves
  - 4. Pumps
  - 5. Meters
  - 6. Backflow Devices

### 3.04 REMOVAL AND STORAGE OF EQUIPMENT FOR REUSE

- A. No structure shall be removed without the approval and consent of the **County** unless shown on the Plans to be removed. The **Contractor** shall maintain all equipment in the same condition as when it was removed. The condition of the structure shall be determined prior to removal by the **County**. The **Contractor** assumes the responsibility for assuring that the material is properly stored and maintained.

### 3.05 DEMOLITION

- A. The Plans define the portion of the structures to be removed. Unless otherwise shown on the Plans, the **Contractor** shall not make rough cuts or breaks that exceed the limits of demolition shown.
- B. All equipment, materials, and piping, except as specified hereinbefore, within the limits of the demolition shall become the property of the **Contractor**.

### 3.06 REMOVAL OF EXISTING PIPING

- A. Where existing piping is in conflict with new piping or construction, rerouting or redesign shall be as directed by the **County**.

### 3.07 REMOVAL OF ASBESTOS-CONTAINING MATERIALS

- A. The **Contractor** shall provide all services to perform the work as follows:
  - 1. Remove asbestos containing materials as required by applicable codes and regulations.
  - 2. Isolate each work area and erect temporary staging, containment barriers, and decontamination facilities as required.
  - 3. Remove all ACM from the work area.
  - 4. Thoroughly clean each work area and perform clearance air testing using NIOSH Method 7400.
  - 5. Remove all temporary staging, partitions, and other items installed to perform the work.
  - 6. Dispose of ACM in accordance with applicable Federal, State, and local laws and regulations.

### 3.08 BACKFILLING

- A. The **Contractor** shall backfill all demolished areas to existing ground level as to create positive sheet runoff.
- B. Backfill material shall meet the minimum requirements of Section 02200 - Earthwork. Backfill compaction shall be in accordance with the applicable requirements of Section 02324 – Trenching and Trench Backfilling and Section Structures. Rock and debris shall not be used as backfill material. In all areas not backfilled to ground level, the **Contractor** shall erect safety barriers around the excavation and not allow water to accumulate.

### 3.09 DISPOSAL OF DEMOLITION DEBRIS

- A. The **Contractor** shall dispose of demolition debris in accordance with the requirements of Section 02000 - Site Work.

+++ END OF SECTION 02050 +++

## SECTION 02060 CRUSHED STONE AGGREGATE

### PART 1 - GENERAL

#### 1.01 SCOPE

- A. This section includes installation of crushed stone aggregate; and any other similar, incidental, or appurtenant operation that may be necessary to properly complete the Work.
- B. The **Contractor** shall provide all services, labor, materials, and equipment required for all installation of crushed stone aggregate and related operations necessary or convenient to the **Contractor** for furnishing complete Work as shown on the Plans or specified in these Contract Documents.
- C. Related Work Specified Elsewhere:
  - 1. Section 01210 - Measurement and Payment
  - 2. Section 02200 - Earthwork
  - 3. Section 02324 - Trenching and Trench Backfilling
  - 4. Section 02920 - Site Restoration
  - 5. Section 03300 - Cast-In-Place Concrete

#### 1.02 SUBMITTALS

Submittals shall be made in accordance with the requirements of the General Requirements of the Contract Documents and Section 01300.

#### 1.03 QUALITY ASSURANCE

- A. Reference Standards: The **Contractor** shall comply with the applicable provisions and recommendations of the latest editions of the following standards, except as otherwise shown on the Plans or specified in these specifications.
  - 1. AASHTO M147 - 65 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses.
  - 2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in) Drop.
  - 3. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - 4. ASTM D698 – 00a - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>; 600 kN-m/m<sup>3</sup>).
  - 5. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soils Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>; 2,700 kN-m/m<sup>3</sup>).
  - 6. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

7. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

## **PART 2 - PRODUCTS**

### 2.01 MATERIALS

- A. Coarse aggregate shall be crushed stone of a quality equal to the best Stone Mountain Granite, of solid composition, free from dirt and adherent coatings, and suited for the class of its intended usage.
- B. Unless otherwise specified elsewhere in these Specifications or directed by the **County**, gradation of coarse aggregate shall conform to size Number 467, Number 57, or Number 67 as described in ASTM C33.
- C. The nominal maximum size of coarse aggregate used in concrete shall not be larger than one-fifth (1/5) of the narrowest dimension between sides of the forms, one-third (1/3) of the depth of slabs, or three-fourths (3/4) of the minimum clear spacing between reinforcing bars as described in ACI 68-50.
- D. Sand shall be clean and sharp, free from all deleterious substances, and shall conform to the requirements of ASTM C33.

## **PART 3 - EXECUTION**

### 3.01 EXAMINATION

The **Contractor** shall verify that subgrade has been inspected and that gradients and elevations are correct and dry.

### 3.02 AGGREGATE PLACEMENT

- A. The **Contractor** shall place coarse aggregates in areas shown on the Plans or directed by the **County**.
- B. The **Contractor** shall place and compact coarse aggregate in accordance with the requirements of Section 02200 - Earthwork and Section 02324 - Trenching and Trench Backfilling.
- C. The **Contractor** shall level and contour surfaces to elevations and gradients indicated on the Plans.
- D. The **Contractor** shall add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
- E. The **Contractor** shall add water to assist compaction. If excess water is apparent, the **Contractor** shall remove aggregate and aerate to reduce moisture content.



- F. The **Contractor** shall use mechanical vibrating tamping in areas inaccessible to compaction equipment.

### 3.03 TOLERANCES

- A. Flatness: Maximum variation of one-quarter ( $\frac{1}{4}$ ) inch measured with a ten (10) foot metal straight edge.
- B. Scheduled Compacted Thickness: Within one-quarter ( $\frac{1}{4}$ ) inch.
- C. Variation from True Elevation: Within one-half ( $\frac{1}{2}$ ) inch.
- D. Base: Compacted to ninety-five (95) percent modified proctor density as determined by ASTM D1557.

+++ END OF SECTION 02060 +++

## SECTION 02110 CLEARING AND GRUBBING

### PART 1 - GENERAL

#### 1.01 SCOPE

- A. Work described in this Section includes furnishing all labor, materials, equipment, tools, and incidentals required for all clearing and grubbing including, but not limited to, the removal from the Site of trees, stumps, roots, brush, structures, abandoned utilities, trash, debris, and all other materials found on or near the surface of the ground in the construction area and understood by generally accepted engineering practice not to be suitable for construction of the type contemplated.
- B. The extent of route clearing is that minimum degree of clearing necessary to carry out all construction activities, including construction of appurtenances and other additional clearing needed for access purposes. The route clearing shall not exceed the easement, temporary easement, or the signed right of entry agreement.
- C. Clearing and grubbing operations shall be coordinated with temporary and permanent erosion control requirements.
- D. Clearing operations include, but are not limited to, the following:
  - 1. Protection of existing trees and other vegetation,
  - 2. Removal of trees and other vegetation,
  - 3. Clearing,
  - 4. Removing above-grade improvements,
  - 5. Removing underground improvements,
  - 6. Restoring damaged improvements,
  - 7. Protecting above-grade and underground improvements,
  - 8. Erosion control of disturbed areas.
- E. Related Work Specified Elsewhere:
  - 1. Division 1, General Requirements.
  - 2. Section 02125, Temporary and Permanent Erosion and Sediment Control
  - 3. Section 02050, Demolition
  - 4. Section 02200, Earthwork

#### 1.02 JOB CONDITIONS

- A. Protection of Existing Improvements:
  - 1. Provide barricades, coverings, or other types of protection necessary to prevent damage to existing improvements.
  - 2. Protect improvements on adjoining properties as well as those on the project site. Restore existing improvements damaged by this work to their original condition, as acceptable to the **County** or property owner, as required. Replace property line monuments (such as iron pins) removed

or disturbed by clearing operations under the direction of a Land Surveyor licensed in the State of Georgia. A submittal is required with data showing the survey and sealed by the licensed land surveyor.

- B. Protection of Existing Trees and Vegetation:
1. Protect existing trees and other vegetation to avoid cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip lines, foot or vehicular traffic, and parking of vehicles or equipment within drip line. Provide temporary fences, barricades, or guards as required to protect trees and vegetation that shall be left standing.
  2. Provide protection for tree roots over one and one-half (1-1/2) inches in diameter that are cut during any construction operation. Coat the cut faces with emulsified asphalt or other acceptable coating that has been specially formulated for horticultural use on cut or damaged plant tissues. Temporarily cover all exposed tree roots with wet burlap to prevent roots from drying out; provide earth cover as soon as possible.
  3. Repair or replace damaged trees and vegetation resulting from any construction operation in a manner acceptable to the **County**. A qualified arborist approved by the **County** shall perform tree damage repair at no cost to the **County**. Replace damaged trees that cannot be repaired and restored to full-growth status, as determined by the **County**.

## **PART 2 – PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### 3.01 EXISTING TREES AND VEGETATION

Avoid cutting or injuring trees and vegetation outside easement line and outside areas to be cleared. The **Contractor** shall be responsible for damages outside these lines.

### 3.02 CLEARING AND GRUBBING

- A. Clearing operations shall begin no more than seven (7) days before beginning construction work for any area.
- B. Materials to be cleared, grubbed and removed from the project site include but are not limited to vegetation, trees, stumps, roots, lawns, shrubbery, gardens, paving, miscellaneous structures, debris, and abandoned utilities to the minimum practicable extent to complete the work. Limit clearing to a single lane work route without provision for construction vehicles to pass utility operation. Determine and stake limitations of construction easement or right-of-way prior to commencement of work and keep construction activity within such limits.
- C. Grubbing shall consist of completely removing roots, stumps, trash, and other debris from all areas to be graded so that topsoil is free of roots and debris. Topsoil is to be left sufficiently clean so that further picking and raking shall not be required.

- D. All stumps, roots, foundations, and planking embedded in the ground shall be removed and disposed of. Stumps and roots larger than one (1) inch shall be grubbed and removed to a depth not less than four (4) feet below grade. All holes or cavities that extend below the subgrade elevation of the proposed work shall be filled with crushed rock or other suitable material, compacted to the same density as the surrounding material. Piling and butts of utility poles shall be removed to a minimum depth of two (2) feet below the limits of excavation for structures, trenches and roadway subgrade or two (2) feet below finish grade, whichever is lower.
- E. Landscaping features shall include, but are not necessarily limited to: fences, cultivated trees, cultivated shrubbery, property corners, man made improvements, subdivision, and other signs shall be moved off the easement. The **Contractor** shall take extreme care in moving landscape features and shall reestablish these features as directed by the **County**.
- F. Surface rocks and boulders shall be grubbed from the soil and removed from the site or used as fill in accordance with Section 02200 - Earthwork.
- G. Where the tree limbs interfere with utility wires, or where the trees to be felled are in close proximity to utility wires, the tree shall be taken down in sections to eliminate the possibility of damage to the utility.
- H. Any work pertaining to utility poles shall comply with the requirements of the appropriate utility.
- I. All fences adjoining any excavation or embankment that, in the **Contractor's** opinion, may be damaged or buried, shall be carefully removed, stored, and replaced. Any fencing that is damaged shall be replaced with new fence material of equal or better quality and construction. The **Contractor** shall be responsible for the new fence material cost if the **County** deems the **Contractor** was negligent.
- J. Stumps and roots shall be grubbed and removed to a depth not less than two feet below grade. All holes or cavities that extend below the subgrade elevation of the proposed work shall be filled with crushed rock or other suitable material, compacted to the same density as the surrounding material
- K. Burying or burning of residual materials and organics shall not be allowed.
- L. The **Contractor** shall utilize special precautions required for the protection and preservation of trees, cultivated shrubs, sod, fences, etc. situated within the construction area but not directly within excavation and/or fill limits. The **Contractor** shall be responsible for repair or replacement of any items damaged as a result of its operations.
- M. Remove lawn sod by cutting into maximum size that can be handled without tearing, stripping sod and underlying topsoil, and stockpiling for use in restoring the surface area. Water sod and otherwise maintain sod in viable, growing condition. Alternative means of lawn sod replacement may be approved by the **County**.
- N. Remove above-grade structures only where shown on the Drawings or as authorized by the **County**.

### 3.02 HOLES AND DEPRESSIONS

- A. Fill holes, depressions, and voids created or exposed by clearing operations with non-organic soil material approved by the **County**, unless further excavation or earthwork is indicated.
- B. Place fill material in horizontal layers not exceeding six (6) inches loose-depth and compact to a ninety-five (95) percent standard Proctor.

### 3.03 DISPOSAL OF WASTE MATERIALS

- A. Disposal General Requirements: Dispose cleared matter daily so as to maintain site in a safe and neat condition throughout the contract period. Owners of the property may remove merchantable timber, buildings, or other items from the work site before the **Contractor** begins operations, and no assurance exists that any such material will be on the work site when the **Contractor** begins work.
- B. On-Site Disposal:
  - 1. When authorized by the **County**, cut tree trunks and limbs, over two inches in diameter, into forty-eight- (48-)inch lengths and neatly stack within work limits on the same property as that on which the tree originally grew.
  - 2. On undeveloped property, distribute brush, trees, and limbs less than two inches in diameter, within the work area from which cut, as directed by the **County**. On developed property, remove all such clearing waste and properly dispose of it off-site.
- C. The debris resulting from the clearing and grubbing operation shall be hauled to a disposal site secured by the **Contractor** and shall be disposed of in accordance with all requirements of federal, state, **County** and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property except with written consent of the property owner. In no case shall any material or debris be left on the project site, shoved onto abutting private properties, or buried on the project site.

### 3.04 CONSTRUCTION ACCESS ROUTE ON EASEMENT

- A. When shown on the Drawings or directed by the **County**, a construction access route shall be built on the sewer easement for the purpose of accessing manholes and performing all other necessary work within the easement.
- B. The Construction access route shall be cut (10) ten feet wide, minimum, and (6) six inches deep below existing grade. Filter fabric shall be placed at the bottom of the cut, and surge stone shall be placed on top of the fabric, filling the six- (6-) inch depth along the roadway.
- C. The filter fabric for use under the stone shall be as specified in Section 02125.
- D. Surge stone shall be 4" to 6" size (4X6) rip rap type stone, or equivalent. Use

sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces shall not be acceptable. Specific gravity shall be two (2.0) or greater. Stones shall have less than sixty-six (66) percent wear when tested in accordance with AASHTO T-96.

### 3.06 TREE REMOVAL ON EASEMENTS

- A. The **Contractor** shall confirm ownership of all on-site trees within the easement before work commences and submit a tree removal and disposal plan to the **County**.
- B. The **County's** written approval shall be obtained prior to the removal of any trees from the easement.
- C. All trees that need further processing (wood chips) on-site or disposal off-site shall be processed or disposed of in conformance with Federal, State, and local rules and regulations.
- D. The **Contractor** shall acquire any additional permits prior to commencement of any type of work done in the easement
- E. Stemmed vegetation, such as brush, shrubs, and trees shall be removed at or near the ground level, leaving the root systems intact.
- F. Trees shall be felled into the cleared construction area or areas to be cleared and not onto vegetation that shall be preserved.
- G. Trees that have fallen into water bodies, or beyond the construction area, shall be removed immediately. All damage and remediation costs shall be the **Contractor's** responsibility.

+++ END OF SECTION 02110 +++

## SECTION 02485 - SEEDING

### PART 1 - GENERAL

#### 1.01 SCOPE OF WORK

- A. The work covered by this section consists of furnishing all labor, equipment, and material required to place topsoil, seed, commercial fertilizer, agricultural limestone, and mulch material, including seedbed preparation, harrowing, compacting, and other placement operations on graded earthen areas as described herein and/or shown on the Drawings. In general, seeding operations shall be conducted on all newly graded earthen areas not covered by structures, pavement, or sidewalks; all cleared or grubbed areas that are to remain as finish grade surfaces; and on all existing turf areas that are disturbed by construction operations and which are to remain as finish grade surfaces. Areas disturbed by borrow activities shall also be seeded according to these specifications.
- B. The work shall include temporary seeding operations to stabilize earthen surfaces during construction or inclement weather and to minimize stream siltation and erosion. Temporary seeding shall be performed on any disturbed area left exposed for a period greater than seven (7) days.
- C. Areas disturbed by construction activities, shall be restored to their original conditions with regard to surface grading, drainage, grass type (predominate), or other landscape features.

#### 1.02 RELATED WORK

- A. Section 02125 - Temporary and Permanent Erosion and Sediment Control
- B. Section 02486 - Sodding

#### 1.03 QUALITY ASSURANCE

- A. Prior to seeding operations, the **Contractor** shall furnish to the **County** all labels or certified laboratory reports from an accredited commercial seed laboratory or a state seed laboratory showing the analysis and germination of the seed to be furnished. Acceptance of the seed test reports shall not relieve the **Contractor** of any responsibility or liability for furnishing seed meeting the requirements of this section.
- B. Prior to topsoil operations, the **Contractor** shall obtain representative samples and furnish soil test certificates including textural, pH, and organic ignition analysis from the State University Agricultural Extension Services or other certified testing laboratory.

#### 1.04 ALTERNATE METHODS

- A. The **Contractor** may propose alternate means and methods to establish a satisfactory coverage of healthy grass of the type required. The **Contractor** shall submit sufficient information to enable the **County** to assess the acceptability of the alternate approach.

## **PART 2 – PRODUCTS**

### **2.01 TOPSOIL**

- A. The **Contractor** shall place a minimum of 4 inches of topsoil over all graded earthen areas and over any other areas to be seeded. The quality of topsoil shall be acceptable to the **County**.
- B. Topsoil shall be a friable loam containing a large amount of humus and shall be original surface soil of good, rich, uniform quality, free from any material such as hard clods, stiff clay, hardpan, partially disintegrated stone, pebbles larger than ½ inch in diameter, lime, cement, bricks, ashes, cinders, slag, concrete, bitumen or its residue, boards, sticks, chips, or other undesirable material harmful or unnecessary to plant growth. Topsoil shall be reasonably free from perennial weeds and perennial weed seeds, and shall not contain objectionable plant material, toxic amounts of either acid or alkaline elements or vegetable debris undesirable or harmful to plant life.
- C. Topsoil shall be natural topsoil without admixture of subsoil material, and shall be classifiable as loam, silt loam, clay loam, sandy loam, or a combination thereof. The pH shall range from five and five tenths to seven (5.5 to 7.0). Topsoil shall contain not less than five (5) percent or more than twenty (20) percent, by weight, of organic matter as determined by loss on ignition of oven-dried samples to sixty-five (65°C) degrees centigrade.

### **2.02 SEED**

- A. Seed shall be delivered in new bags or bags that are sound and labeled in accordance with the U. S. Department of Agriculture Federal Seed Act.
- B. All seed shall be from the last crop available at time of purchase and shall not be moldy, wet, or otherwise damaged in transit or storage.
- C. Seed shall bear the growers analysis testing to ninety eight (98) percent for purity and ninety (90) percent for germination. At the discretion of the **County**, samples of seed may be taken for check against the grower's analysis.
- D. Species, rate of seeding, fertilization, and other requirements shall be as necessary to successfully establish the required stand of grass.

### **2.03 FERTILIZER AND LIMING MATERIALS**

- A. Fertilizer and liming materials shall comply with applicable state, local, and federal laws concerned with their production and use.



- B. Commercial fertilizer shall be a ready mixed material of grade 18-46-0. Container bags shall have the name and address of the manufacturer, the brand name, net weight, and chemical composition.
- C. Agricultural limestone shall be a pulverized limestone having a calcium carbonate content of not less than 85 percent by weight. Agricultural limestone shall be crushed so that at least 85 percent of the material shall pass a No. 10 mesh screen and 50 percent shall pass a No. 40 mesh screen.

#### **2.04 MULCH MATERIAL**

- A. All mulch materials shall be air dried and reasonably free of noxious weeds and weed seeds or other materials detrimental to plant growth.
- B. Mulch shall be composed of wood cellulose fiber, straw, or stalks, as specified herein. Mulch shall be suitable for spreading with standard mulch blowing equipment.
- C. Wood-cellulose fiber mulch shall be as manufactured by Weyerhaeuser Company, Conway Corporation, or equal.
- D. Straw mulch shall be partially decomposed stalks of wheat, rye, oats, or other approved grain crops.
- E. Stalks shall be the partially decomposed, shredded residue of corn, cane, sorghum, or other approved standing field crops.

#### **2.05 MULCH BINDER**

- A. Mulch on slopes exceeding three to one (3 to 1) ratio shall be held in place by the use of an approved mulch binder. The mulch binder shall be non-toxic to plant life.
- B. Emulsified asphalt binder shall be Grade SS-1, ASTM D 977. Cutback asphalt binder shall be Grade RC 70 or RC 250.

#### **2.06 INOCULANTS FOR LEGUMES**

- A. All leguminous seed shall be inoculated prior to seeding with a standard culture of nitrogen-fixing bacteria that is adapted to the particular seed involved.

#### **2.07 WATER**

- A. Water shall be clean, clear water free from any objectionable or harmful chemical qualities or organisms and shall be furnished by the **Contractor**.

## **PART 3 - EXECUTION**

### **3.01 PLACING TOPSOIL**

- A. Before placing or depositing topsoil upon any areas, all improvement within the area shall be completed.
- B. The areas in which topsoil is to be placed or incorporated shall be prepared before securing topsoil for use.

### **3.02 SEEDBED PREPARATION**

- A. Before fertilizing and seeding, all topsoil surfaces shall be trimmed and worked to true line free from unsightly variation, bumps, ridges and depressions, and all detrimental material, and roots. All stones larger than two (2) inches in any dimension shall be removed from the soil. All non-residential and residential areas shall be hand raked to remove all detrimental material, roots, and stones
- B. No earlier than twenty-four (24) hours before the seed is to be sown, the soil surface to be seeded shall be thoroughly cultivated to a depth of not less than two (2) inches with a weighted disc, tiller, pulvimixer, or other equipment, until the surface is smooth.
- C. If the prepared surface becomes eroded because of rain or for any other reason, or becomes crusted before the seed is sown, the surface shall again be placed in a condition suitable for seeding.
- D. Ground preparation operations shall be performed only when the ground is in a tillable and workable condition.

### **3.03 FERTILIZATION AND LIMING**

- A. Following seedbed preparation, fertilizer shall be applied to all areas to be seeded so as to achieve an application rate 80 pounds per acre.
- B. Fertilizer shall be spread evenly over the seedbed and shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of ½ inch.
- C. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment. The seed shall not remain in water containing fertilizer for more than thirty (30) minutes when a hydraulic seeder is used.
- D. Agricultural limestone shall be thoroughly mixed into the soil at a rate of one to two (1 to 2) tons per acre. The specified rate of application of limestone may be reduced by the **County** if pH tests indicate this to be desirable. It is the responsibility of the **Contractor** to obtain such tests and submit the results to the **County** for adjustment in rates.

- E. It is the responsibility of the **Contractor** to make one application of maintenance fertilizer at one-half the original rates applied in early spring following initial establishment of cover.

### 3.04 SEEDING

- A. Seed of the specified group shall be sown as soon as preparation of the seedbed has been completed. No seed shall be sown during high winds, nor until the surface is suitable for working and is in a proper condition. Seeding shall be performed during the periods shown below. Seed mixtures may be sown together provided they are kept in a thoroughly mixed condition during the seeding operation.
- B. Seeds shall be uniformly sown by any approved mechanical method to suit the slope and size of the areas to be seeded, preferably with a broadcast type seeder, windmill hand seeder, or approved mechanical power drawn seed drills. Hydroseeding and hydromulching may be used on steep embankments, provided full coverage is obtained. Care shall be taken to adjust the seeder so that the seeding's are at the proper rate before seeding operations are started, and to maintain their adjustment during seeding. Seed in hoppers shall be agitated to prevent segregation of the various seeds in a seeding mixture.
- C. Immediately after sowing, the seeds shall be covered and compacted to a depth of one-eighth to three-eighths ( $1/8$  to  $3/8$ ) inch by a cultipacker or suitable roller.
- D. Leguminous seeds shall be inoculated prior to seeding with an approved and compatible nitrogen-fixing inoculant in accordance with the manufacturer's mixing instructions.

### Seeding Requirements Table

The seed shall be a mixture as shown in the Table below, and shall be applied at the following rates shown:

| Seeding Requirements |                         |                 |
|----------------------|-------------------------|-----------------|
| Season               | Type of Seed            | Pounds Per Acre |
| Jan 1 – May 15       | Unhulled Common Bermuda | 45              |
|                      | Kentucky 31 Fescue      | 300             |
|                      | Rebel II Supreme        | 150             |
| May 16 – Sept 1      | Hulled Common Bermuda   | 75              |
| Sept 2 – Dec 31      | Unhulled Common Bermuda | 45              |
|                      | Kentucky 31 Fescue      | 300             |
|                      | Rebel II Supreme        | 150             |

### 3.05 MULCHING

- A. All areas to be seeded shall be uniformly mulched in a continuous blanket immediately after seeding when using Wheat straw at a minimum of two and one-half (2½) tons per acre or equivalent to two to four (2" to 4") inches thickness. The rate of application shall correspond to a depth of at least one inch and not more than one and one half inches, according to the texture and moisture content of the mulch material. It is intended that mulch shall allow some sunlight to penetrate and air to circulate, at the same time shading the ground, reducing erosion and conserving soil moisture. The **Contractor** shall take steps necessary to prevent loss of mulch or bunching of mulch as caused by the wind.
- B. Mulch on slopes greater than three to one (3 to 1) ratio shall be held in place by the use of an approved mulch binder. Binder shall be thoroughly mixed and applied with the mulch. Emulsified asphalt or cutback asphalt shall be applied at the approximate rate of five (5) gallons per one thousand (1,000) square feet as required to hold the mulch in place.
- C. The **Contractor** shall cover structures, poles, fence, and appurtenances if the mulch binder is applied in such a way that it would come in contact with or discolor the structures.

- D. Mulch and binder shall be applied by suitable blowing equipment at closely controlled application rates.

### 3.06 WATERING

- A. **Contractor** shall be responsible for maintaining the proper moisture content of the soil to ensure adequate plant growth until a satisfactory stand is obtained. If necessary, watering shall be performed to maintain adequate water content in the soil. Water shall not be applied when there is danger of freezing. In the event that official watering bans or water restrictions are in effect, the Contract shall comply with applicable guidelines on watering for new grassing.
- B. Watering shall be accomplished by hoses, tank truck, or sprinklers in such a way to prevent erosion, excessive runoff, and overwatered spots.

### 3.07 MAINTENANCE

- A. Upon completion of seeding operations, the **Contractor** shall clear the area of all equipment, debris, and excess material and the premises shall be left in a neat and orderly condition.
- B. The **Contractor** shall maintain all seeded area without additional payment until final acceptance of the work by the **County**, including all regrading, refertilizing, reliming, reseeding, remulching, and watering required. Seeding work shall be repeated on defective areas until the **County** is satisfied that a satisfactory uniform stand is accomplished. Damage resulting from erosion, gulleys, washouts, or other causes shall be repaired at the **Contractor's** expense by filling with topsoil, compacting, and repeating the seeding work.

### 3.08 VEGETATIVE STABILIZATION SCHEDULE

- A. The **Contractor** shall stabilize disturbed areas as construction progresses. The time duration limitations for stabilization of disturbed areas by either temporary mulching (for 7 days or less), temporary grassing, permanent grassing, or permanent sodding shall be as specified in Section 02125 - Temporary and Permanent Erosion and Sediment Control; however, unstabilized areas of the construction corridor shall not exceed one thousand (1,000) linear feet on sanitary sewer sewers or water mains installed with easements and three hundred (300) linear feet for all other projects. Stabilization with permanent vegetation is preferred unless seasonal limitations exist.

+++ END OF SECTION 02485 +++

## SECTION 02510 PAVEMENT REPAIRS

### PART 1 - GENERAL

#### 1.01 SCOPE

- A. Work described in this Section includes furnishing all labor, materials, equipment, tools and incidentals for installation of all pavement repairs; pavement replacement; surface preparation; asphaltic concrete placement; pavement milling; cleaning and protection and any other similar, incidental, or appurtenant pavement repair operation which may be necessary to properly complete the Work as shown on the drawings and as specified herein.
- B. Related Work specified elsewhere:
  - 1. Section 01210 - Measurement and Payment
  - 2. Section 02521 - Concrete sidewalks, curbs and gutters
  - 3. Section 02920 - Site Restoration
  - 4. Section 03300 - Cast-In-Place Concrete

#### 1.02 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements within Section 01300 - Submittals of the Contract Documents. In addition, the following specific information shall be provided:
  - 1. The **Contractor** shall submit asphalt mix design to the **County** for approval.
  - 2. Certificates: The **Contractor** shall submit certification of quality control and compliance with the requirements of this section to the **County**. Certificates shall be signed by asphalt and concrete producers and the **Contractor**.

#### 1.03 QUALITY ASSURANCE

- A. Reference Standards: The **Contractor** shall comply with the applicable provisions and recommendations of the latest editions of the following standards, except as otherwise shown on the Plans or specified in these Specifications.
  - 1. ASTM C94 - Standard Specification for Ready Mix Concrete.
  - 2. ASTM C33 - Standard Specification for Concrete Aggregates.
  - 3. ASTM C150 - Standard Specification for Portland Cement.
  - 4. ACI 301 - Specifications for Structural Concrete.

5. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
  6. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
  7. ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
  8. ASTM C494 - Chemical Admixtures for Concrete.
  9. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
  10. ASTM D3371 - Standard Specification for Viscosity-Graded Asphalt Cement for use in Pavement Construction.
  11. ASTM D946 - Standard Specification for Penetration Graded Asphalt Cement for use in Pavement Construction.
  12. AI (Asphalt Institute) - MS-2- Mix Design Methods for Asphalt Concrete and Other Hot Mix Types.
  13. AI (Asphalt Institute) - MS-3- Asphalt Plant Manual.
  14. AI (Asphalt Institute) - MS-8- Asphalt Paving Manual.
  15. AI (Asphalt Institute) - MS-19 - Basic Asphalt Emulsion Manual.
  16. AASHTO M147-65 - Materials for Aggregate and Soil Aggregates.
  17. ASTM C-136 - Sieve Analysis of Fine and Coarse Aggregates.
  18. Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, latest edition.
- B. The **Contractor** shall perform Work in accordance with the requirements of the Georgia Department of Transportation (GDOT) Standard Specifications Construction of Transportation Systems, latest edition.
- C. The **Contractor** shall obtain materials from the same source throughout the duration of the paving Work.
- D. The **Contractor** shall use only materials which are furnished by a bulk asphalt concrete producer regularly engaged in production of hot-mix, hot-laid asphalt concrete and shall be a GDOT-approved facility.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. The **Contractor** shall comply with the performance standards and requirements established by GDOT.

- B. Paving: Pavement shall be designed for movement of trucks up to sixty-thousand (60,000) pounds.
- C. General: In addition to other specified conditions, the **Contractor** shall comply with the following minimum requirements:
  - 1. Finished asphaltic concrete courses shall be compacted to the following densities:
    - a. Asphaltic Concrete Hot Mix Surface Course; Not less than ninety-two (92) percent of theoretical density.
    - b. Asphaltic Concrete Hot Mix Binder Course: Not less than ninety (90) percent of theoretical density.
  - 2. On the day following placement of asphaltic materials, samples for the determination of in-place density shall be taken from the finished pavement. The **Contractor** shall core the samples at locations and in the manner directed by the **County**. The cuts made in taking such samples shall be repaired by the **Contractor** at no expense to the **County**.
  - 3. The finished surface, when checked with a ten-foot straightedge placed parallel to the centerline, shall show no variation more than one-quarter ( $\frac{1}{4}$ ) inch for base and intermediate courses, and not more than one-eighth ( $\frac{1}{8}$ ) inch for surface courses. All testing shall be made in a longitudinal direction at intervals as directed by the **County**. Surface deviations for intermediate courses may be corrected by skin patching, feather edging, or other methods that would provide the required smoothness and maintain quality material. However, surface deviations for surface courses shall be corrected in such a manner as to maintain a quality pavement having the same uniform texture and appearance as the adjoining surface. All corrective work shall be performed at the expense of the **Contractor**.

#### 1.05 REGULATORY REQUIREMENTS

- A. The **Contractor** shall conform to applicable code for paving work on public and private properties.

#### 1.06 JOB CONDITIONS

- A. Weather Limitations:
  - 1. The **Contractor** shall apply bituminous prime and tack coats only when the ambient temperature in the shade has been at least forty (40) degrees F.
  - 2. The **Contractor** shall not conduct paving operations when the surface is wet, frozen, or contains excess moisture that would prevent uniform distribution and required penetration.



3. The **Contractor** shall construct asphaltic courses only when atmospheric temperature in the shade is above thirty five (35) degrees F, when the underlying base is dry and when weather is not rainy.
  4. The **Contractor** shall place base course when air temperature is above thirty-five (35) degrees F and rising. The **Contractor** shall not place base course on a frozen or muddy subgrade.
- B. The **Contractor** shall establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.
- C. Traffic Control:
1. The **Contractor** shall maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.
  2. In addition, the **Contractor** shall provide flagmen, barricades, and warning signs for the safe and expeditious movement of traffic through construction zones within public rights-of-way in accordance with the requirements of Section 01550 - Traffic Regulation.

#### 1.07 TEMPORARY ROADWAY PAVING REPAIRS

- A. Temporary cold or permanent hot asphalt patching will be required for both transverse and longitudinal roadway cuts upon completing backfilling requirements at the end of each day's work if the road is to be opened for local traffic while work has stopped.
- B. It shall be the **Contractor's** responsibility to maintain the temporary paving in such condition as to prevent hindrance or hazard to traffic. When final paving is undertaken the temporary surfacing materials shall be removed to accommodate final paving of types and thicknesses as specified in this section, the edges of the existing paving shall be neatly and uniformly trimmed, and the permanent pavement shall be placed.
- C. Steel Plate Bridging:
1. At the **County's** discretion, steel plate bridging may be used. The **Contractor** shall adhere to the following chart with respect to minimum plate size and thickness.

| Trench Width   | Minimum Plate Thickness |
|--|-------------------------|
| 10" (0.25 m)   | 1/2" (13 mm)            |
| 1'-11" (0.58 m)  | 3/4" (19 mm)            |
| 2'-7" (0.80 m)   | 7/8" (22 mm)            |
| 3'-5" (1.04 m)   | 1" (25 mm)              |
| 5'-3" (1.60 m)   | 1 1/4" (32 mm)          |
| *For trench widths greater than 5' 3", the <b>County</b> will determine the plate thickness. |                         |

2. Steel plates used for bridging shall extend a minimum of twelve (12) inches beyond all edges of the trench.
  3. For traffic speeds less than forty-five (45) mph, the surrounding pavement shall be cold planed to a depth equal to that of the steel plate selected.
  4. For traffic speeds greater than forty-five (45) mph, approach plate(s) and ending plate (if longitudinal placement) shall be attached to the roadway by a minimum of two (2) dowels pre-drilled into the corners of the plate and drilled two (2) inches into the pavement. Subsequent plates shall be butted to each other. Fine graded asphalt concrete shall be compacted to form ramps, maximum slope eight and one-half (8½) percent with a minimum twelve (12) inches taper to cover all edges of the steel plates. When steel plates are removed, the dowel holes in the pavement shall be backfilled with either graded fines of either asphalt concrete mix, concrete slurry, or an equivalent slurry that is satisfactory to the **County**.
  5. Steel plates shall not be left on the road in any one location for more than fourteen (14) days.
- D. Graded Aggregate Base:
1. Temporary patch paving using graded aggregate base shall be placed only as approved and directed by the **County**. All compacted material shall conform closely enough to the existing road surface so as to permit safe travel.
  2. Graded aggregate may consist of gravel, air cooled blast furnace slag, crushed stone, or synthetic aggregate having hard, strong, durable pieces free of adherent coatings and shall be approved for use by the **County**.

#### 1.08 SOURCE QUALITY CONTROL

- A. The **Contractor** shall submit proposed mix design of each class of mix to the **County** for review prior to commencement of the Work.
- B. The **County's** independent testing laboratory shall test samples in accordance with TAI MS.

#### 1.09 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed in accordance with the requirements of the General Requirements.
- B. The **County's** independent testing laboratory shall take samples and perform tests in accordance with the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, latest edition.

#### 1.10 PROTECTION

- A. Immediately after placement, the **Contractor** shall protect pavement from mechanical injury for seven (7) days.

## **PART 2 - PRODUCTS**

### **2.01 FLEXIBLE PAVEMENT**

- A. Aggregates for asphaltic concrete shall comply with the applicable requirements of the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, latest edition.
- B. Asphaltic cement for asphaltic concrete shall comply with the applicable requirements of the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, latest edition.
- C. Bituminous prime coat shall comply with the applicable requirements of the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, latest edition.
- D. Bituminous tack coat shall comply with the applicable requirements of the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, latest edition.
- E. Hot Mix asphaltic concrete construction shall comply with the applicable requirements of the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, latest edition.

### **2.02 RIGID PAVEMENT**

- A. Concrete and reinforcing bars (where required) for rigid pavement shall conform to the requirements of Section 03200 - Concrete Reinforcement and Section 03300 - Cast-In-Place Concrete. Concrete for pavement shall be Class A.

### **2.03 CURB AND GUTTER**

- A. Concrete for curb, curb and gutter, or valley gutter shall be Class A. Concrete shall conform to the requirements of Section 03300 - Cast-In-Place Concrete.

### **2.04 SIDEWALKS**

- A. Concrete for sidewalks shall be Class A conforming to the requirements of Section 03300 - Cast-In-Place Concrete.

### **2.05 DRIVEWAYS**

- A. Concrete for driveways shall be Class A conforming to the requirements of Section 03300 - Cast-In-Place Concrete.

### **2.06 STANDARD GRANITE CURB, GRADE B**

- A. Curbs shall be furnished in standard lengths of eight (8) feet in so far as possible employing shorter lengths where required such that the minimum length employed shall not be less than four (4) feet long. Curb sections shall have a split

face and split top. Each joint shall have an unreinforced concrete footing as specified in the Detail Drawings. On wheel chair ramps and driveways, the granite curb shall continue through depressed sections of these elements as shown in the Detail Drawings. On curve section of roadway, the granite curb shall be split or cut on the curve.

## **2.07 SPECIALTY BRICK PAVER REPLACEMENT**

- A. The **Contractor** shall verify the size, type, color, and pattern of the existing specialty brick pavement surface prior to removal. The **Contractor** shall submit to the **County** for review the proposed replacement brick paver material and installation information. Materials shall conform to the existing installation for pattern, color, and size.

## **2.08 SPECIAL BRICK SIDEWALK REPLACEMENT**

- A. All brick shall be solid pavers conforming to the requirements of the GDOT Standard Specifications Construction of Transportation Systems, Latest Edition. The **Contractor** shall submit to the **County** for review on the brick to be used to replace brick sidewalks within the Project area. Materials shall conform to the existing installation for pattern, color, and size.

## **2.09 STAMPED HEXAGONAL CONCRETE PAVERS**

- A. Where existing, hexagonal concrete pavers shall be removed to allow pipe installation, the **Contractor** may replace them with poured-in-place concrete sidewalk with stamped paver pattern as shown in the Standard Details.

## **2.10 PAVEMENT MARKINGS**

- A. This work shall consist of furnishing and applying thermoplastic reflectorized pavement marking compound that is extruded or sprayed on the pavement by mechanical means and which, upon cooling to pavement temperature, produces a reflectorized pavement marking.
- B. Pavement markings shall be placed to reconstitute the markings that were existing before the pavement was milled for resurfacing. All final markings shall meet the requirements of the Manual of Uniform Traffic Control Devices (MUTCD). If any existing markings did not meet the MUTCD requirements or were absent, the **Contractor** shall nevertheless upgrade the markings at these locations to meet the MUTCD requirements. Thermoplastic traffic stripe shall consist of solid or broken (skip) lines, words and/or symbols of the type and color as shown in the MUTCD Manual. Short lines such as crosswalks, stop bars, arrows, symbols, and crosshatching shall be extruded. All other lines shall be sprayed.
- C. Materials shall meet the requirements of GDOT Standard Specifications Construction of Transportation Systems, latest edition, Section 653.02.
- D. Pavement markings shall include, but not be limited to, the following:
  - 1. Double solid yellow center line.

2. Solid white pavement edge line where street does not have curb and to mark bike lanes.
3. Skip yellow lines to designate lanes in multi-lane streets.
4. Traffic stripe shall be six (6) inches wide on GDOT streets and **County** streets designated as arterial. Traffic stripe shall be four (4) inches wide on all other streets.
5. White crosshatched lines for crosswalks at schools and at intersections.
6. White stop bars at stop streets.
7. Symbols such as turn arrows, one-way arrows, etc.
8. Wording such as "STOP," "SCHOOL," etc.
9. All other striping, symbols, and wording required by MUTCD.

## **PART 3 - EXECUTION**

### **3.01 PAVEMENT REPLACEMENT**

- A. The **Contractor** shall obtain prior approval from the **County** for any paving subcontracts.
- B. The **Contractor** shall replace all pavements following the guidelines established by the Georgia Department of Transportation and other authorities having jurisdiction.
- C. Where paved streets, sidewalks, driveways, and gutters are removed within the construction limits as specified, such replacement shall be paid for at the respective unit prices in the Bid Form. Such pavements removed or damaged by the **Contractor** beyond the specified construction limits shall be replaced in accordance with these specifications at the **Contractor's** expense.
- D. Where chert, gravel, slag, or other unpaved street or driveway surfaces are removed or damaged, they shall be replaced with the same type of materials that were removed as an incidental part of the Work and no specific payment therefore shall be allowed. Unpaved drives shall be topped with gravel at no additional cost to the **County**.
- E. In replacing pavements and unpaved surfaces, the materials used and the construction methods shall comply with the applicable requirements of the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, latest edition.
- F. Where shown on the Plans, service lines and small diameter pipes, eight (8) inches in diameter or less located across paved surfaces shall be installed by boring or other approved methods that shall not require cutting or removing the pavement where feasible. This is to be approved by the **County**.

- G. All concrete pavement replaced shall not be less than four (4) inches thick or equal to the original if greater than four (4) inches.
- H. Pavements replaced shall be of the same type of construction as was removed, except that no asphalt surface replaced shall be less than three (3) inches thick consisting of a binder and seal coat. Wearing surfaces shall be slag sealed in accordance with the requirements established by GDOT.

### 3.02 SURFACE PREPARATION

- A. Graded Aggregate Base Course:
  - 1. The **Contractor** shall check subgrade for conformity with elevations and section immediately before placing aggregate base material.
  - 2. The **Contractor** shall place aggregate base material in compacted layers not more than six (6) inches thick, unless continuing tests indicate that the required results are being obtained with thicker layers.
  - 3. In no case shall more than eight (8) inches of compacted base be placed in one lift.
  - 4. The **Contractor** shall spread, shape, and compact all aggregate base material deposited on the subgrade during the same day.
  - 5. The compacted base shall have sufficient stability to support construction traffic without pumping and meet minimum contract compaction specifications.
  - 6. If compacted base becomes unstable as a result of too much moisture, the base material and underlying subgrade, if necessary, shall be dried or removed and reworked to a moisture content that can be recompacted to meet minimum contract compaction specifications at the expense of the **Contractor**.
- B. Loose and Foreign Material:
  - 1. The **Contractor** shall remove loose and foreign material from the surface immediately before application of paving.
  - 2. The **Contractor** shall use power brooms or blowers, and hand brooming as required.
  - 3. The **Contractor** shall not displace surface material.
- C. Prime Coat:
  - 1. The **Contractor** shall uniformly apply at a rate of 0.20 to 0.50 gallon per square yard over compacted and cleaned subbase surface.
  - 2. The **Contractor** shall apply enough material to penetrate and seal, but not

flood the surface.

3. The **Contractor** shall allow material to cure and dry as long as required to attain penetration and evaporation of volatile, and in no case less than twenty-four (24) hours unless otherwise acceptable to the **County**.
4. The **Contractor** shall blot excess asphalt with just enough sand to prevent pick-up under traffic.
5. The **Contractor** shall remove loose sand before paving.

D. Tack Coat:

1. The **Contractor** shall dilute material with equal parts of water and apply to contact surfaces of previously constructed asphalt concrete or Portland cement concrete and similar surfaces.
2. The **Contractor** shall apply at a rate of 0.05 to 0.15 gallons per square yard of surface.
3. The **Contractor** shall apply tack coat by brush to contact surfaces of curbs, gutters, manholes, and other structures projecting into or abutting asphalt concrete pavement.
4. The **Contractor** shall allow surfaces to dry until material is at a condition of tackiness to receive pavement.

### 3.03 EQUIPMENT

- A. The **Contractor** shall provide size and quantity of equipment to complete the work specified in this section within the Project Schedule.
- B. Bituminous pavers shall be self-propelled that spread hot asphalt concrete mixtures without tearing, shoving, or gouging surfaces, and control pavement edges to true lines without use of stationary forms.
- C. Rolling equipment shall be self-propelled, steel-wheeled, and pneumatic-tired rollers that can reverse direction without backlash.
- D. The **Contractor** shall provide rakes, lutes, shovels, tampers, smoothing irons, pavement cutters, portable heaters, and other miscellaneous small tools to complete the work specified in this section.

### 3.04 ASPHALTIC CONCRETE PLACEMENT

- A. The **Contractor** shall place asphalt concrete mix on prepared surfaces, spread, and strike-off using paving machine.
- B. The **Contractor** shall spread the asphaltic concrete mixture at a minimum temperature of two-hundred and twenty-five (225) degrees F.
- C. Inaccessible and small areas may be placed by hand.

- D. The **Contractor** shall place each course at a thickness such that when compacted it shall conform to the indicated grade, cross-section, finish thickness, and density indicated in the Plans.
- E. Pavement Placing:
1. Unless otherwise directed by the **County**, the **Contractor** shall begin placing asphaltic concrete along the centerline of areas to be paved on crowned section, and at high side of sections on one-way slope, and in direction of traffic flow.
  2. After first strip has been placed and rolled, the **Contractor** shall place succeeding strips and extend rolling to overlap previous strips.
  3. The **Contractor** shall complete base courses for a section before placing surface courses.
  4. The **Contractor** shall place the asphaltic concrete mixture in as continuous an operation as practical.
- F. Hand Placing:
1. The **Contractor** shall spread, tamp, and finish the asphaltic concrete mixture using hand tools in areas where machine spreading is not possible, as acceptable to the **County**.
  2. The **Contractor** shall place the asphaltic concrete mixture at a rate that shall ensure handling and compaction before mixture becomes cooler than acceptable working temperature.
- G. Joints:
1. The **Contractor** shall carefully make joints between old and new pavements, or between successive days work, to ensure a continuous bond between adjoining work.
  2. The **Contractor** shall construct joints to have the same texture, density, and smoothness as adjacent sections of asphalt concrete course.
  3. The **Contractor** shall clean contact surfaces free of sand, dirt, or other objectionable material and apply tack coat.
  4. The **Contractor** shall offset transverse joints in succeeding courses not less than twenty-four (24) inches.
  5. The **Contractor** shall cut back edge of previously placed course to expose an even, vertical surface for full course thickness.
  6. The **Contractor** shall offset longitudinal joints in succeeding courses not less than six (6) inches.



7. When the edges of longitudinal joints are irregular, honeycombed, or inadequately compacted, the **Contractor** shall cut back unsatisfactory sections to expose an even, vertical surface for full course thickness.

### 3.05 ASPHALTIC CONCRETE COMPACTION

- A. The **Contractor** shall provide sufficient rollers to obtain the required pavement density.
- B. The **Contractor** shall begin rolling operations as soon after placing, as the mixture shall bear weight of roller without excessive displacement.
- C. The **Contractor** shall not permit heavy equipment, including rollers to stand on finished surface before it has thoroughly cooled or set.
- D. The **Contractor** shall compact the asphaltic concrete mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- E. The **Contractor** shall start rolling longitudinally at extreme lower side of sections and proceed toward center of pavement. The **Contractor** shall roll to slightly different lengths on alternate roller runs.
- F. The **Contractor** shall not roll centers of sections first under any circumstances.
- G. Breakdown Rolling:
  1. The **Contractor** shall accomplish breakdown or initial rolling immediately following rolling of transverse and longitudinal joints and the outside edge.
  2. The **Contractor** shall operate rollers as close as possible to paver without causing pavement displacement.
  3. The **Contractor** shall check crown, grade, and smoothness after breakdown rolling.
  4. The **Contractor** shall repair displaced areas by loosening at once with lutes or rakes and filling, if required, with hot loose material before continuing rolling.
- H. Second Rolling:
  1. The **Contractor** shall follow breakdown rolling as soon as possible, while the asphaltic concrete mixture is hot and in condition for compaction.
  2. The **Contractor** shall continue second rolling until the asphaltic concrete mixture has been thoroughly compacted.
- I. Finish Rolling:
  1. The **Contractor** shall perform finish rolling while the asphaltic concrete mixture is still warm enough for removal of roller marks.

2. The **Contractor** shall continue rolling until roller marks are eliminated and the course has attained specified density.

J. Patching:

1. The **Contractor** shall remove and replace defective areas.
2. The **Contractor** shall cut-out and fill with fresh, hot asphalt concrete.
3. The **Contractor** shall compact by rolling to specified surface density and smoothness.
4. The **Contractor** shall remove deficient areas for full depth of course.
5. The **Contractor** shall cut sides perpendicular and parallel to direction of traffic with edges vertical.
6. The **Contractor** shall apply tack coat to exposed surfaces before placing new asphaltic concrete mixture.

### 3.06 PAVEMENT MILLING

- A. In street areas where pavement replacement occurs, pavement milling shall be performed by the **Contractor** to eliminate excessive buildup of pavement. The depth of milling shall be 1-1/2" from curb to curb measured at each edge of pavement or as directed by the **County**.

### 3.07 CLEANING AND PROTECTION

- A. Cleaning: After completion of paving operations, the **Contractor** shall clean surfaces of excess or spilled asphalt materials to the satisfaction of the **County**.
- B. Protection:
  1. After final rolling, the **Contractor** shall not permit vehicular traffic on asphaltic concrete pavements until it has cooled and hardened, and in no case no sooner than six (6) hours.
  2. The **Contractor** shall provide barricades and warning devices as required to protect pavement and the general public.
- C. Maintenance: The **Contractor** shall maintain the surfaces of pavements until the acceptance of the Work. Maintenance shall include replacement, overlaying, milling, and reshaping as necessary to prevent raveling of the road material, the preservation of smooth surfaces, and the repair of damaged or unsatisfactory surfaces, to the satisfaction of the **County**.

### 3.08 STANDARD GRANITE CURB, GRADE B

- A. This work shall consist of furnishing and installing the standard granite curb where indicated in the Plans or directed by the **County**. In general, granite curb required to be installed shall match existing granite curb that has been removed or damaged in the progress of the Work.
- B. When existing granite curb will conflict with pipe installation, the **Contractor** shall carefully remove, clean, and store the granite curb. The **Contractor** shall remove damaged granite curb from the job site. Granite curb that is acceptable to the **County** may be re-installed.
- C. Installation of standard granite curb, Grade B, shall include saw cutting existing asphalt concrete pavement a minimum of one (1) inch and removing remaining pavement to subgrade, excavation of base and subgrade as necessary to install the granite curbing and backfilling and compacting of the installation.

### **3.09 SPECIALTY BRICK PAVER REPLACEMENT**

- A. This work shall consist of replacing existing brick pavement required to be removed for installation of sanitary sewers or connection of services.
- B. Existing brick pavers removed to accommodate sanitary sewers or services or damaged by the Work shall be removed in neat, rectangular sections the full width of the pavement as shown on the Plans. Existing concrete base slabs shall be cut with a concrete saw and removed prior to replacement. Replacement construction shall match existing pavement section including concrete base slab.

### **3.10 SPECIAL BRICK SIDEWALK REPLACEMENT**

- A. This work shall consist of replacing existing brick sidewalks required to be removed for connection of services or for installation of sanitary sewers.
- B. Existing brick sidewalk removed to accommodate the sanitary sewers or services or damaged by the Work shall be removed in neat, rectangular sections the full width of the sidewalk or driveway on a line perpendicular to the street. Existing concrete base slabs shall be cut with a concrete saw and removed prior to replacement. Brick pavers shall be laid on a four (4) inch thick concrete base slab and meet the same requirements as Standard Concrete Sidewalk four (4) inches thick.

### **3.11 STAMPED HEXAGONAL CONCRETE PAVERS**

- A. This work shall consist of replacing existing hexagonal concrete pavers required to be removed for connections of services or for installation of sanitary sewers.

- B. Existing hexagonal pavers removed to accommodate the sanitary sewers or services or damaged by the Work shall be removed the full width of the sidewalk or driveway on a line perpendicular to the street. The stamped hexagonal concrete pavers shall be constructed according to the Standard Detail. Prior to beginning construction of the first section of stamped pavers, the **Contractor** shall construct a four (4) foot by a four (4) foot test panel for approval by the **County**. A standard concrete sidewalk four (4) inches thick shall be poured. When the concrete has achieved sufficient set, the paver pattern imprint shall be created by pushing the form into the concrete to the specified depth and then carefully removing the form. If the constructed stamped pavers do not conform to the test panel, the unsatisfactory sections shall be removed and reconstructed by the **Contractor** to the satisfaction of the **County** without additional cost to the **County**.

### 3.12 PAVEMENT MARKINGS

- A. Construction of pavement markings shall be performed according to the requirements of GDOT Standard Specifications Construction of Transportation Systems, latest edition, Section 653.03.

+++ END OF SECTION 02510 +++

## SECTION 02665 WATER MAINS AND ACCESSORIES

### PART 1 - GENERAL

#### 1.01 SCOPE

- A. The work included under this section includes providing all labor, materials, equipment, tools, and incidentals required for a complete installation of water mains and accessories as shown on the Plans and as specified in this section.
- B. The **Contractor** shall supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), Steel Structures Painting Council (SSPC), and other recognized standards. Latest revisions of all standards are applicable.
- C. Galvanized pipe/fittings shall not be used as any part of the Water Transmission and Distribution System, nor shall it be used to join any appurtenances to the System.
- D. Water mains, valves, hydrants, and appurtenances shall be installed before the installation of the sub-base course or paving or any other utilities except sanitary sewer lines.
- E. All water system products and materials shall be submitted for approval by the **County**. Each shall meet all design and operating requirements of the **County**.
- F. Related Work Specified Elsewhere:
  - 1. Section 01210 - Measurement and Payment
  - 2. Section 01550 - Traffic Regulation
  - 3. Section 02000 – Site Work
  - 4. Section 02140 - Dewatering
  - 5. Section 02200 - Earthwork
  - 6. Section 02324 - Trenching and Trench Backfilling
  - 7. Section 02510 - Pavement Repairs
  - 8. Section 02521 - Concrete Sidewalks, Curbs, and Gutters
  - 9. Section 02920 - Site Restoration

#### 1.02 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of the General Requirements of the Contract Documents and Section 01300. In addition, the following specific information shall be provided:
  - 1. Complete product data and engineering data, including shop drawings.
  - 2. Documentation that manufacturers have consistently produced products of satisfactory quality and performance for a period of at least two (2) years.

3. Written certification to the **County** that all products furnished comply with all applicable requirements of these Specifications.

### 1.03 QUALITY ASSURANCE

- A. Reference Standards: The **Contractor** shall comply with the applicable provisions and recommendations of the latest editions of the following standards, except as otherwise shown on the Plans or specified in these Specifications.
  1. ANSI A21.4 (AWWA C104) - Cement Mortar Lining for Ductile Iron and Gray Iron Pipe and Fittings, for Water and Other Liquids.
  2. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
  3. ANSI B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  4. ANSI B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
  5. ASTM B32 - Standard Specification for Solder Metal.
  6. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
  7. ASTM C150 - Standard Specification for Portland Cement.
  8. ASTM D1248 - Polyethylene Plastics Molding and Extrusion Materials.
  9. ASTM G62 - Test Methods for Holiday Detection in Pipeline Coatings.
  10. AWWA C104 (ANSI A21.4) - Cement Mortar Lining for Ductile Iron and Gray Iron Pipe and Fittings, for Water and Other Liquids.
  11. AWWA C110 (ANSI A21.10) - Ductile Iron and Gray Iron Fittings, 3-in. through 48-in., for Water and Other Liquids.
  12. AWWA C111 (ANSI A21.11) - Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
  13. AWWA C115 (ANSI A21.15) - Flanged Ductile Iron Pipe with Threaded Flanges.
  14. AWWA C150 (ANSI A21.50) - Thickness Design of Ductile Iron Pipe.
  15. AWWA C151 (ANSI A21.51) - Ductile Iron Pipe, Centrifugally Cast for Water and Other Liquids.
  16. AWWA C153 (ANSI A21.53) - Ductile Iron Compact Fittings, 3-in. through 24-in. and 54-in. through 64-in., for Water Service.
  17. AWWA C600 - Installation of Ductile Iron Water Mains and Their Appurtenances.
  18. AWWA C606 - Joints, Grooved and Shouldered Type.
  19. AWWA C651 - Disinfecting Water Mains.
  20. SSPC-SP6 - Steel Structures Painting Council, Commercial Blast Cleaning.
  21. Other ANSI, ASTM, and AWWA specifications referenced herein.

### 1.04 TRANSPORTATION AND HANDLING

- A. Unloading: The **Contractor** shall furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves, and accessories. The **Contractor** shall make equipment available at all times for use in unloading. The **Contractor** shall not drop or dump materials. All materials dropped or dumped shall be subject to rejection without additional justification. Pipe handled on skids shall not be rolled or skidded against the pipe on the ground.

- B. Handling: The **Contractor** shall handle pipe, fittings, valves, and accessories carefully to prevent shock or damage. The **Contractor** shall handle pipe by rolling on skids, forklift, or front-end loader. The **Contractor** shall not use material damaged in handling. Slings, hooks, or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior coatings or internal lining of the pipe.

#### 1.05 STORAGE AND PROTECTION

- A. The **Contractor** shall store all pipes that cannot be distributed along the route. The **Contractor** shall make arrangements for the use of suitable storage areas.
- B. Stored materials shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that shall protect them from damage by freezing.
- C. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tier shall be kept off the ground on timbers, rails, or concrete. Pipe in tiers shall be alternated: bell-plain end; plain end-bell. At least two (2) rows of timbers shall be placed between tiers and chocks, affixed to each other in order to prevent movement. The timbers shall be large enough to prevent contact between the pipes in adjacent tiers.
- D. Stored mechanical and push on joint gaskets shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first in, first out basis.
- E. Mechanical-joint bolts shall be handled and stored in such a manner that shall ensure proper use with respect to types and sizes.

#### 1.06 WATER MAIN LOCATION

- A. Except as otherwise shown on the Plans, the minimum depth of cover shall be four (4) feet and the maximum cover shall be five (5) feet. All deviations shall be specifically approved by the **County**.
- B. The installation of a water main parallel to another utility in the same vertical plane is not permitted, i.e., "stacking" of utilities is not permitted.

### **PART 2 - PRODUCTS**

#### 2.01 DUCTILE IRON PIPE

- A. Ductile iron pipe shall be manufactured in accordance with the requirements of AWWA C151. All pipe, except specials, shall be furnished in nominal lengths of eighteen (18) to twenty (20) feet. Sizes shall be as shown on the Plans. All pipe shall have a minimum pressure rating as indicated in following Table below, and corresponding minimum wall thickness, unless otherwise shown on the Plans, specified in these Specifications, or approved by the **County**.

| <b>Pipe Sizes</b>      |                      |
|------------------------|----------------------|
| Pipe Diameter (inches) | Pressure Class (psi) |
| 4 – 12                 | 350                  |
| 14 – 18                | 350                  |
| 20                     | 300                  |
| 24                     | 250                  |
| 30 – 54                | 200                  |
| 60 – 64                | 200                  |

- D. Flanged pipe minimum wall thickness shall be equal to Special Class 53. Flanges shall be furnished by the pipe manufacturer.
- E. Ductile Iron Pipe and fittings shall be cement lined in accordance with the requirements of AWWA C104. A seal coat over the cement lining is not required. Pipe and fittings shall be furnished with a bituminous outside coating.
- F. Fittings shall be ductile iron and shall conform to the requirements of AWWA C110 or AWWA C153 with a minimum rated working pressure of two-hundred and fifty (250) psi.
- G. Malleable iron threaded fittings and appurtenances shall conform to the requirements of ASTM A47, ASTM A197, or ANSI B16.3
- H. Unless otherwise specified, steel fittings and appurtenances shall conform to the requirements of ASTM A234, ASTM A105, or ANSI B16.11; and fabricated steel fittings and appurtenances shall conform to the requirements of AWWA C208.
- I. Fittings for grooved end piping systems shall be full flow cast fittings, steel fittings, or segmentally welded fittings with grooves or shoulders designed to accept grooved end couplings. Cast fittings shall be cast of ductile iron conforming to the requirements of ASTM A536 or malleable iron conforming to the requirements of ASTM A47. Standard steel fittings, including large size elbows, shall be forged steel conforming to the requirements of ASTM A106. Standard segmentally welded fittings shall be fabricated of Schedule 40 carbon steel pipe.
- J. Joints:
  - 1. Unless shown or specified otherwise, joints for ductile iron pipe shall be push on or restrained joint type for pipe and standard mechanical, push on, or restrained joints for fittings. Push on and mechanical joints shall conform to the requirements of AWWA C111.
  - 2. The only acceptable restrained joint systems for ductile iron pipe are identified in the Table below, unless approved by the **County**. No field welding of restrained joint pipe shall be allowed.



| <b>Acceptable Restrained Joints</b> |                     |                   |                                 |                        |
|-------------------------------------|---------------------|-------------------|---------------------------------|------------------------|
| <b>Diameter (inches)</b>            | ACIPCO              | U.S. Pipe         | McWayne                         | Generic <sup>(1)</sup> |
| 4 – 12                              | Fast-Grip Flex Ring | Field Lok TR Flex | Push-On Restrained Joint Type A | MJ with Retainer Gland |
| 16 – 24                             | Fast-Grip Flex Ring | Field Lok TR Flex | Push-On Restrained Joint Type A | MJ with Retainer Gland |
| 30 – 36                             | Flex Ring           | TR Flex           | Push-On Restrained Joint Type B | MJ with Retainer Gland |
| 42 – 48                             | Lok-Ring            | TR Flex           | N/A                             | MJ with Retainer Gland |
| 54 – 64                             | Lok-Ring            | TR Flex           | N/A                             | N/A                    |

<sup>(1)</sup> Fittings and valves only, and only where specifically allowed.

3. Restrained joint pipe (RJP) on supports shall have bolted joints and shall be specifically designed for clear spans of at least thirty-six (36) feet and as approved by the **County**
4. Flanged joints shall meet the requirements of ANSI B16.1, Class 125.

K. The **Contractor** shall provide the appropriate gaskets for mechanical and flange joints. Gaskets for flange joints shall be made of one-eighth ( $\frac{1}{8}$ ) inch thick, cloth reinforced rubber; gaskets may be ring type or full-face type.

L. Bolts and Nuts:

1. The **Contractor** shall provide the necessary bolts for connections. All bolts and nuts shall be threaded in accordance with the requirements of ANSI B1.1, Coarse Thread Series, Class 2A external, and 2B internal fit. All bolts and nuts shall be made in the U.S.A.
2. Bolts and nuts for mechanical joints shall be Tee Head Bolts and nuts of high strength low alloy steel in accordance with the requirements of ASTM A242 to the dimensions shown in AWWA C111/ANSI A21.11.
3. Flanged joints shall be bolted with through stud or tap bolts of required size as directed. Bolt length and diameter shall conform to the requirements of ANSI/AWWA C115 for Class 125 flanges shown in ANSI/ASME B16.1.
4. Bolts for exposed service shall be zinc plated, cold pressed, steel machine bolts conforming to the requirements of ASTM A307, Grade B.

Nuts for exposed service shall be zinc plated, heavy hex conforming to ASTM A 563. Zinc plating shall conform to the requirements of ASTM B633, Type II.

5. Bolts for submerged service shall be stainless steel machine bolts conforming to the requirements of ASTM A193, Grade B8. Nuts shall be heavy hex, stainless steel conforming to the requirements of ASTM A194, Grade 8.

M. Mechanical joint glands shall be ductile iron.

N. Welded Outlet: Welded outlets may be provided in lieu of tees or saddles on mains with a diameter greater than or equal to twenty four (24) inches. The pipe joint on the outlet pipe shall meet the joint requirements specified above. All welding shall be performed by a certified welder and approved by the **County**. The minimum pipe wall thickness of the parent pipe and the outlet pipe shall be Special Thickness Class 53 [Pressure Class 350 for sixty (60) and sixty-four (64) inch sizes]. The welded outlet shall be rated for two hundred and fifty (250) psi working pressure. Each welded outlet shall be hydrostatically tested at five hundred (500) psi or as approved by the **County**. The welded outlet shall be fabricated by the manufacturer of the parent pipe. The maximum outlet diameters shall not exceed those listed in the following table:

| Maximum Outlet Diameters      |                                  |
|-------------------------------|----------------------------------|
| Parent Pipe Diameter (inches) | Maximum Outlet Diameter (inches) |
| 24                            | 16                               |
| 30                            | 20                               |
| 36                            | 24                               |
| 42                            | 30                               |
| 48                            | 30                               |
| 54                            | 30                               |
| 60                            | 30                               |
| 64                            | 30                               |

- O. Ductile iron pipe shall be encased with polyethylene film where shown on the Plans. Polyethylene film shall be in accordance with the requirements of AWWA C105.
- P. Acceptance shall be based on the **County's** inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

## 2.02 PIPE LINING

- A. Cement Mortar: Unless otherwise specified, pipe and fittings shall be lined with cement mortar as specified in AWWA C205. Fittings and specials larger than twenty four (24) inches not fabricated from centrifugally lined straight sections

shall require two (2) inches by four (4) inches by thirteen (13) gage self-furring wire mesh reinforcement for hand-applied lining.

### 2.03 PIPE COATING

- A. Epoxy: Unless otherwise specified, pipe and fittings shall be coated with a liquid epoxy as specified in AWWA C210 with the following requirements:
  - 1. No Coal tar products shall be incorporated in the liquid epoxy.
  - 2. The curing agent may be an amidoamine as well as other curing agents listed in AWWA C210
  - 3. The coating shall be applied to a minimum thickness of sixteen (16) mils in not less than two (2) coats.
- B. Polyethylene tape: Where shown on the Plans or directed by the **County**, pipe and fittings shall be coated and wrapped with prefabricated multi-layer cold applied polyethylene tape coating in accordance with the requirements of AWWA C214. The coating application shall be a continuous step operation in conformity with the requirements of AWWA C214, Section 3. The total coating thickness shall be not less than fifty (50) mils for pipe twenty four (24) inches and smaller and not less than eighty (80) mils for pipe twenty six (26) inches and larger.

### 2.04 FUSION EPOXY COATING AND LINING

- A. Where shown on the Plans or directed by the **County**, steel pipe and fittings shall be fusion epoxy coated and lined. The fusion epoxy coating shall be 3M Scotchkote 203, or approved equal, approved by the **County**. Surface preparation shall be in accordance with the requirements of SSPC-SP 10 near white blast cleaning. The application method shall be by the fluidized bed method and shall attain twelve (12) mils minimum dry film thickness.
- B. Field welds, connections, and otherwise damaged areas shall be coated and patched according to the manufacturer's instructions with 3M Scotchkote 306 or approved equal

### 2.05 COPPER PIPE

- A. Pipe shall be rolled copper tubing, ASTM B 88, Type K.
- B. Where required, sweat to screw adapters shall be cast bronze ANSI B16.18, wrought solder joint ANSI B16.22. Unions shall be cast bronze or bronze with solder connections. Joints shall be made with 95/5 solder for Type K pipe. All fittings less than or equal to 1" shall be flared unless otherwise approved by the **County**.

### 2.06 PIPING APPURTENANCES

- A. Retainer Glands:

1. Retainer glands shall be Megalug Series 1100, as manufactured by EBAA Iron, Uni-Flange Series 1400 or equal, as manufactured by Ford Meter Box Company.
  2. Retainer glands shall be provided at all mechanical joints, including fittings, valves, hydrants and other locations as shown on the Plans.
- B. Hydrant Tees: Hydrant tees shall be ACIPCO A10180 or U.S. Pipe U 592 or approved equal.
- C. Anchor Couplings: Lengths and sizes shall be as shown on the Plans. Anchor couplings shall be equal to ACIPCO A 10895 or U.S. Pipe U 591.
- D. Hydrant Connector Pipe: The connector pipe shall be ductile iron meeting the requirements of AWWA C153; twenty-four (24) inch offset design so that the hydrant can be adjusted to ensure placement at the proper grade; shall have an anchoring feature at both ends so that when used with M.J. split glands a restrained joint is provided; cement lined in accordance with AWWA C104 and equal to the Gradelok as manufactured by Assured Flow Sales, Inc., Sarasota, Florida.
- E. Tapping Saddles: Tapping saddles are not allowed unless approved by the **County**
- F. Detection Tape: Detection tape shall be composed of a solid aluminum foil encased in a protective plastic jacket. Tapes shall be color coded in accordance with APWA color codes with the following legends: Water Systems, Safety Precaution Blue, and "Caution Water Line Buried Below". Colors may be solid or striped. Tape shall be permanently printed with no surface printing allowed. Tape width shall be a minimum of two (2) inches when buried less than ten (10) inches below the surface. Tape width shall be a minimum of three (3) inches when buried greater than ten (10) inches and less than twenty (20) inches. Detection tape shall be equal to Lineguard Type III Detectable or Allen Systems Detectatape.

## 2.07 FIRE HYDRANTS

- A. General: Fire hydrant shall be a two (2) piece standpipe and stem, compression shutoff, dry-barrel type. Fire hydrant shall conform to the requirements of AWWA C502 and shall be listed by Underwriters Laboratories, Inc. in accordance with the requirements of UL 246.
- B. Acceptable Products: Fire hydrants shall be American Valve and Hydrant B-62-B, M & H 129T, Mueller Super Centurion 250-AWB, A-423, Kennedy K81A, U.S. Metropolitan 250, or approved equal.
- C. Product Data: The following information shall be provided to the **County**:
1. Affidavit of compliance with the requirements of AWWA C502.
  2. Records of standard tests.

D. Manufacture

1. Fire hydrant shall be cast iron traffic, three (3) way four and one-half ( $4\frac{1}{2}$ ) inch valve, and left opening type.
2. Internal main valve diameter shall be a minimum of five and one quarter ( $5\frac{1}{4}$ ) inches.
3. Each hydrant shall have the name of the manufacturer, the year of manufacture, and the nominal size in legible, raised letters cast on the barrel or bonnet.
4. Each hydrant shall be constructed with a moist-proof lubricant chamber that encloses the operating threads and which provides automatic lubrication of the threads and bearing surfaces each time the hydrant is operated. The bonnet shall have "O" ring packing and reservoir capable of utilizing oil or grease so that all operating parts are enclosed in the lubricant.
5. Operating nut shall be bronze, seven eights ( $7/8$ ) inch tapered square nut with tamper-proof device. The direction "opening left" shall be marked on a special tamper-proof device. The tamper-proof device shall be a combination fold-down nut for the op-nut. Hydrant shall have ductile iron combination hold-down nut and operating nut shield to eliminate operation of hydrant with wrenches other than a special socket-type wrench. Arrow shall be cast on the outside of the periphery of the operating nut shield indicating direction of the operation for opening the hydrant.
6. The hydrant barrel section shall be connected at the ground line in a manner that shall prevent damage to the hydrant when struck by a vehicle. The main valve rod section shall be connected at the ground line by a frangible coupling. The standpipe and ground line safety construction shall be such that the hydrant nozzles can be rotated to any desired position without disassembling or removing the top operating components and top section of the hydrant standpipe.
7. The hydrant main valve shall be made of synthetic rubber and formed to fit the valve seat accurately. The hydrant valve shall be made from material that shall resist damage from rocks or other foreign matter. The valve shall be reversible. The hydrant shall be a true compression type, opening against pressure and closing with pressure.
8. The main valve seat shall be of bronze and its assembly into the hydrant shall involve bronze-to-bronze thread engagement. Two (2) "C" ring seals shall be provided as a positive pressure seal between the bronze seat ring and the shoe. The valve assembly pressure seals shall be obtained to allow without the employment of torque of torque compressed gaskets. The hydrant shall be designed to allow the removal of all operating parts

through the hydrant barrel by means of a single, lightweight disassembly wrench without excavating.

9. The drain mechanism shall be designed to operate with the operation of the main valve and shall allow a momentary flushing of the drain ports. A minimum of two (2) internal and two (2) external bronze-lined drain pots shall be required in the main valve assembly to drain the hydrant barrel.
10. Cast iron inlet elbows shall have a six (6) inch mechanical joint connection complete with accessories.
11. Barrel extension sections shall be available in six (6) inch increments complete with rod, extension, coupling and the necessary flanges, gaskets and bolts, so that extending the hydrant can be accomplished without excavating. Hydrants shall have letters "AWB" cast in the barrel for identification purposes. Bury mark of fire hydrant shall be cast on barrel of the hydrant.
12. Hydrant shall have two (2) two and one-half (2½) inch hose nozzles one-hundred and twenty (120) degrees apart and one (1) four and one half (4½) inch pumper nozzle. The threads shall be national standard threads. The nozzle caps shall be secured to fire hydrant with non-kinking chain loop on cap ends to permit free turning of caps.
13. Bolts and nuts shall be corrosion resistant.
14. Hydrants shall be designed with safety flange to protect the barrel and stem from damage and to eliminate flooding of area when hydrant is struck or knocked off by vehicular equipment or other objects.

E. Setting Hydrants: Fire hydrants Traffic design.

1. Hydrants shall be placed at the locations indicated on the Plans in a manner to provide complete accessibility and so that the possibility of damage from vehicles or injury to pedestrians shall be minimized. The **Contractor** shall install proper "bury" hydrants or shall use, at no cost to the **County**, proper length extensions to ensure that each fire hydrant is installed in accordance with the manufacturer's recommendation and the requirements of these Specifications. When placed behind curb, the hydrant barrel shall be set such that no portion of the pumper or hose nozzle caps shall be less than six (6) inches, nor more than twelve (12) inches from the gutter face of the curb. The **Contractor** shall place gravel as shown on the Plans. All pipe connecting the fire hydrant to the main line shall be ductile iron pipe meeting the requirements of these Specifications or approved connecting pieces.
2. The use of PVC pipe for hydrant branch piping is specifically prohibited. The connection of the hydrant to the supply main shall be through either a ductile iron tee or a tapping sleeve and shall include an outlet valve at the point of connection. Using a tapping sleeve where the Plans indicate a tee shall not result in any additional costs to the **County**.

- F. Connection to main: Each fire hydrant shall be connected to the main with a six (6) inch ductile iron branch connection. Gate valves shall be used on fire hydrant branches unless otherwise specified.
- G. Drainage: Stone no larger than four (4) inches in diameter, shall be placed around the base of the fire hydrant for a depth of thirty (30) inches from the bottom of the trench and shall extend for a distance of thirty (30) inches from the back of the hydrant toward the main.
- H. Anchoring and Bracing: The shoe of each fire hydrant shall be braced against unexcavated earth at the end of the trench with stone slabs or poured concrete; or it shall be tied to the pipe with suitable metal tie rods or clamps or both, as directed by the **County**. The straps and rods, nuts and threads, used for anchoring shall be coated with protective materials at the end of installation.
- I. Painting, Coating, and Lubricating:
  - 1. All iron parts of the hydrant inside and outside shall be cleaned and thereafter, unless otherwise stipulated, all surfaces, except the exterior portion above the ground line, shall be coated or painted with, or dipped in an asphalt or bituminous base paint or coating. If these parts are painted, they shall be covered with two (2) coats, the first being allowed to dry thoroughly before the second coat is applied.
  - 2. The outside of the hydrant valve above the finished ground line shall be thoroughly cleaned and thereafter painted in the shop with two (2) coats of Koppers primer 621 or approved equal. After installation, each hydrant shall be painted with two (2) field coats of Koppers Glamortex Enamel as manufactured by the Sika Inertol Company or approved equal, color shall be silver. The top cap of each hydrant shall be painted in one of the following colors to indicate the main size: six (6) inch or eight (8) inch mains shall be silver; ten (10) inch or twelve (12) inch mains shall be yellow; and sixteen (16) inch or greater mains shall be green.
  - 3. All bronze, threaded contact moving parts shall, during shop assembly, be lubricated, and protected by a coating of rustproof compound to prevent damage in shipment and storage.
- J. Accessories: The **Contractor** shall furnish one (1) standard four (4) sided hydrant wrench for each ten (10) hydrants installed or fraction thereof.
- K. Testing: All fire hydrants shall be tested in strict accordance with the requirements of AWWA C502, with no additional cost to the **County**. The Certificate of Compliance shall be furnished to the **County**.

## 2.08 GATE VALVES (GV)

- A. Twenty (20) Inches in Diameter and Smaller:

1. Gate valves shall be resilient-seated type conforming to the requirements of AWWA C509 or AWWA C515.
  2. Valves through twelve (12) inches in diameter shall have a minimum rated working pressure of two hundred (200) psi. Sixteen (16) inch and twenty (20) inch valves shall have a minimum rated working pressure of one hundred and fifty (150) psi.
  3. Valves less than four (4) inches in diameter shall have threaded ends. Larger valves shall be mechanical joint unless shown otherwise on the Plans.
  4. Valves shall be non-rising stem type with a two (2) inch square wrench nut, and shall open left. The manufacturer shall provide an affidavit of compliance with the applicable AWWA standards.
  5. All internal ferrous surfaces shall be coated with epoxy to a minimum thickness of four (4) mils. The epoxy shall be non-toxic, impart no taste to the water and shall conform to the requirements of AWWA C550.
  6. All seals between valve parts, such as body and bonnet, bonnet and bonnet cover, shall be flat gaskets or O-rings.
  7. Valve disks shall be made of cast or ductile iron having a vulcanized, synthetic rubber coating.
  8. Valves shall be manufactured by American Flow Control, Mueller, or M & H Valve.
- B. Twenty-four (24) Inches in Diameter and Larger:
1. Valves shall be double disc type conforming to the requirements of AWWA C500.
  2. Valves shall be designed for horizontal installation with tracks and rollers, bypass valves, and bevel gear type operator. Valves shall be rated for one-hundred and fifty (150) psi working pressure.
  3. Valve ends shall be mechanical joint type except where restrained joint ends are shown. Flanged joints shall meet the requirements of ANSI B16.1, Class 125.
  4. Buried valves shall be equipped with valve boxes unless access to the operator is provided by a manhole.
  5. Manually operated valves, including geared valves, shall be non-rising stem type having O-ring seals.
  6. Gate valves twenty four (24) inches in diameter and larger shall be manufactured by American R/D Gate Valve Company, Mueller, M & H Valve, or approved equal.



## 2.09 BUTTERFLY VALVES (BV)

- A. Unless indicated on the Plans to be two-hundred and fifty (250) pound butterfly valves shall be resilient seated, short body design, and shall be designed, manufactured, and tested in accordance with the requirements of AWWA C504 for Class 150B.
- B. Where butterfly valves are indicated on the Plans to be 250 pound butterfly valves shall be resilient seated, short body design, and shall be designed, manufactured, and tested in accordance with the requirements of AWWA C504, and as modified below. Valves shall be designed for a rated working pressure of two-hundred and fifty (250) psi. Class B, AWWA C504 Section 5.2 testing requirements are modified as follows:
1. The leakage test shall be performed at a pressure of two-hundred and fifty (250) psi.
  2. The hydrostatic test shall be performed at a pressure of five-hundred (500) psi.
  3. Proof of design tests shall be performed and certification of such proof of design test shall be provided to the **County**.
- C. 150 Pound Valves: Valve bodies shall be ductile iron conforming to the requirements of ASTM A536, Grade 65-45-12, or ASTM A126, Grade B cast iron. Shafts shall be ASTM A76, Type 304 stainless steel, machined and polished. Valve discs shall be ductile iron, ASTM A536, Grade 65-45-12 or ASTM A126, Grade B cast iron. The valve shall have a resilient seat.
- D. 250 Pound Valves: Valve bodies shall be ductile iron conforming to the requirements of ASTM A536, Grade 65-45-12 or ASTM A126, Grade B cast iron shafts, and shaft hardware shall be ASTM A564, Type 630 stainless steel, machined and polished. Valve discs shall be ductile iron, ASTM A536, Grade 65-45-12. The resilient valve seat shall be located either on the valve disc or in the valve body and shall be fully field adjustable and field replaceable.
- E. Valves shall be installed with the valve shafts horizontal. Valves and actuators shall have seals on all shafts and gaskets on valve actuator covers to prevent the entry of water. Actuator mounting brackets shall be totally enclosed and shall have gasket seals.
- F. Actuators:
1. Valves shall be equipped with traveling nut, self-locking type actuators designed, manufactured, and tested in accordance with the requirements of AWWA C504. Actuators shall be capable of holding the disc in any position between full open and full closed without any movement or fluttering of the disc.
  2. Actuators shall be furnished with fully adjustable mechanical stop limiting devices. Actuators that utilize the sides of the actuator housing to limit disc travel are unacceptable.

3. Valve actuators shall be capable of withstanding a minimum of four-hundred and fifty (450) foot pounds of input torque in either the open or the closed position without damage.
- G. Operators: Valves for buried service shall have a nut-type operator and shall be equipped with a valve box and stem extension, as required.
- H. Valve ends shall be mechanical joint type, except where flanged or restrained joint ends are shown on the Plans. Flange joints shall meet the requirements of ANSI B16.1, Class 125.
- I. Butterfly valves shall be manufactured by Mueller (Pratt), DeZurik, or equal.
- J. All butterfly valves shall be installed in an approved structure. The structure shall meet the applicable requirements within Section 02607 Manholes, Junction Boxes, and Inlets. The structure design shall be submitted to the **County** for approval.

#### 2.10 VALVE BOXES (VB) AND EXTENSION STEMS

- A. All valves shall be equipped with valve boxes. The valve boxes shall be cast iron two (2) piece screw type with drop covers. Valve boxes shall have a five and one-quarter (5¼) inch inside diameter. Valve box covers shall weigh a minimum of thirteen (13) pounds. The valve boxes shall be adjustable to six (6) inches up or down from the nominal required cover over the pipe. Valve boxes shall be of sufficient length that bottom flange of the lower belled portion of the box is below the valve operating nut. Ductile or cast iron extensions shall be provided as necessary. Covers shall have "WATER VALVE" or "WATER" cast into them. Valve boxes shall be manufactured in the United States.
- B. All valves shall be furnished with extension stems if operating nut is greater than four (4) feet deep, to bring the operating nut to within twenty-four (24) inches of the top of the valve box. Connection to the valve shall be with a wrench nut coupling and a set screw to secure the coupling to the valve's operating nut. The coupling and square wrench nut shall be welded to the extension stem. Extension stems shall be equal to Mueller A-26441 or M & H Valve Style 3801 or approved equal.

#### 2.11 VALVE MARKERS (VM)

- A. The **Contractor** shall provide a concrete valve marker as detailed on the Plans for each valve installed, except on hydrant isolation valves. Valve markers shall be stamped "WATER."

#### 2.12 TAPPING SLEEVES AND VALVES (TS&V)

- A. Tapping sleeves for mains twelve (12) inches in diameter and smaller shall be ductile iron of the split sleeve, mechanical joint type. Tapping sleeves shall be equal to Mueller H-615.

- B. Tapping sleeves for mains larger than twelve (12) inches shall be of all stainless steel construction.
- C. The **Contractor** shall be responsible for determining the outside diameter of the pipe to be connected to prior to ordering the sleeve. The tapping sleeve shall be rated for two-hundred and fifty (250) psi.
- D. Valves shall be gate valves furnished in accordance with the specifications shown above, with flanged connection to the tapping sleeve and mechanical joint connection to the branch pipe. The tapping sleeve shall be supplied by the valve manufacturer.

### 2.13 CORPORATION COCKS AND CURB STOPS

- A. Corporation cocks and curb stops shall be ball type, shall be made of bronze conforming to the requirements of ASTM B61 or ASTM B62, and shall be suitable for the working pressure of the system. Ends shall be suitable for flared tube joint. Threaded ends for inlet and outlet of corporation cocks shall conform to the requirements of AWWA C800; coupling nut for connection to flared copper tubing shall conform to the requirements of ANSI B16.26. Corporation cocks and curb stops shall be manufactured by Mueller, Ford FB-600, or equal.

## **PART 3 - EXECUTION**

### 3.01 EXISTING UTILITIES AND OBSTRUCTIONS

- A. The Plans indicate utilities or obstructions that are known to exist according to the best information available. The **Contractor** shall call the Utilities Protection Center (UPC) (800 282 7411) as required by Georgia Law (O.C.G.A. Sections 25 9 1 through 25 9 13) and shall call all utilities, agencies, or departments that own and/or operate utilities in the vicinity of the construction work site at least seventy-two (72) hours [three (3) business days] prior to construction to verify the location of the existing utilities.
- B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service:
  - 1. The **Contractor** shall provide the required notice to the utility owners and allow them to locate their facilities according to Georgia law. Field utility locations are valid for only ten (10) days after original notice. The **Contractor** shall ensure at the time of any excavation that a valid utility location exists at the point of excavation.
  - 2. The **Contractor** shall expose the facility, for a distance of at least two-hundred (200) feet in advance of pipeline construction, to verify its true location and grade. The **Contractor** shall repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.
  - 3. The **Contractor** shall avoid utility damage and interruption by protection with means or methods recommended by the utility owner.

4. The **Contractor** shall maintain a log identifying when phone calls were made, who was called, area for which utility relocation was requested and work order number issued, if any. The **Contractor** shall provide the **County with** an updated copy of the log biweekly, or more frequently if required by the **County**.
- C. Conflict with Existing Utilities:
1. Horizontal Conflict: Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed water main does not permit safe installation of the water main by the use of sheeting, shoring, tying back, supporting, or temporarily suspending service of the parallel or crossing facility. The **Contractor** may change the proposed alignment of the water main to avoid horizontal conflicts if the new alignment remains within the available right of way or easement, complies with regulatory agency requirements and after a written request to and subsequent approval by the **County**. Where such relocation of the water main is denied by the **County**, the **Contractor** shall arrange to have the utility, main, or service relocated. The **Contractor** shall receive approval from the **County** for any utility relocation.
  2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed water main does not permit the crossing without immediate or potential future damage to the utility, main, service, or the water main. The minimum clearance shall be twelve (12) inches. The **Contractor** may change the proposed grade of the water main to avoid vertical conflicts if the changed grade maintains adequate cover and complies with regulatory agencies requirements after written request to and subsequent approval by the **County**. Where such relocation of the water main is denied by the **County**, the **Contractor** shall arrange to have the utility, main, or service relocated. The **Contractor** shall receive approval from the **County** for any utility relocation.
- D. Electronic Locator: The **Contractor** shall have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.
- E. Water and Sewer Line Separation:
1. Water mains shall maintain a minimum ten (10) foot edge-to-edge separation from sewer lines, whether gravity or pressure. If the main cannot be installed in the prescribed easement or right-of-way and provide the ten (10) foot separation, the separation may be reduced, provided the bottom of the water main is a minimum of eighteen (18) inches above the top of the sewer. Should neither of these two separation criteria be possible, the water main shall be installed below the sewer with a minimum vertical separation of eighteen (18) inches.

2. The water main, when installed below the sewer, shall be encased in concrete with a minimum six (6) inch concrete depth, to the first joint in each direction. Where water mains cross the sewer, the pipe joint adjacent to the pipe crossing the sewer shall be cut to provide maximum separation of the pipe joints from the sewer.
3. No water main shall pass through, or come in contact with, any part of a sanitary sewer manhole.

### 3.02 CONSTRUCTION ALONG HIGHWAYS, STREETS, AND ROADWAYS

- A. The **Contractor** shall install pipe lines and appurtenances along highways, streets, and roadways in accordance with the applicable regulations of, and permits issued by, the Georgia Department of Transportation (GDOT) or applicable permitting authority and the **County** with reference to construction operations, safety, traffic control, road maintenance, and repair.
- B. Traffic Control: Shall meet the requirements of Section 01550 and as stipulated below.
  1. The **Contractor** shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the Work and the safety of the public. Flagmen shall be certified by a GDOT-approved training program.
  2. Construction traffic control devices and their installation shall be in accordance with the current Manual on Uniform Traffic Control Devices for Streets and Highways.
  3. Placement and removal of construction traffic control devices shall be coordinated with GDOT and the **County** a minimum of forty eight (48) hours in advance of the activity.
  4. Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street right of way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as "Flagmen Ahead," shall be removed and replaced when needed.
  5. Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.

6. Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.
7. Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white background. Construction sign panels shall meet the minimum reflective requirements of GDOT and the **County**. Sign panels shall be of durable materials capable of maintaining their color, reflective character, and legibility during the period of construction.
8. Channelization devices shall be positioned preceding an obstruction at a taper length as required by the Manual on Uniform Traffic Control Devices for Streets and Highways, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to insure that they are maintained in the proper position throughout their period of use.

C. Construction Operations:

1. The **Contractor** shall perform all work along highways, streets, and roadways to minimize interference with traffic.
2. Stripping: Where the pipe line is laid along road right of way, the **Contractor** shall strip and stockpile all sod, topsoil, and other material suitable for right of way restoration.
3. Trenching, Laying and Backfilling: The **Contractor** shall not open the trench any further ahead of pipe laying operations than is necessary. The **Contractor** shall backfill and remove excess material immediately behind laying operations. The **Contractor** shall complete excavation and backfill for any portion of the trench in the same day.
4. Shaping: The **Contractor** shall reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. The **Contractor** shall replace topsoil, sod, and any other materials removed from shoulders.
5. Construction operations shall be limited to four hundred (400) feet along areas, including clean up and utility exploration.

D. Excavated Materials: The **Contractor** shall not place excavated material along highways, streets, and roadways in a manner that obstructs traffic. The **Contractor** shall sweep all scattered excavated material off the pavement in a timely manner meeting all Erosion and Sedimentation requirements of Section 02125.

E. Drainage Structures: The **Contractor** shall keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.

E&S measures shall be maintained and the **Contractor** is subject to clean any storm line and MH that has received siltation.

- F. Landscaping Features: Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision and other signs within the right of way and easement. The **Contractor** shall take extreme care in moving landscape features and promptly reestablish these features.
- G. Maintaining Highways, Streets, Roadways, and Driveways:
1. The **Contractor** shall maintain streets, highways, roadways, and driveways in suitable condition for movement of traffic until completion and final acceptance of the Work.
  2. During the time period between pavement removal and completing permanent pavement replacement, the **Contractor** shall maintain highways, streets, and roadways by the use of steel running plates. Running plate edges shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.
  3. The **Contractor** shall furnish a road grader or front end loader for maintaining highways, streets, and roadways. The grader or front end loader shall be available at all times.
  4. The **Contractor** shall immediately repair all driveways that are cut or damaged and the **Contractor** shall maintain them in a suitable condition for use until completion and final acceptance of the Work.

### 3.03 PIPE DISTRIBUTION

- A. Pipe shall be distributed and placed in such a manner that shall not interfere with traffic.
- B. No pipe shall be strung further along the route than one-thousand (1,000) feet beyond the area in which the **Contractor** is actually working without written permission from the **County**. The **County** reserves the right to reduce this distance to a maximum distance of two-hundred (200) feet in residential and commercial areas based on the effects of the distribution to the adjacent property owners.
- C. No street or roadway shall be closed for unloading of pipe without first obtaining permission from the proper authorities. The **Contractor** shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets, and roadways upon which pipe is distributed.
- D. No distributed pipe shall be placed inside drainage ditches.

- E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five (5) feet from the roadway pavement, as measured edge to edge.

### 3.04 LAYING AND JOINTING PIPE AND ACCESSORIES

- A. The **Contractor** shall lay all pipe and fittings to accurately conform to the lines and grades established by the **County**.
- B. Pipe Installation:
  - 1. Pipe shall be installed in accordance with the requirements of AWWA M11, Chapter 16. Welded joints shall be in accordance with the requirements of AWWA C206.
  - 2. Sleeve-type mechanical pipe couplings shall conform to the requirements of AWWA M11.
  - 3. Unless otherwise specified, buried mechanical couplings and valves shall be field coated as shown on the Plans, specified in these Specifications, or as directed by the **County**.
  - 4. Anchorage shall be provided as shown on the Plans, specified in these Specifications, or as directed by the **County**.
  - 5. Proper implements, tools, and facilities shall be provided for the safe performance of the Work. All pipe, fittings, valves, and hydrants shall be lowered carefully into the trench by means of slings, ropes, or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench.
  - 6. All pipe, fittings, valves, hydrants, and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be rejected by the **County** and replaced at the **Contractor** or manufacturer's expense.
  - 7. All lumps, blisters, and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe containing dirt shall be laid.
  - 8. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing, or other materials shall be placed in the pipe at any time.
  - 9. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.



10. It is not mandatory to lay pipe with the bells facing the direction in which work is progressing.
11. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade, shall not be permitted.
12. The **Contractor** shall provide detection tape for all pipe greater than twelve (12) inches in diameter. Detection tape shall be buried four (4) to ten (10) inches deep. Should detection tape need to be installed deeper, the **Contractor** shall provide three (3) inch wide tape. In no case shall detection tape be buried greater than twenty (20) inches from the finish grade surface.

C. Alignment and Gradient:

1. The **Contractor** shall lay pipe straight in alignment and gradient or follow true curves as nearly as practicable. The **Contractor** shall not deflect any joint more than the maximum deflection recommended by the manufacturer.
2. The **Contractor** shall maintain a transit, level, and accessories on the site of the Work to lay out angles and ensure that deflection allowances are not exceeded.

D. Expediting of Work: The **Contractor** shall excavate, lay the pipe, and backfill as closely together as possible. The **Contractor** shall not leave un-jointed pipe in the trench overnight. The **Contractor** shall backfill and compact the trench as soon as possible after laying and jointing is completed. The **Contractor** shall backfill the installed pipe each day at the close of work and at all other times when work is not in progress. No excavation is to be left unbackfilled or unsupervised. If necessary to backfill over the end of an uncompleted pipe or accessory, the **Contractor** shall close the end with a suitable plug, either push on, mechanical joint, restrained joint, or as approved by the **County**.

E. Joint Assembly:

1. Push-on, mechanical, flange, and restrained-type joints shall be assembled in accordance with the manufacturer's recommendations.
2. The **Contractor** shall inspect each pipe joint within one-thousand (1,000) feet on either side of main line valves to insure one-hundred (100) percent seating of the pipe spigot, except as noted otherwise.
3. Each restrained joint shall be inspected by the **Contractor** to ensure that it has been "homed" one-hundred (100) percent.
4. The **Contractor** shall internally inspect each pipe joint to insure proper assembly for pipe twenty four (24) inches in diameter and larger after the pipe has been brought to final alignment.

- F. Cutting Pipe: The **Contractor** shall cut ductile iron pipe using an abrasive wheel saw. The **Contractor** shall cut PVC pipe using a suitable saw; remove all burrs, and smooth the end before jointing. The **Contractor** shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories, and closure pieces in the correct location. Only push on or mechanical joint pipe shall be cut.
- G. Polyethylene Encasement: Installation shall be in accordance with the requirements of AWWA C105 and the manufacturer's instructions. All ends shall be securely closed with tape and all damaged areas shall be completely repaired to the satisfaction of the **County**.
- H. Valve and Fitting Installation:
1. Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of pressure containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Defective valves shall be rejected by the **County** and replaced at the **Contractor's** or manufacturer's expense. Valves shall be closed before being installed.
  2. Valves, fittings, plugs, and caps shall be set and joined to the pipe in the manner specified in this section for cleaning, laying and joining pipe, except that twelve (12) inch and larger valves shall be provided with special support, such as crushed stone, concrete pads, or a sufficiently tamped trench bottom, so that the pipe shall not be required to support the weight of the valve. Valves shall be installed in the closed position.
  3. A valve box shall be provided on each underground valve. They shall be carefully set, centered exactly over the operating nut, and truly plumbed. The valve box shall not transmit shock or stress to the valve. The bottom flange of the lower belled portion of the box shall be placed below the valve operating nut. This flange shall be set on brick, so arranged that the weight of the valve box and superimposed loads shall bear on the base and not on the valve or pipe. The valve box cover shall be flush with the surface of the finished area or such other level as directed by the **County**.
  4. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.
  5. A valve marker shall be provided for each underground valve. Unless otherwise detailed on the Plans or directed by the **County**, valve markers shall be installed six (6) inches inside the right of way or easement, and buried to a depth of thirty (30) inches as per Standard Detail No. W-8
- I. Air Valve Vaults:
1. The **Contractor** shall construct the vault or manhole as detailed on the Plans.

2. The frame and cover shall be cast into the top slab. The floor drain shall be piped to vault exterior.
3. Manholes shall be constructed such that their walls are plumb.

### 3.05 CONNECTIONS TO EXISTING WATER MAINS

- A. The **Contractor** shall make connections to existing pipelines with tapping sleeves and valves, unless specifically shown otherwise on the Plans. Before connecting to any existing water main, the **Contractor** shall receive approval from the **County**.
- B. Location: Before laying pipe, the **Contractor** shall locate the points of connection to existing water mains and uncover as necessary for the **County** to confirm the nature of the connection to be made.
- C. Interruption of Services: The **Contractor** shall make connections to existing water mains only when system operations permit and only when notices are issued to the customer. The **Contractor** shall operate existing valves only with the specific authorization and direct supervision of the **County**.
- D. Tapping Sleeves:
  1. Holes in the new pipe shall be machine cut, either in the field or at the factory. No torch cutting of holes shall be permitted.
  2. Prior to attaching sleeve, the pipe shall be thoroughly cleaned, utilizing a brush and rag, as required.
  3. Before performing field machine cut, the water tightness of the sleeve assembly shall be pressure tested. The interior of the assembly shall be filled with water. An air compressor shall be attached to induce a test pressure as specified in this section. No leakage shall be permitted for a period of five (5) minutes.
  4. After attaching the sleeve to an existing main, but prior to making the tap, the interior of the assembly shall be disinfected. All surfaces to be exposed to potable water shall be swabbed or sprayed with a one (1) percent sodium hypochlorite solution.
- E. Connections Using Solid Sleeves: Where connections are shown on the Plans using solid sleeves, the **Contractor** shall furnish materials and labor necessary to make the connection to the existing pipe line.
- F. Connections Using Couplings: Where connections are shown on the Plans using couplings, the **Contractor** shall furnish materials and labor necessary to make the connection to the existing pipe line, including all necessary cutting, plugging, and backfill.
- G. Transfer of Service: Immediately before connecting to the relocated or existing meter, all service lines shall be flushed to remove any foreign matter. All special

fittings required to reconnect the existing meter to the new copper service line, or the existing private service line, shall be provided by the **Contractor**. To minimize out-of-service time, the **Contractor** shall determine the connections to be made and have all the required pipe and fittings on hand before shutting off the existing service. After completing the connection, the new corporation stop shall be opened and all visible leaks shall be repaired.

### 3.06 THRUST RESTRAINT

- A. The **Contractor** shall provide restraint at all points where hydraulic thrust may develop.
- B. Retainer Glands: The **Contractor** shall provide retainer glands where shown on the Plans. Retainer glands shall be installed in accordance with the manufacturer's recommendations, particularly, the required torque of the set screws. The **Contractor** shall furnish a torque wrench to verify the torque on all set screws that do not have inherent torque indicators.
- C. Harnessing:
  - 1. The **Contractor** shall provide harness rods only where specifically shown on the Plans or directed by the **County**.
  - 2. Harness rods shall be manufactured in accordance with the requirements of ASTM A36 and shall have an allowable tensile stress of no less than 22,000 psi. Harness rods shall be hot dip galvanized or field coated with bitumastic before backfilling.
  - 3. Where possible, harness rods shall be installed through the mechanical joint bolt holes. Where it is not possible, the **Contractor** shall provide ninety (90) degree bend eye bolts.
  - 4. Eye bolts shall be of the same diameter as specified in AWWA C111 for that pipe size. The eye shall be welded closed. Where eye bolts are used in conjunction with harness rods, an appropriate size washer shall be utilized with a nut on each end of the harness rod. Eye bolts shall be of the same material and coating as the harness rods.
- D. Thrust Collars: Collars shall be constructed as shown on the Plans. Concrete and reinforcing steel shall meet the requirements of Sections 03200 - Concrete Reinforcement and Section 03300 - Cast-In-Place Concrete. Welded-on collar shall be designed to meet the minimum allowable load shown on the Plans. The welded-on collar shall be attached to the pipe by the pipe manufacturer.
- E. Concrete Blocking as required and approved by the **County**:
  - 1. The **Contractor** shall provide concrete blocking for all bends, tees, valves, and other points where thrust may develop in addition to thrust restraint as per Standard Detail No. W-36.
  - 2. Concrete shall be as specified in Section 03300 - Cast-In-Place Concrete.

3. The **Contractor** shall form and pour concrete blocking at fittings as shown on the Standard Details and as directed by the **County**. The **Contractor** shall pour blocking against undisturbed earth. The **Contractor** shall increase dimensions when required by over excavation.

### 3.07 INSPECTION AND TESTING

- A. All sections of the water main subject to internal pressure shall be pressure-tested in accordance with the requirements of AWWA C600 and these Specifications. A section of main shall be considered ready for testing after completion and curing of all thrust restraint and backfilling.
- B. Water used for testing mains and washing streets will be made available to the **Contractor** at the nearest existing **County DWM** facilities. The **Contractor** shall furnish all necessary pipe or hose extensions and transportation to the point of use and exercise care in use of the water. Water used for other purposes shall be supplied through a metered connection, which the **Contractor** shall obtain through the **County DWM** Applications Office.
- C. Each segment of water main between main valves shall be tested individually.
- D. Test Preparation:
  1. For water mains less than twenty four (24) inches in diameter, the **Contractor** shall flush sections thoroughly at flow velocities, greater than two and one-half (2½) feet per second, adequate to remove debris from pipe and valve seats. For water mains twenty four (24) inches in diameter and larger, the main shall be carefully swept clean, and mopped if directed by the **County**. The **Contractor** shall partially open valves to allow the water to flush the valve seat.
  2. The **Contractor** shall partially operate valves and hydrants to clean out seats.
  3. The **Contractor** shall provide temporary blocking, bulkheads, flanges, and plugs as necessary, to assure all new pipe, valves, and appurtenances shall be pressure tested.
  4. Before applying test pressure, air shall be completely expelled from the pipeline and all appurtenances. The **Contractor** shall insert corporation cocks at highpoints to expel air as main is filled with water as necessary to supplement automatic air valves. Corporation stops shall be constructed as shown on the Standard Details with a meter box.
  5. The **Contractor** shall fill pipeline slowly with water. The **Contractor** shall provide a suitable pump with an accurate water meter to pump the line to the specified pressure.
  6. The differential pressure across a valve or hydrant shall equal the maximum possible, but not exceed the rated working pressure of the

system. Where necessary, the **Contractor** shall provide temporary backpressure to meet the differential pressure restrictions.

7. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure.
- E. Test Pressure: The **Contractor** shall test the pipeline at two-hundred and fifty (250) psi measured at the lowest point for at least two (2) hours. The **Contractor** shall maintain the test pressure within five (5) psi of the specified test pressure for the test duration. Should the pressure drop more than five (5) psi at any time during the test period, the pressure shall be restored to the specified test pressure. The **Contractor** shall provide an accurate pressure gauge with graduation not greater than five (5) psi.
- F. Leakage:
1. Leakage shall be defined as the sum of the quantity of water that shall be pumped into the test section, to maintain pressure within five (5) psi of the specified test pressure for the test duration plus water required to return line to test pressure at the end of the test. Leakage shall be the total cumulative amount measured on a water meter.
  2. The **County** assumes no responsibility for leakage occurring through existing valves.
- G. Test Results: No test section shall be accepted if the leakage exceeds the limits determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

Where:

|   |   |   |
|---|---|---|
| L | = | Allowable leakage, in gallons per hour        |
| S | = | Length of pipe tested, in feet                |
| D | = | Nominal diameter of the pipe, in inches       |
| P | = | Average pressure during the test (psi, gauge) |

As determined under Section 4 of AWWA C600.

- H. If the water main section being tested contains lengths of various pipe diameters, the allowable leakage shall be the sum of the computed leakage for each diameter. The leakage test shall be repeated until the test section is accepted. All visible leaks shall be repaired regardless of leakage test results at the **Contractor's** expense.
- I. Completion: After a pipeline section has been accepted, the **Contractor** shall relieve test pressure. The **Contractor** shall record type, size, and location of all outlets on the Record Drawings.

### 3.08 DISINFECTING PIPELINE

- A. After successfully pressure testing each pipeline section, the **Contractor** shall disinfect in accordance with the requirements of AWWA C651 for the continuous feed method and these Specifications.
- B. Specialty **Contractor**: Disinfection shall be performed by an approved specialty **Contractor**. Before disinfection is performed, the **Contractor** shall submit a written procedure for approval before being permitted to proceed with the disinfection. This plan shall also include the steps to be taken for the neutralization of the chlorinated water. The **Contractor** shall receive approval from the **County** where to dispose of chlorinated water.
- C. Chlorination:
  - 1. The **Contractor** shall apply chlorine solution to achieve a concentration of at least twenty-five (25) milligrams per liter free chlorine in new line. The **Contractor** shall retain chlorinated water for twenty-four (24) hours. Water shall be supplied from a temporary source protected by appropriate backflow prevention devices. Backflow preventer shall be approved by the **County** prior to connection. Chlorine shall be injected no more than ten (10) feet from the beginning of the new main.
  - 2. Chlorine concentration shall be recorded at every outlet along the line at the beginning and end of the twenty four (24) hour period.
  - 3. After twenty four (24) hours, all samples of water shall contain at least ten (10) milligrams per liter free chlorine. The **Contractor** shall rechlorinate if the required results are not obtained on all samples.
- D. Disposal of Chlorinated Water: The **Contractor** shall reduce chlorine residual of disinfection water to less than one (1) milligram per liter if discharged directly to a body of water or to less than two (2) milligrams per liter if discharged onto the ground prior to disposal. The **Contractor** shall treat water with sulfur dioxide or other reducing chemicals to neutralize chlorine residual. The **Contractor** shall flush all lines until residual is equal to existing system.
- E. Bacteriological Testing: After final flushing and before the water main is placed in service, the **Contractor** shall collect samples from the line and have them tested for bacteriological quality in accordance with the rules of the Georgia Department of Natural Resources, Environmental Protection Division. The **County** reserves the right to collect and test the samples in the **County's** laboratory. One (1) set of samples shall be collected from every one-thousand and two-hundred (1,200) feet of water main, plus one (1) set from each end of main and one (1) set from each branch. If the test results are not acceptable, the **Contractor** shall re-chlorinate lines at its cost until required results are obtained.

### 3.09 PROTECTION AND RESTORATION OF WORK AREA

- A. General: The **Contractor** shall return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is completed. Restoration of streets, sidewalks, curb, and driveways shall comply with Section 02510 and 02521. Restoration of

off-street areas shall comply with the requirements of Section 02920 and as stipulated below.

1. The **Contractor** shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum.
  2. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of underground facilities, ditches, and disturbed areas shall be accomplished on a daily basis as work is completed. Finishing, dressing, and grassing shall be accomplished immediately thereafter, as a continuous operation within each area being constructed and with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
  3. Handwork, including raking and smoothing, shall be required to ensure that the removal of roots, sticks, rocks, and other debris is removed in order to provide a neat and pleasing appearance.
  4. The **County** shall be authorized to stop all work by the **Contractor** when restoration and cleanup are unsatisfactory and to require appropriate remedial measures.
- B. Man-Made Improvements: The **Contractor** shall protect, or remove and replace with the **County's** approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, property pins, and other improvements that may be encountered in the Work.
- C. Cultivated Growth: The **Contractor** shall not disturb cultivated trees or shrubbery unless approved by the **County**. All such trees or shrubbery that must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.
- D. Cutting of Trees: The **Contractor** shall not cut trees for the performance of the Work except as absolutely necessary and with the approval from the **County**. The **Contractor** shall protect trees that remain in the vicinity of the work from damage from equipment. The **Contractor** shall not store spoil from excavation against the trunks. The **Contractor** shall remove excavated material stored over the root system of trees within thirty (30) days to allow proper natural watering of the root system. The **Contractor** shall repair any damaged tree over three (3) inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the site of the Work and disposed of by the **Contractor** in a lawful manner. No stumps, wood piles, or trash piles shall be permitted on the site of the Work.
- E. Disposal of Rubbish: The **Contractor** shall dispose of all materials cleared and grubbed during the construction of the Project in accordance with the applicable codes and rules of the appropriate Federal, State, and local regulatory agencies.



F. Wetlands:

1. The **Contractor** shall not construct permanent roadbeds, berms, drainage structures, or any other structures that alter the original topographic features within the easement.
2. All temporary construction or alterations to the original topography shall incorporate measures to prevent erosion into the surrounding wetland. All areas within the easement shall be returned to their original topographic condition as soon as possible after work is completed in the area. All materials of construction and other non-native materials shall be disposed by the **Contractor**.
3. The **Contractor** shall provide temporary culverts or other drainage structures, as necessary, to permit the free migration of water between portions of a swamp, wetland, or stream that may be temporarily divided by construction.
4. The **Contractor** shall not spread, discharge, or dump any fuel oil, gasoline, pesticide, or any other pollutant to adjacent swamps or wetlands.

3.10 ABANDONING EXISTING WATER MAINS

- A. General: The **Contractor** shall abandon in place all existing water main segments indicated on the Plans to be abandoned. The **Contractor** shall perform abandonment after the new water main has been placed in service and all water main services have been changed over to the new main. The **Contractor** shall salvage for the **County** existing fire hydrants, valve boxes, valve markers, and other materials located on the abandoned water mains.
- B. Capping and Plugging: The **Contractor** shall disconnect by sawing or cutting and removing a segment of existing pipe where cutting and capping or plugging is directed by the **County**. The **Contractor** shall provide a watertight pipe cap or plug and concrete blocking for restraint to seal off existing mains indicated to remain in service. The **Contractor** shall seal ends of existing mains to be abandoned with a pipe cap or plug or with a masonry plug and minimum six- (6-) inch cover of concrete on all sides around the end of the pipe. The **Contractor** shall be responsible for uncovering and verifying the size and material of the existing main to be capped or plugged. The abandoned pipeline shall be filled with flowable fill if directed by the **County**.
- C. Salvaging Materials: The **Contractor** shall salvage existing fire hydrants, valve boxes, valve markers, and other materials located of water mains abandoned and deliver salvaged items in good condition to the **County's** storage yard. The **Contractor** shall coordinate delivery and placement of salvaged materials in advance with the **County**.

- D. Pavement Removal and Replacement: The **Contractor** shall perform any necessary pavement removal and replacement in accordance with Section 02510 - Pavement Repairs and the approved plans.

+++ END OF SECTION 02665 +++

## **SECTION 02665 WATER MAINS AND ACCESSORIES**

### **PART 1 - GENERAL**

#### 1.01 SCOPE

- A. The work included under this section includes providing all labor, materials, equipment, tools, and incidentals required for a complete installation of water mains and accessories as shown on the Plans and as specified in this section.
- B. The **Contractor** shall supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), Steel Structures Painting Council (SSPC), and other recognized standards. Latest revisions of all standards are applicable.
- C. Galvanized pipe/fittings shall not be used as any part of the Water Transmission and Distribution System, nor shall it be used to join any appurtenances to the System.
- D. Water mains, valves, hydrants, and appurtenances shall be installed before the installation of the sub-base course or paving or any other utilities except sanitary sewer lines.
- E. All water system products and materials shall be submitted for approval by the **County**. Each shall meet all design and operating requirements of the **County**.
- F. Related Work Specified Elsewhere:
  - 1. Section 01210 - Measurement and Payment
  - 2. Section 01550 - Traffic Regulation
  - 3. Section 02000 - Site Work
  - 4. Section 02140 - Dewatering
  - 5. Section 02200 - Earthwork
  - 6. Section 02324 - Trenching and Trench Backfilling
  - 7. Section 02510 - Pavement Repairs
  - 8. Section 02521 - Concrete Sidewalks, Curbs, and Gutters
  - 9. Section 02920 - Site Restoration

#### 1.02 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of the General Requirements of the Contract Documents and Section 01300. In addition, the following specific information shall be provided:
  - 1. Complete product data and engineering data, including shop drawings.
  - 2. Documentation that manufacturers have consistently produced products of satisfactory quality and performance for a period of at least two (2) years.

3. Written certification to the **County** that all products furnished comply with all applicable requirements of these Specifications.

### 1.03 QUALITY ASSURANCE

- A. Reference Standards: The **Contractor** shall comply with the applicable provisions and recommendations of the latest editions of the following standards, except as otherwise shown on the Plans or specified in these Specifications.
1. ANSI A21.4 (AWWA C104) - Cement Mortar Lining for Ductile Iron and Gray Iron Pipe and Fittings, for Water and Other Liquids.
  2. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
  3. ANSI B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  4. ANSI B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
  5. ASTM B32 - Standard Specification for Solder Metal.
  6. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
  7. ASTM C150 - Standard Specification for Portland Cement.
  8. ASTM D1248 - Polyethylene Plastics Molding and Extrusion Materials.
  9. ASTM G62 - Test Methods for Holiday Detection in Pipeline Coatings.
  10. AWWA C104 (ANSI A21.4) - Cement Mortar Lining for Ductile Iron and Gray Iron Pipe and Fittings, for Water and Other Liquids.
  11. AWWA C110 (ANSI A21.10) - Ductile Iron and Gray Iron Fittings, 3-in. through 48-in., for Water and Other Liquids.
  12. AWWA C111 (ANSI A21.11) - Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
  13. AWWA C115 (ANSI A21.15) - Flanged Ductile Iron Pipe with Threaded Flanges.
  14. AWWA C150 (ANSI A21.50) - Thickness Design of Ductile Iron Pipe.
  15. AWWA C151 (ANSI A21.51) - Ductile Iron Pipe, Centrifugally Cast for Water and Other Liquids.
  16. AWWA C153 (ANSI A21.53) - Ductile Iron Compact Fittings, 3-in. through 24-in. and 54-in. through 64-in., for Water Service.
  17. AWWA C600 - Installation of Ductile Iron Water Mains and Their Appurtenances.
  18. AWWA C606 - Joints, Grooved and Shouldered Type.
  19. AWWA C651 - Disinfecting Water Mains.
  20. SSPC-SP6 - Steel Structures Painting Council, Commercial Blast Cleaning.
  21. Other ANSI, ASTM, and AWWA specifications referenced herein.

### 1.04 TRANSPORTATION AND HANDLING

- A. Unloading: The **Contractor** shall furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves, and accessories. The **Contractor** shall make equipment available at all times for use in unloading. The **Contractor** shall not drop or dump materials. All materials dropped or dumped shall be subject to rejection without additional justification. Pipe handled on skids shall not be rolled or skidded against the pipe on the ground.

- B. Handling: The **Contractor** shall handle pipe, fittings, valves, and accessories carefully to prevent shock or damage. The **Contractor** shall handle pipe by rolling on skids, forklift, or front-end loader. The **Contractor** shall not use material damaged in handling. Slings, hooks, or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior coatings or internal lining of the pipe.

#### 1.05 STORAGE AND PROTECTION

- A. The **Contractor** shall store all pipes that cannot be distributed along the route. The **Contractor** shall make arrangements for the use of suitable storage areas.
- B. Stored materials shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that shall protect them from damage by freezing.
- C. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tier shall be kept off the ground on timbers, rails, or concrete. Pipe in tiers shall be alternated: bell-plain end; plain end-bell. At least two (2) rows of timbers shall be placed between tiers and chocks, affixed to each other in order to prevent movement. The timbers shall be large enough to prevent contact between the pipes in adjacent tiers.
- D. Stored mechanical and push on joint gaskets shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first in, first out basis.
- E. Mechanical-joint bolts shall be handled and stored in such a manner that shall ensure proper use with respect to types and sizes.

#### 1.06 WATER MAIN LOCATION

- A. Except as otherwise shown on the Plans, the minimum depth of cover shall be four (4) feet and the maximum cover shall be five (5) feet. All deviations shall be specifically approved by the **County**.
- B. The installation of a water main parallel to another utility in the same vertical plane is not permitted, i.e., "stacking" of utilities is not permitted.

### **PART 2 - PRODUCTS**

#### 2.01 DUCTILE IRON PIPE

- A. Ductile iron pipe shall be manufactured in accordance with the requirements of AWWA C151. All pipe, except specials, shall be furnished in nominal lengths of eighteen (18) to twenty (20) feet. Sizes shall be as shown on the Plans. All pipe shall have a minimum pressure rating as indicated in following Table below, and corresponding minimum wall thickness, unless otherwise shown on the Plans, specified in these Specifications, or approved by the **County**.

| <b>Pipe Sizes</b>      |                      |
|------------------------|----------------------|
| Pipe Diameter (inches) | Pressure Class (psi) |
| 4 – 12                 | 350                  |
| 14 – 18                | 350                  |
| 20                     | 300                  |
| 24                     | 250                  |
| 30 – 54                | 200                  |
| 60 – 64                | 200                  |

- D. Flanged pipe minimum wall thickness shall be equal to Special Class 53. Flanges shall be furnished by the pipe manufacturer.
- E. Ductile Iron Pipe and fittings shall be cement lined in accordance with the requirements of AWWA C104. A seal coat over the cement lining is not required. Pipe and fittings shall be furnished with a bituminous outside coating.
- F. Fittings shall be ductile iron and shall conform to the requirements of AWWA C110 or AWWA C153 with a minimum rated working pressure of two-hundred and fifty (250) psi.
- G. Malleable iron threaded fittings and appurtenances shall conform to the requirements of ASTM A47, ASTM A197, or ANSI B16.3
- H. Unless otherwise specified, steel fittings and appurtenances shall conform to the requirements of ASTM A234, ASTM A105, or ANSI B16.11; and fabricated steel fittings and appurtenances shall conform to the requirements of AWWA C208.
- I. Fittings for grooved end piping systems shall be full flow cast fittings, steel fittings, or segmentally welded fittings with grooves or shoulders designed to accept grooved end couplings. Cast fittings shall be cast of ductile iron conforming to the requirements of ASTM A536 or malleable iron conforming to the requirements of ASTM A47. Standard steel fittings, including large size elbows, shall be forged steel conforming to the requirements of ASTM A106. Standard segmentally welded fittings shall be fabricated of Schedule 40 carbon steel pipe.
- J. Joints:
  - 1. Unless shown or specified otherwise, joints for ductile iron pipe shall be push on or restrained joint type for pipe and standard mechanical, push on, or restrained joints for fittings. Push on and mechanical joints shall conform to the requirements of AWWA C111.
  - 2. The only acceptable restrained joint systems for ductile iron pipe are identified in the Table below, unless approved by the **County**. No field welding of restrained joint pipe shall be allowed.

| <b>Acceptable Restrained Joints</b> |                     |                   |                                 |                        |
|-------------------------------------|---------------------|-------------------|---------------------------------|------------------------|
| <b>Diameter (inches)</b>            | ACIPCO              | U.S. Pipe         | McWayne                         | Generic <sup>(1)</sup> |
| 4 – 12                              | Fast-Grip Flex Ring | Field Lok TR Flex | Push-On Restrained Joint Type A | MJ with Retainer Gland |
| 16 – 24                             | Fast-Grip Flex Ring | Field Lok TR Flex | Push-On Restrained Joint Type A | MJ with Retainer Gland |
| 30 – 36                             | Flex Ring           | TR Flex           | Push-On Restrained Joint Type B | MJ with Retainer Gland |
| 42 – 48                             | Lok-Ring            | TR Flex           | N/A                             | MJ with Retainer Gland |
| 54 – 64                             | Lok-Ring            | TR Flex           | N/A                             | N/A                    |

<sup>(1)</sup> Fittings and valves only, and only where specifically allowed.

3. Restrained joint pipe (RJP) on supports shall have bolted joints and shall be specifically designed for clear spans of at least thirty-six (36) feet and as approved by the **County**
4. Flanged joints shall meet the requirements of ANSI B16.1, Class 125.

K. The **Contractor** shall provide the appropriate gaskets for mechanical and flange joints. Gaskets for flange joints shall be made of one-eighth ( $\frac{1}{8}$ ) inch thick, cloth reinforced rubber; gaskets may be ring type or full-face type.

L. Bolts and Nuts:

1. The **Contractor** shall provide the necessary bolts for connections. All bolts and nuts shall be threaded in accordance with the requirements of ANSI B1.1, Coarse Thread Series, Class 2A external, and 2B internal fit. All bolts and nuts shall be made in the U.S.A.
2. Bolts and nuts for mechanical joints shall be Tee Head Bolts and nuts of high strength low alloy steel in accordance with the requirements of ASTM A242 to the dimensions shown in AWWA C111/ANSI A21.11.
3. Flanged joints shall be bolted with through stud or tap bolts of required size as directed. Bolt length and diameter shall conform to the requirements of ANSI/AWWA C115 for Class 125 flanges shown in ANSI/ASME B16.1.
4. Bolts for exposed service shall be zinc plated, cold pressed, steel machine bolts conforming to the requirements of ASTM A307, Grade B.

Nuts for exposed service shall be zinc plated, heavy hex conforming to ASTM A 563. Zinc plating shall conform to the requirements of ASTM B633, Type II.

- 5. Bolts for submerged service shall be stainless steel machine bolts conforming to the requirements of ASTM A193, Grade B8. Nuts shall be heavy hex, stainless steel conforming to the requirements of ASTM A194, Grade 8.

M. Mechanical joint glands shall be ductile iron.

N. **Welded Outlet:** Welded outlets may be provided in lieu of tees or saddles on mains with a diameter greater than or equal to twenty four (24) inches. The pipe joint on the outlet pipe shall meet the joint requirements specified above. All welding shall be performed by a certified welder and approved by the **County**. The minimum pipe wall thickness of the parent pipe and the outlet pipe shall be Special Thickness Class 53 [Pressure Class 350 for sixty (60) and sixty-four (64) inch sizes]. The welded outlet shall be rated for two hundred and fifty (250) psi working pressure. Each welded outlet shall be hydrostatically tested at five hundred (500) psi or as approved by the **County**. The welded outlet shall be fabricated by the manufacturer of the parent pipe. The maximum outlet diameters shall not exceed those listed in the following table:

| <b>Maximum Outlet Diameters</b>      |   |
|--------------------------------------|---|
| <b>Parent Pipe Diameter (inches)</b> | <b>Maximum Outlet Diameter (inches)</b> |
| 24                                   | 16                                      |
| 30                                   | 20                                      |
| 36                                   | 24                                      |
| 42                                   | 30                                      |
| 48                                   | 30                                      |
| 54                                   | 30                                      |
| 60                                   | 30                                      |
| 64                                   | 30                                      |

O. Ductile iron pipe shall be encased with polyethylene film where shown on the Plans. Polyethylene film shall be in accordance with the requirements of AWWA C105.

P. Acceptance shall be based on the **County's** inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

2.02 PIPE LINING

A. **Cement Mortar:** Unless otherwise specified, pipe and fittings shall be lined with cement mortar as specified in AWWA C205. Fittings and specials larger than twenty four (24) inches not fabricated from centrifugally lined straight sections



shall require two (2) inches by four (4) inches by thirteen (13) gage self-furring wire mesh reinforcement for hand-applied lining.

### 2.03 PIPE COATING

- A. Epoxy: Unless otherwise specified, pipe and fittings shall be coated with a liquid epoxy as specified in AWWA C210 with the following requirements:
  - 1. No Coal tar products shall be incorporated in the liquid epoxy.
  - 2. The curing agent may be an amidoamine as well as other curing agents listed in AWWA C210
  - 3. The coating shall be applied to a minimum thickness of sixteen (16) mils in not less than two (2) coats.
- B. Polyethylene tape: Where shown on the Plans or directed by the **County**, pipe and fittings shall be coated and wrapped with prefabricated multi-layer cold applied polyethylene tape coating in accordance with the requirements of AWWA C214. The coating application shall be a continuous step operation in conformity with the requirements of AWWA C214, Section 3. The total coating thickness shall be not less than fifty (50) mils for pipe twenty four (24) inches and smaller and not less than eighty (80) mils for pipe twenty six (26) inches and larger.

### 2.04 FUSION EPOXY COATING AND LINING

- A. Where shown on the Plans or directed by the **County**, steel pipe and fittings shall be fusion epoxy coated and lined. The fusion epoxy coating shall be 3M Scotchkote 203, or approved equal, approved by the **County**. Surface preparation shall be in accordance with the requirements of SSPC-SP 10 near white blast cleaning. The application method shall be by the fluidized bed method and shall attain twelve (12) mils minimum dry film thickness.
- B. Field welds, connections, and otherwise damaged areas shall be coated and patched according to the manufacturer's instructions with 3M Scotchkote 306 or approved equal

### 2.05 COPPER PIPE

- A. Pipe shall be rolled copper tubing, ASTM B 88, Type K.
- B. Where required, sweat to screw adapters shall be cast bronze ANSI B16.18, wrought solder joint ANSI B16.22. Unions shall be cast bronze or bronze with solder connections. Joints shall be made with 95/5 solder for Type K pipe. All fittings less than or equal to 1" shall be flared unless otherwise approved by the **County**.

### 2.06 PIPING APPURTENANCES

- A. Retainer Glands:

1. Retainer glands shall be Megalug Series 1100, as manufactured by EBAA Iron, Uni-Flange Series 1400 or equal, as manufactured by Ford Meter Box Company.
  2. Retainer glands shall be provided at all mechanical joints, including fittings, valves, hydrants and other locations as shown on the Plans.
- B. Hydrant Tees: Hydrant tees shall be ACIPCO A10180 or U.S. Pipe U 592 or approved equal.
- C. Anchor Couplings: Lengths and sizes shall be as shown on the Plans. Anchor couplings shall be equal to ACIPCO A 10895 or U.S. Pipe U 591.
- D. Hydrant Connector Pipe: The connector pipe shall be ductile iron meeting the requirements of AWWA C153; twenty-four (24) inch offset design so that the hydrant can be adjusted to ensure placement at the proper grade; shall have an anchoring feature at both ends so that when used with M.J. split glands a restrained joint is provided; cement lined in accordance with AWWA C104 and equal to the Gradelok as manufactured by Assured Flow Sales, Inc., Sarasota, Florida.
- E. Tapping Saddles: Tapping saddles are not allowed unless approved by the **County**
- F. Detection Tape: Detection tape shall be composed of a solid aluminum foil encased in a protective plastic jacket. Tapes shall be color coded in accordance with APWA color codes with the following legends: Water Systems, Safety Precaution Blue, and "Caution Water Line Buried Below". Colors may be solid or striped. Tape shall be permanently printed with no surface printing allowed. Tape width shall be a minimum of two (2) inches when buried less than ten (10) inches below the surface. Tape width shall be a minimum of three (3) inches when buried greater than ten (10) inches and less than twenty (20) inches. Detection tape shall be equal to Lineguard Type III Detectable or Allen Systems Detectatape.

## 2.07 FIRE HYDRANTS

- A. General: Fire hydrant shall be a two (2) piece standpipe and stem, compression shutoff, dry-barrel type. Fire hydrant shall conform to the requirements of AWWA C502 and shall be listed by Underwriters Laboratories, Inc. in accordance with the requirements of UL 246.
- B. Acceptable Products: Fire hydrants shall be American Valve and Hydrant B-62-B, M & H 129T, Mueller Super Centurion 250-AWB, A-423, Kennedy K81A, U.S. Metropolitan 250, or approved equal.
- C. Product Data: The following information shall be provided to the **County**:
1. Affidavit of compliance with the requirements of AWWA C502.
  2. Records of standard tests.

D. Manufacture

1. Fire hydrant shall be cast iron traffic, three (3) way four and one-half ( $4\frac{1}{2}$ ) inch valve, and left opening type.
2. Internal main valve diameter shall be a minimum of five and one quarter ( $5\frac{1}{4}$ ) inches.
3. Each hydrant shall have the name of the manufacturer, the year of manufacture, and the nominal size in legible, raised letters cast on the barrel or bonnet.
4. Each hydrant shall be constructed with a moist-proof lubricant chamber that encloses the operating threads and which provides automatic lubrication of the threads and bearing surfaces each time the hydrant is operated. The bonnet shall have "O" ring packing and reservoir capable of utilizing oil or grease so that all operating parts are enclosed in the lubricant.
5. Operating nut shall be bronze, seven eights ( $7/8$ ) inch tapered square nut with tamper-proof device. The direction "opening left" shall be marked on a special tamper-proof device. The tamper-proof device shall be a combination fold-down nut for the op-nut. Hydrant shall have ductile iron combination hold-down nut and operating nut shield to eliminate operation of hydrant with wrenches other than a special socket-type wrench. Arrow shall be cast on the outside of the periphery of the operating nut shield indicating direction of the operation for opening the hydrant.
6. The hydrant barrel section shall be connected at the ground line in a manner that shall prevent damage to the hydrant when struck by a vehicle. The main valve rod section shall be connected at the ground line by a frangible coupling. The standpipe and ground line safety construction shall be such that the hydrant nozzles can be rotated to any desired position without disassembling or removing the top operating components and top section of the hydrant standpipe.
7. The hydrant main valve shall be made of synthetic rubber and formed to fit the valve seat accurately. The hydrant valve shall be made from material that shall resist damage from rocks or other foreign matter. The valve shall be reversible. The hydrant shall be a true compression type, opening against pressure and closing with pressure.
8. The main valve seat shall be of bronze and its assembly into the hydrant shall involve bronze-to-bronze thread engagement. Two (2) "C" ring seals shall be provided as a positive pressure seal between the bronze seat ring and the shoe. The valve assembly pressure seals shall be obtained to allow without the employment of torque of torque compressed gaskets. The hydrant shall be designed to allow the removal of all operating parts

through the hydrant barrel by means of a single, lightweight disassembly wrench without excavating.

9. The drain mechanism shall be designed to operate with the operation of the main valve and shall allow a momentary flushing of the drain ports. A minimum of two (2) internal and two (2) external bronze-lined drain pots shall be required in the main valve assembly to drain the hydrant barrel.
10. Cast iron inlet elbows shall have a six (6) inch mechanical joint connection complete with accessories.
11. Barrel extension sections shall be available in six (6) inch increments complete with rod, extension, coupling and the necessary flanges, gaskets and bolts, so that extending the hydrant can be accomplished without excavating. Hydrants shall have letters "AWB" cast in the barrel for identification purposes. Bury mark of fire hydrant shall be cast on barrel of the hydrant.
12. Hydrant shall have two (2) two and one-half (2½) inch hose nozzles one-hundred and twenty (120) degrees apart and one (1) four and one half (4½) inch pumper nozzle. The threads shall be national standard threads. The nozzle caps shall be secured to fire hydrant with non-kinking chain loop on cap ends to permit free turning of caps.
13. Bolts and nuts shall be corrosion resistant.
14. Hydrants shall be designed with safety flange to protect the barrel and stem from damage and to eliminate flooding of area when hydrant is struck or knocked off by vehicular equipment or other objects.

E. Setting Hydrants: Fire hydrants Traffic design.

1. Hydrants shall be placed at the locations indicated on the Plans in a manner to provide complete accessibility and so that the possibility of damage from vehicles or injury to pedestrians shall be minimized. The **Contractor** shall install proper "bury" hydrants or shall use, at no cost to the **County**, proper length extensions to ensure that each fire hydrant is installed in accordance with the manufacturer's recommendation and the requirements of these Specifications. When placed behind curb, the hydrant barrel shall be set such that no portion of the pumper or hose nozzle caps shall be less than six (6) inches, nor more than twelve (12) inches from the gutter face of the curb. The **Contractor** shall place gravel as shown on the Plans. All pipe connecting the fire hydrant to the main line shall be ductile iron pipe meeting the requirements of these Specifications or approved connecting pieces.
2. The use of PVC pipe for hydrant branch piping is specifically prohibited. The connection of the hydrant to the supply main shall be through either a ductile iron tee or a tapping sleeve and shall include an outlet valve at the point of connection. Using a tapping sleeve where the Plans indicate a tee shall not result in any additional costs to the **County**.

- F. Connection to main: Each fire hydrant shall be connected to the main with a six (6) inch ductile iron branch connection. Gate valves shall be used on fire hydrant branches unless otherwise specified.
- G. Drainage: Stone no larger than four (4) inches in diameter, shall be placed around the base of the fire hydrant for a depth of thirty (30) inches from the bottom of the trench and shall extend for a distance of thirty (30) inches from the back of the hydrant toward the main.
- H. Anchoring and Bracing: The shoe of each fire hydrant shall be braced against unexcavated earth at the end of the trench with stone slabs or poured concrete; or it shall be tied to the pipe with suitable metal tie rods or clamps or both, as directed by the **County**. The straps and rods, nuts and threads, used for anchoring shall be coated with protective materials at the end of installation.
- I. Painting, Coating, and Lubricating:
  - 1. All iron parts of the hydrant inside and outside shall be cleaned and thereafter, unless otherwise stipulated, all surfaces, except the exterior portion above the ground line, shall be coated or painted with, or dipped in an asphalt or bituminous base paint or coating. If these parts are painted, they shall be covered with two (2) coats, the first being allowed to dry thoroughly before the second coat is applied.
  - 2. The outside of the hydrant valve above the finished ground line shall be thoroughly cleaned and thereafter painted in the shop with two (2) coats of Koppers primer 621 or approved equal. After installation, each hydrant shall be painted with two (2) field coats of Koppers Glamortex Enamel as manufactured by the Sika Inertol Company or approved equal, color shall be silver. The top cap of each hydrant shall be painted in one of the following colors to indicate the main size: six (6) inch or eight (8) inch mains shall be silver; ten (10) inch or twelve (12) inch mains shall be yellow; and sixteen (16) inch or greater mains shall be green.
  - 3. All bronze, threaded contact moving parts shall, during shop assembly, be lubricated, and protected by a coating of rustproof compound to prevent damage in shipment and storage.
- J. Accessories: The **Contractor** shall furnish one (1) standard four (4) sided hydrant wrench for each ten (10) hydrants installed or fraction thereof.
- K. Testing: All fire hydrants shall be tested in strict accordance with the requirements of AWWA C502, with no additional cost to the **County**. The Certificate of Compliance shall be furnished to the **County**.

## 2.08 GATE VALVES (GV)

- A. Twenty (20) Inches in Diameter and Smaller:

1. Gate valves shall be resilient-seated type conforming to the requirements of AWWA C509 or AWWA C515.
  2. Valves through twelve (12) inches in diameter shall have a minimum rated working pressure of two hundred (200) psi. Sixteen (16) inch and twenty (20) inch valves shall have a minimum rated working pressure of one hundred and fifty (150) psi.
  3. Valves less than four (4) inches in diameter shall have threaded ends. Larger valves shall be mechanical joint unless shown otherwise on the Plans.
  4. Valves shall be non-rising stem type with a two (2) inch square wrench nut, and shall open left. The manufacturer shall provide an affidavit of compliance with the applicable AWWA standards.
  5. All internal ferrous surfaces shall be coated with epoxy to a minimum thickness of four (4) mils. The epoxy shall be non-toxic, impart no taste to the water and shall conform to the requirements of AWWA C550.
  6. All seals between valve parts, such as body and bonnet, bonnet and bonnet cover, shall be flat gaskets or O-rings.
  7. Valve disks shall be made of cast or ductile iron having a vulcanized, synthetic rubber coating.
  8. Valves shall be manufactured by American Flow Control, Mueller, or M & H Valve.
- B. Twenty-four (24) Inches in Diameter and Larger:
1. Valves shall be double disc type conforming to the requirements of AWWA C500.
  2. Valves shall be designed for horizontal installation with tracks and rollers, bypass valves, and bevel gear type operator. Valves shall be rated for one-hundred and fifty (150) psi working pressure.
  3. Valve ends shall be mechanical joint type except where restrained joint ends are shown. Flanged joints shall meet the requirements of ANSI B16.1, Class 125.
  4. Buried valves shall be equipped with valve boxes unless access to the operator is provided by a manhole.
  5. Manually operated valves, including geared valves, shall be non-rising stem type having O-ring seals.
  6. Gate valves twenty four (24) inches in diameter and larger shall be manufactured by American R/D Gate Valve Company, Mueller, M & H Valve, or approved equal.

## 2.09 BUTTERFLY VALVES (BV)

- A. Unless indicated on the Plans to be two-hundred and fifty (250) pound butterfly valves shall be resilient seated, short body design, and shall be designed, manufactured, and tested in accordance with the requirements of AWWA C504 for Class 150B.
- B. Where butterfly valves are indicated on the Plans to be 250 pound butterfly valves shall be resilient seated, short body design, and shall be designed, manufactured, and tested in accordance with the requirements of AWWA C504, and as modified below. Valves shall be designed for a rated working pressure of two-hundred and fifty (250) psi. Class B, AWWA C504 Section 5.2 testing requirements are modified as follows:
1. The leakage test shall be performed at a pressure of two-hundred and fifty (250) psi.
  2. The hydrostatic test shall be performed at a pressure of five-hundred (500) psi.
  3. Proof of design tests shall be performed and certification of such proof of design test shall be provided to the **County**.
- C. 150 Pound Valves: Valve bodies shall be ductile iron conforming to the requirements of ASTM A536, Grade 65-45-12, or ASTM A126, Grade B cast iron. Shafts shall be ASTM A76, Type 304 stainless steel, machined and polished. Valve discs shall be ductile iron, ASTM A536, Grade 65-45-12 or ASTM A126, Grade B cast iron. The valve shall have a resilient seat.
- D. 250 Pound Valves: Valve bodies shall be ductile iron conforming to the requirements of ASTM A536, Grade 65-45-12 or ASTM A126, Grade B cast iron shafts, and shaft hardware shall be ASTM A564, Type 630 stainless steel, machined and polished. Valve discs shall be ductile iron, ASTM A536, Grade 65-45-12. The resilient valve seat shall be located either on the valve disc or in the valve body and shall be fully field adjustable and field replaceable.
- E. Valves shall be installed with the valve shafts horizontal. Valves and actuators shall have seals on all shafts and gaskets on valve actuator covers to prevent the entry of water. Actuator mounting brackets shall be totally enclosed and shall have gasket seals.
- F. Actuators:
1. Valves shall be equipped with traveling nut, self-locking type actuators designed, manufactured, and tested in accordance with the requirements of AWWA C504. Actuators shall be capable of holding the disc in any position between full open and full closed without any movement or fluttering of the disc.
  2. Actuators shall be furnished with fully adjustable mechanical stop limiting devices. Actuators that utilize the sides of the actuator housing to limit disc travel are unacceptable.

3. Valve actuators shall be capable of withstanding a minimum of four-hundred and fifty (450) foot pounds of input torque in either the open or the closed position without damage.
- G. Operators: Valves for buried service shall have a nut-type operator and shall be equipped with a valve box and stem extension, as required.
- H. Valve ends shall be mechanical joint type, except where flanged or restrained joint ends are shown on the Plans. Flange joints shall meet the requirements of ANSI B16.1, Class 125.
- I. Butterfly valves shall be manufactured by Mueller (Pratt), DeZurik, or equal.
- J. All butterfly valves shall be installed in an approved structure. The structure shall meet the applicable requirements within Section 02607 Manholes, Junction Boxes, and Inlets. The structure design shall be submitted to the **County** for approval.

#### 2.10 VALVE BOXES (VB) AND EXTENSION STEMS

- A. All valves shall be equipped with valve boxes. The valve boxes shall be cast iron two (2) piece screw type with drop covers. Valve boxes shall have a five and one-quarter (5¼) inch inside diameter. Valve box covers shall weigh a minimum of thirteen (13) pounds. The valve boxes shall be adjustable to six (6) inches up or down from the nominal required cover over the pipe. Valve boxes shall be of sufficient length that bottom flange of the lower belled portion of the box is below the valve operating nut. Ductile or cast iron extensions shall be provided as necessary. Covers shall have "WATER VALVE" or "WATER" cast into them. Valve boxes shall be manufactured in the United States.
- B. All valves shall be furnished with extension stems if operating nut is greater than four (4) feet deep, to bring the operating nut to within twenty-four (24) inches of the top of the valve box. Connection to the valve shall be with a wrench nut coupling and a set screw to secure the coupling to the valve's operating nut. The coupling and square wrench nut shall be welded to the extension stem. Extension stems shall be equal to Mueller A-26441 or M & H Valve Style 3801 or approved equal.

#### 2.11 VALVE MARKERS (VM)

- A. The **Contractor** shall provide a concrete valve marker as detailed on the Plans for each valve installed, except on hydrant isolation valves. Valve markers shall be stamped "WATER."

#### 2.12 TAPPING SLEEVES AND VALVES (TS&V)

- A. Tapping sleeves for mains twelve (12) inches in diameter and smaller shall be ductile iron of the split sleeve, mechanical joint type. Tapping sleeves shall be equal to Mueller H-615.



- B. Tapping sleeves for mains larger than twelve (12) inches shall be of all stainless steel construction.
- C. The **Contractor** shall be responsible for determining the outside diameter of the pipe to be connected to prior to ordering the sleeve. The tapping sleeve shall be rated for two-hundred and fifty (250) psi.
- D. Valves shall be gate valves furnished in accordance with the specifications shown above, with flanged connection to the tapping sleeve and mechanical joint connection to the branch pipe. The tapping sleeve shall be supplied by the valve manufacturer.

### 2.13 CORPORATION COCKS AND CURB STOPS

- A. Corporation cocks and curb stops shall be ball type, shall be made of bronze conforming to the requirements of ASTM B61 or ASTM B62, and shall be suitable for the working pressure of the system. Ends shall be suitable for flared tube joint. Threaded ends for inlet and outlet of corporation cocks shall conform to the requirements of AWWA C800; coupling nut for connection to flared copper tubing shall conform to the requirements of ANSI B16.26. Corporation cocks and curb stops shall be manufactured by Mueller, Ford FB-600, or equal.

## **PART 3 - EXECUTION**

### 3.01 EXISTING UTILITIES AND OBSTRUCTIONS

- A. The Plans indicate utilities or obstructions that are known to exist according to the best information available. The **Contractor** shall call the Utilities Protection Center (UPC) (800 282 7411) as required by Georgia Law (O.C.G.A. Sections 25 9 1 through 25 9 13) and shall call all utilities, agencies, or departments that own and/or operate utilities in the vicinity of the construction work site at least seventy-two (72) hours [three (3) business days] prior to construction to verify the location of the existing utilities.
- B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service:
  - 1. The **Contractor** shall provide the required notice to the utility owners and allow them to locate their facilities according to Georgia law. Field utility locations are valid for only ten (10) days after original notice. The **Contractor** shall ensure at the time of any excavation that a valid utility location exists at the point of excavation.
  - 2. The **Contractor** shall expose the facility, for a distance of at least two-hundred (200) feet in advance of pipeline construction, to verify its true location and grade. The **Contractor** shall repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.
  - 3. The **Contractor** shall avoid utility damage and interruption by protection with means or methods recommended by the utility owner.

4. The **Contractor** shall maintain a log identifying when phone calls were made, who was called, area for which utility relocation was requested and work order number issued, if any. The **Contractor** shall provide the **County with** an updated copy of the log biweekly, or more frequently if required by the **County**.
- C. Conflict with Existing Utilities:
1. Horizontal Conflict: Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed water main does not permit safe installation of the water main by the use of sheeting, shoring, tying back, supporting, or temporarily suspending service of the parallel or crossing facility. The **Contractor** may change the proposed alignment of the water main to avoid horizontal conflicts if the new alignment remains within the available right of way or easement, complies with regulatory agency requirements and after a written request to and subsequent approval by the **County**. Where such relocation of the water main is denied by the **County**, the **Contractor** shall arrange to have the utility, main, or service relocated. The **Contractor** shall receive approval from the **County** for any utility relocation.
  2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed water main does not permit the crossing without immediate or potential future damage to the utility, main, service, or the water main. The minimum clearance shall be twelve (12) inches. The **Contractor** may change the proposed grade of the water main to avoid vertical conflicts if the changed grade maintains adequate cover and complies with regulatory agencies requirements after written request to and subsequent approval by the **County**. Where such relocation of the water main is denied by the **County**, the **Contractor** shall arrange to have the utility, main, or service relocated. The **Contractor** shall receive approval from the **County** for any utility relocation.
- D. Electronic Locator: The **Contractor** shall have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.
- E. Water and Sewer Line Separation:
1. Water mains shall maintain a minimum ten (10) foot edge-to-edge separation from sewer lines, whether gravity or pressure. If the main cannot be installed in the prescribed easement or right-of-way and provide the ten (10) foot separation, the separation may be reduced, provided the bottom of the water main is a minimum of eighteen (18) inches above the top of the sewer. Should neither of these two separation criteria be possible, the water main shall be installed below the sewer with a minimum vertical separation of eighteen (18) inches.

2. The water main, when installed below the sewer, shall be encased in concrete with a minimum six (6) inch concrete depth, to the first joint in each direction. Where water mains cross the sewer, the pipe joint adjacent to the pipe crossing the sewer shall be cut to provide maximum separation of the pipe joints from the sewer.
3. No water main shall pass through, or come in contact with, any part of a sanitary sewer manhole.

### 3.02 CONSTRUCTION ALONG HIGHWAYS, STREETS, AND ROADWAYS

- A. The **Contractor** shall install pipe lines and appurtenances along highways, streets, and roadways in accordance with the applicable regulations of, and permits issued by, the Georgia Department of Transportation (GDOT) or applicable permitting authority and the **County** with reference to construction operations, safety, traffic control, road maintenance, and repair.
- B. Traffic Control: Shall meet the requirements of Section 01550 and as stipulated below.
  1. The **Contractor** shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the Work and the safety of the public. Flagmen shall be certified by a GDOT-approved training program.
  2. Construction traffic control devices and their installation shall be in accordance with the current Manual on Uniform Traffic Control Devices for Streets and Highways.
  3. Placement and removal of construction traffic control devices shall be coordinated with GDOT and the **County** a minimum of forty eight (48) hours in advance of the activity.
  4. Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street right of way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as "Flagmen Ahead," shall be removed and replaced when needed.
  5. Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.

6. Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.
7. Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white background. Construction sign panels shall meet the minimum reflective requirements of GDOT and the **County**. Sign panels shall be of durable materials capable of maintaining their color, reflective character, and legibility during the period of construction.
8. Channelization devices shall be positioned preceding an obstruction at a taper length as required by the Manual on Uniform Traffic Control Devices for Streets and Highways, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to insure that they are maintained in the proper position throughout their period of use.

C. Construction Operations:

1. The **Contractor** shall perform all work along highways, streets, and roadways to minimize interference with traffic.
2. Stripping: Where the pipe line is laid along road right of way, the **Contractor** shall strip and stockpile all sod, topsoil, and other material suitable for right of way restoration.
3. Trenching, Laying and Backfilling: The **Contractor** shall not open the trench any further ahead of pipe laying operations than is necessary. The **Contractor** shall backfill and remove excess material immediately behind laying operations. The **Contractor** shall complete excavation and backfill for any portion of the trench in the same day.
4. Shaping: The **Contractor** shall reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. The **Contractor** shall replace topsoil, sod, and any other materials removed from shoulders.
5. Construction operations shall be limited to four hundred (400) feet along areas, including clean up and utility exploration.

D. Excavated Materials: The **Contractor** shall not place excavated material along highways, streets, and roadways in a manner that obstructs traffic. The **Contractor** shall sweep all scattered excavated material off the pavement in a timely manner meeting all Erosion and Sedimentation requirements of Section 02125.

E. Drainage Structures: The **Contractor** shall keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.

E&S measures shall be maintained and the **Contractor** is subject to clean any storm line and MH that has received siltation.

- F. Landscaping Features: Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision and other signs within the right of way and easement. The **Contractor** shall take extreme care in moving landscape features and promptly reestablish these features.
- G. Maintaining Highways, Streets, Roadways, and Driveways:
1. The **Contractor** shall maintain streets, highways, roadways, and driveways in suitable condition for movement of traffic until completion and final acceptance of the Work.
  2. During the time period between pavement removal and completing permanent pavement replacement, the **Contractor** shall maintain highways, streets, and roadways by the use of steel running plates. Running plate edges shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.
  3. The **Contractor** shall furnish a road grader or front end loader for maintaining highways, streets, and roadways. The grader or front end loader shall be available at all times.
  4. The **Contractor** shall immediately repair all driveways that are cut or damaged and the **Contractor** shall maintain them in a suitable condition for use until completion and final acceptance of the Work.

### 3.03 PIPE DISTRIBUTION

- A. Pipe shall be distributed and placed in such a manner that shall not interfere with traffic.
- B. No pipe shall be strung further along the route than one-thousand (1,000) feet beyond the area in which the **Contractor** is actually working without written permission from the **County**. The **County** reserves the right to reduce this distance to a maximum distance of two-hundred (200) feet in residential and commercial areas based on the effects of the distribution to the adjacent property owners.
- C. No street or roadway shall be closed for unloading of pipe without first obtaining permission from the proper authorities. The **Contractor** shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets, and roadways upon which pipe is distributed.
- D. No distributed pipe shall be placed inside drainage ditches.

- E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five (5) feet from the roadway pavement, as measured edge to edge.

### 3.04 LAYING AND JOINTING PIPE AND ACCESSORIES

- A. The **Contractor** shall lay all pipe and fittings to accurately conform to the lines and grades established by the **County**.
- B. Pipe Installation:
  - 1. Pipe shall be installed in accordance with the requirements of AWWA M11, Chapter 16. Welded joints shall be in accordance with the requirements of AWWA C206.
  - 2. Sleeve-type mechanical pipe couplings shall conform to the requirements of AWWA M11.
  - 3. Unless otherwise specified, buried mechanical couplings and valves shall be field coated as shown on the Plans, specified in these Specifications, or as directed by the **County**.
  - 4. Anchorage shall be provided as shown on the Plans, specified in these Specifications, or as directed by the **County**.
  - 5. Proper implements, tools, and facilities shall be provided for the safe performance of the Work. All pipe, fittings, valves, and hydrants shall be lowered carefully into the trench by means of slings, ropes, or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench.
  - 6. All pipe, fittings, valves, hydrants, and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be rejected by the **County** and replaced at the **Contractor** or manufacturer's expense.
  - 7. All lumps, blisters, and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe containing dirt shall be laid.
  - 8. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing, or other materials shall be placed in the pipe at any time.
  - 9. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.

10. It is not mandatory to lay pipe with the bells facing the direction in which work is progressing.
11. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade, shall not be permitted.
12. The **Contractor** shall provide detection tape for all pipe greater than twelve (12) inches in diameter. Detection tape shall be buried four (4) to ten (10) inches deep. Should detection tape need to be installed deeper, the **Contractor** shall provide three (3) inch wide tape. In no case shall detection tape be buried greater than twenty (20) inches from the finish grade surface.

C. Alignment and Gradient:

1. The **Contractor** shall lay pipe straight in alignment and gradient or follow true curves as nearly as practicable. The **Contractor** shall not deflect any joint more than the maximum deflection recommended by the manufacturer.
2. The **Contractor** shall maintain a transit, level, and accessories on the site of the Work to lay out angles and ensure that deflection allowances are not exceeded.

D. Expediting of Work: The **Contractor** shall excavate, lay the pipe, and backfill as closely together as possible. The **Contractor** shall not leave un-jointed pipe in the trench overnight. The **Contractor** shall backfill and compact the trench as soon as possible after laying and jointing is completed. The **Contractor** shall backfill the installed pipe each day at the close of work and at all other times when work is not in progress. No excavation is to be left unbackfilled or unsupervised. If necessary to backfill over the end of an uncompleted pipe or accessory, the **Contractor** shall close the end with a suitable plug, either push on, mechanical joint, restrained joint, or as approved by the **County**.

E. Joint Assembly:

1. Push-on, mechanical, flange, and restrained-type joints shall be assembled in accordance with the manufacturer's recommendations.
2. The **Contractor** shall inspect each pipe joint within one-thousand (1,000) feet on either side of main line valves to insure one-hundred (100) percent seating of the pipe spigot, except as noted otherwise.
3. Each restrained joint shall be inspected by the **Contractor** to ensure that it has been "homed" one-hundred (100) percent.
4. The **Contractor** shall internally inspect each pipe joint to insure proper assembly for pipe twenty four (24) inches in diameter and larger after the pipe has been brought to final alignment.

- F. Cutting Pipe: The **Contractor** shall cut ductile iron pipe using an abrasive wheel saw. The **Contractor** shall cut PVC pipe using a suitable saw; remove all burrs, and smooth the end before jointing. The **Contractor** shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories, and closure pieces in the correct location. Only push on or mechanical joint pipe shall be cut.
- G. Polyethylene Encasement: Installation shall be in accordance with the requirements of AWWA C105 and the manufacturer's instructions. All ends shall be securely closed with tape and all damaged areas shall be completely repaired to the satisfaction of the **County**.
- H. Valve and Fitting Installation:
1. Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of pressure containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Defective valves shall be rejected by the **County** and replaced at the **Contractor's** or manufacturer's expense. Valves shall be closed before being installed.
  2. Valves, fittings, plugs, and caps shall be set and joined to the pipe in the manner specified in this section for cleaning, laying and joining pipe, except that twelve (12) inch and larger valves shall be provided with special support, such as crushed stone, concrete pads, or a sufficiently tamped trench bottom, so that the pipe shall not be required to support the weight of the valve. Valves shall be installed in the closed position.
  3. A valve box shall be provided on each underground valve. They shall be carefully set, centered exactly over the operating nut, and truly plumbed. The valve box shall not transmit shock or stress to the valve. The bottom flange of the lower belled portion of the box shall be placed below the valve operating nut. This flange shall be set on brick, so arranged that the weight of the valve box and superimposed loads shall bear on the base and not on the valve or pipe. The valve box cover shall be flush with the surface of the finished area or such other level as directed by the **County**.
  4. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.
  5. A valve marker shall be provided for each underground valve. Unless otherwise detailed on the Plans or directed by the **County**, valve markers shall be installed six (6) inches inside the right of way or easement, and buried to a depth of thirty (30) inches as per Standard Detail No. W-8
- I. Air Valve Vaults:
1. The **Contractor** shall construct the vault or manhole as detailed on the Plans.



2. The frame and cover shall be cast into the top slab. The floor drain shall be piped to vault exterior.
3. Manholes shall be constructed such that their walls are plumb.

### 3.05 CONNECTIONS TO EXISTING WATER MAINS

- A. The **Contractor** shall make connections to existing pipelines with tapping sleeves and valves, unless specifically shown otherwise on the Plans. Before connecting to any existing water main, the **Contractor** shall receive approval from the **County**.
- B. Location: Before laying pipe, the **Contractor** shall locate the points of connection to existing water mains and uncover as necessary for the **County** to confirm the nature of the connection to be made.
- C. Interruption of Services: The **Contractor** shall make connections to existing water mains only when system operations permit and only when notices are issued to the customer. The **Contractor** shall operate existing valves only with the specific authorization and direct supervision of the **County**.
- D. Tapping Sleeves:
  1. Holes in the new pipe shall be machine cut, either in the field or at the factory. No torch cutting of holes shall be permitted.
  2. Prior to attaching sleeve, the pipe shall be thoroughly cleaned, utilizing a brush and rag, as required.
  3. Before performing field machine cut, the water tightness of the sleeve assembly shall be pressure tested. The interior of the assembly shall be filled with water. An air compressor shall be attached to induce a test pressure as specified in this section. No leakage shall be permitted for a period of five (5) minutes.
  4. After attaching the sleeve to an existing main, but prior to making the tap, the interior of the assembly shall be disinfected. All surfaces to be exposed to potable water shall be swabbed or sprayed with a one (1) percent sodium hypochlorite solution.
- E. Connections Using Solid Sleeves: Where connections are shown on the Plans using solid sleeves, the **Contractor** shall furnish materials and labor necessary to make the connection to the existing pipe line.
- F. Connections Using Couplings: Where connections are shown on the Plans using couplings, the **Contractor** shall furnish materials and labor necessary to make the connection to the existing pipe line, including all necessary cutting, plugging, and backfill.
- G. Transfer of Service: Immediately before connecting to the relocated or existing meter, all service lines shall be flushed to remove any foreign matter. All special

fittings required to reconnect the existing meter to the new copper service line, or the existing private service line, shall be provided by the **Contractor**. To minimize out-of-service time, the **Contractor** shall determine the connections to be made and have all the required pipe and fittings on hand before shutting off the existing service. After completing the connection, the new corporation stop shall be opened and all visible leaks shall be repaired.

### 3.06 THRUST RESTRAINT

- A. The **Contractor** shall provide restraint at all points where hydraulic thrust may develop.
- B. Retainer Glands: The **Contractor** shall provide retainer glands where shown on the Plans. Retainer glands shall be installed in accordance with the manufacturer's recommendations, particularly, the required torque of the set screws. The **Contractor** shall furnish a torque wrench to verify the torque on all set screws that do not have inherent torque indicators.
- C. Harnessing:
  - 1. The **Contractor** shall provide harness rods only where specifically shown on the Plans or directed by the **County**.
  - 2. Harness rods shall be manufactured in accordance with the requirements of ASTM A36 and shall have an allowable tensile stress of no less than 22,000 psi. Harness rods shall be hot dip galvanized or field coated with bitumastic before backfilling.
  - 3. Where possible, harness rods shall be installed through the mechanical joint bolt holes. Where it is not possible, the **Contractor** shall provide ninety (90) degree bend eye bolts.
  - 4. Eye bolts shall be of the same diameter as specified in AWWA C111 for that pipe size. The eye shall be welded closed. Where eye bolts are used in conjunction with harness rods, an appropriate size washer shall be utilized with a nut on each end of the harness rod. Eye bolts shall be of the same material and coating as the harness rods.
- D. Thrust Collars: Collars shall be constructed as shown on the Plans. Concrete and reinforcing steel shall meet the requirements of Sections 03200 - Concrete Reinforcement and Section 03300 - Cast-In-Place Concrete. Welded-on collar shall be designed to meet the minimum allowable load shown on the Plans. The welded-on collar shall be attached to the pipe by the pipe manufacturer.
- E. Concrete Blocking as required and approved by the **County**:
  - 1. The **Contractor** shall provide concrete blocking for all bends, tees, valves, and other points where thrust may develop in addition to thrust restraint as per Standard Detail No. W-36.
  - 2. Concrete shall be as specified in Section 03300 - Cast-In-Place Concrete.

3. The **Contractor** shall form and pour concrete blocking at fittings as shown on the Standard Details and as directed by the **County**. The **Contractor** shall pour blocking against undisturbed earth. The **Contractor** shall increase dimensions when required by over excavation.

### 3.07 INSPECTION AND TESTING

- A. All sections of the water main subject to internal pressure shall be pressure-tested in accordance with the requirements of AWWA C600 and these Specifications. A section of main shall be considered ready for testing after completion and curing of all thrust restraint and backfilling.
- B. Water used for testing mains and washing streets will be made available to the **Contractor** at the nearest existing **County DWM** facilities. The **Contractor** shall furnish all necessary pipe or hose extensions and transportation to the point of use and exercise care in use of the water. Water used for other purposes shall be supplied through a metered connection, which the **Contractor** shall obtain through the **County DWM** Applications Office.
- C. Each segment of water main between main valves shall be tested individually.
- D. Test Preparation:
  1. For water mains less than twenty four (24) inches in diameter, the **Contractor** shall flush sections thoroughly at flow velocities, greater than two and one-half (2½) feet per second, adequate to remove debris from pipe and valve seats. For water mains twenty four (24) inches in diameter and larger, the main shall be carefully swept clean, and mopped if directed by the **County**. The **Contractor** shall partially open valves to allow the water to flush the valve seat.
  2. The **Contractor** shall partially operate valves and hydrants to clean out seats.
  3. The **Contractor** shall provide temporary blocking, bulkheads, flanges, and plugs as necessary, to assure all new pipe, valves, and appurtenances shall be pressure tested.
  4. Before applying test pressure, air shall be completely expelled from the pipeline and all appurtenances. The **Contractor** shall insert corporation cocks at highpoints to expel air as main is filled with water as necessary to supplement automatic air valves. Corporation stops shall be constructed as shown on the Standard Details with a meter box.
  5. The **Contractor** shall fill pipeline slowly with water. The **Contractor** shall provide a suitable pump with an accurate water meter to pump the line to the specified pressure.
  6. The differential pressure across a valve or hydrant shall equal the maximum possible, but not exceed the rated working pressure of the

system. Where necessary, the **Contractor** shall provide temporary backpressure to meet the differential pressure restrictions.

7. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure.
- E. Test Pressure: The **Contractor** shall test the pipeline at two-hundred and fifty (250) psi measured at the lowest point for at least two (2) hours. The **Contractor** shall maintain the test pressure within five (5) psi of the specified test pressure for the test duration. Should the pressure drop more than five (5) psi at any time during the test period, the pressure shall be restored to the specified test pressure. The **Contractor** shall provide an accurate pressure gauge with graduation not greater than five (5) psi.
- F. Leakage:
1. Leakage shall be defined as the sum of the quantity of water that shall be pumped into the test section, to maintain pressure within five (5) psi of the specified test pressure for the test duration plus water required to return line to test pressure at the end of the test. Leakage shall be the total cumulative amount measured on a water meter.
  2. The **County** assumes no responsibility for leakage occurring through existing valves.
- G. Test Results: No test section shall be accepted if the leakage exceeds the limits determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

Where:

|   |   |   |
|---|---|---|
| L | = | Allowable leakage, in gallons per hour        |
| S | = | Length of pipe tested, in feet                |
| D | = | Nominal diameter of the pipe, in inches       |
| P | = | Average pressure during the test (psi, gauge) |

As determined under Section 4 of AWWA C600.

- H. If the water main section being tested contains lengths of various pipe diameters, the allowable leakage shall be the sum of the computed leakage for each diameter. The leakage test shall be repeated until the test section is accepted. All visible leaks shall be repaired regardless of leakage test results at the **Contractor's** expense.
- I. Completion: After a pipeline section has been accepted, the **Contractor** shall relieve test pressure. The **Contractor** shall record type, size, and location of all outlets on the Record Drawings.

### 3.08 DISINFECTING PIPELINE

- A. After successfully pressure testing each pipeline section, the **Contractor** shall disinfect in accordance with the requirements of AWWA C651 for the continuous feed method and these Specifications.
- B. Specialty **Contractor**: Disinfection shall be performed by an approved specialty **Contractor**. Before disinfection is performed, the **Contractor** shall submit a written procedure for approval before being permitted to proceed with the disinfection. This plan shall also include the steps to be taken for the neutralization of the chlorinated water. The **Contractor** shall receive approval from the **County** where to dispose of chlorinated water.
- C. Chlorination:
  - 1. The **Contractor** shall apply chlorine solution to achieve a concentration of at least twenty-five (25) milligrams per liter free chlorine in new line. The **Contractor** shall retain chlorinated water for twenty-four (24) hours. Water shall be supplied from a temporary source protected by appropriate backflow prevention devices. Backflow preventer shall be approved by the **County** prior to connection. Chlorine shall be injected no more than ten (10) feet from the beginning of the new main.
  - 2. Chlorine concentration shall be recorded at every outlet along the line at the beginning and end of the twenty four (24) hour period.
  - 3. After twenty four (24) hours, all samples of water shall contain at least ten (10) milligrams per liter free chlorine. The **Contractor** shall rechlorinate if the required results are not obtained on all samples.
- D. Disposal of Chlorinated Water: The **Contractor** shall reduce chlorine residual of disinfection water to less than one (1) milligram per liter if discharged directly to a body of water or to less than two (2) milligrams per liter if discharged onto the ground prior to disposal. The **Contractor** shall treat water with sulfur dioxide or other reducing chemicals to neutralize chlorine residual. The **Contractor** shall flush all lines until residual is equal to existing system.
- E. Bacteriological Testing: After final flushing and before the water main is placed in service, the **Contractor** shall collect samples from the line and have them tested for bacteriological quality in accordance with the rules of the Georgia Department of Natural Resources, Environmental Protection Division. The **County** reserves the right to collect and test the samples in the **County's** laboratory. One (1) set of samples shall be collected from every one-thousand and two-hundred (1,200) feet of water main, plus one (1) set from each end of main and one (1) set from each branch. If the test results are not acceptable, the **Contractor** shall re-chlorinate lines at its cost until required results are obtained.

### 3.09 PROTECTION AND RESTORATION OF WORK AREA

- A. General: The **Contractor** shall return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is completed. Restoration of streets, sidewalks, curb, and driveways shall comply with Section 02510 and 02521. Restoration of

off-street areas shall comply with the requirements of Section 02920 and as stipulated below.

1. The **Contractor** shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum.
  2. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of underground facilities, ditches, and disturbed areas shall be accomplished on a daily basis as work is completed. Finishing, dressing, and grassing shall be accomplished immediately thereafter, as a continuous operation within each area being constructed and with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
  3. Handwork, including raking and smoothing, shall be required to ensure that the removal of roots, sticks, rocks, and other debris is removed in order to provide a neat and pleasing appearance.
  4. The **County** shall be authorized to stop all work by the **Contractor** when restoration and cleanup are unsatisfactory and to require appropriate remedial measures.
- B. Man-Made Improvements: The **Contractor** shall protect, or remove and replace with the **County's** approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, property pins, and other improvements that may be encountered in the Work.
- C. Cultivated Growth: The **Contractor** shall not disturb cultivated trees or shrubbery unless approved by the **County**. All such trees or shrubbery that must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.
- D. Cutting of Trees: The **Contractor** shall not cut trees for the performance of the Work except as absolutely necessary and with the approval from the **County**. The **Contractor** shall protect trees that remain in the vicinity of the work from damage from equipment. The **Contractor** shall not store spoil from excavation against the trunks. The **Contractor** shall remove excavated material stored over the root system of trees within thirty (30) days to allow proper natural watering of the root system. The **Contractor** shall repair any damaged tree over three (3) inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the site of the Work and disposed of by the **Contractor** in a lawful manner. No stumps, wood piles, or trash piles shall be permitted on the site of the Work.
- E. Disposal of Rubbish: The **Contractor** shall dispose of all materials cleared and grubbed during the construction of the Project in accordance with the applicable codes and rules of the appropriate Federal, State, and local regulatory agencies.

F. Wetlands:

1. The **Contractor** shall not construct permanent roadbeds, berms, drainage structures, or any other structures that alter the original topographic features within the easement.
2. All temporary construction or alterations to the original topography shall incorporate measures to prevent erosion into the surrounding wetland. All areas within the easement shall be returned to their original topographic condition as soon as possible after work is completed in the area. All materials of construction and other non-native materials shall be disposed by the **Contractor**.
3. The **Contractor** shall provide temporary culverts or other drainage structures, as necessary, to permit the free migration of water between portions of a swamp, wetland, or stream that may be temporarily divided by construction.
4. The **Contractor** shall not spread, discharge, or dump any fuel oil, gasoline, pesticide, or any other pollutant to adjacent swamps or wetlands.

3.10 ABANDONING EXISTING WATER MAINS

- A. General: The **Contractor** shall abandon in place all existing water main segments indicated on the Plans to be abandoned. The **Contractor** shall perform abandonment after the new water main has been placed in service and all water main services have been changed over to the new main. The **Contractor** shall salvage for the **County** existing fire hydrants, valve boxes, valve markers, and other materials located on the abandoned water mains.
- B. Capping and Plugging: The **Contractor** shall disconnect by sawing or cutting and removing a segment of existing pipe where cutting and capping or plugging is directed by the **County**. The **Contractor** shall provide a watertight pipe cap or plug and concrete blocking for restraint to seal off existing mains indicated to remain in service. The **Contractor** shall seal ends of existing mains to be abandoned with a pipe cap or plug or with a masonry plug and minimum six- (6-) inch cover of concrete on all sides around the end of the pipe. The **Contractor** shall be responsible for uncovering and verifying the size and material of the existing main to be capped or plugged. The abandoned pipeline shall be filled with flowable fill if directed by the **County**.
- C. Salvaging Materials: The **Contractor** shall salvage existing fire hydrants, valve boxes, valve markers, and other materials located of water mains abandoned and deliver salvaged items in good condition to the **County's** storage yard. The **Contractor** shall coordinate delivery and placement of salvaged materials in advance with the **County**.

- D. Pavement Removal and Replacement: The **Contractor** shall perform any necessary pavement removal and replacement in accordance with Section 02510 - Pavement Repairs and the approved plans.

+++ END OF SECTION 02665 +++



## **SECTION 02711 FENCING AND GATES**

### **PART 1 - GENERAL**

#### 1.01 SCOPE

- A. Work described in this Section includes furnishing all labor, materials, equipment, tools, and incidentals required for a complete installation of chain link fence and gates. All materials shall be installed and adjusted, in accordance with these Specifications, the manufacturer's recommendations and as shown on the Drawings.
- B. Contract drawings show only functional features and some of the required external connections. They do not show all components required for a complete installation nor exact dimensions particular to any manufacturer's products. **Contractor** shall supply all parts, devices, and equipment necessary to meet the requirements of the Contract Documents and shall make all dimensional adjustments particular to the materials being furnished. All costs associated with such changes and adjustments shall be considered as being included in the price bid for the Work shown and specified.

- C. Related Work specified elsewhere:

Section 03300 – Cast-in-Place Concrete

#### 1.02 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of the General Requirements of the Contract Documents and Section 01300.

#### 1.03 QUALITY ASSURANCE

- A. Reference Standards: Comply with all Federal and State laws or ordinances, as well as all applicable codes, standards, regulations and/or regulatory agency requirements including the partial listing below:
  - 1. Department of Transportation Standard Specifications for Construction of Roads and Bridges, Sections 643 and 894.
- B. Experience: Products furnished under this Section shall be of a design and manufacture that has been successfully used in similar applications. The manufacturer shall have furnished product for a minimum of five similar applications. Provide a list of such installations complete with installation description contact names, addresses, telephone numbers. This reference list shall be submitted with the shop drawings.

#### 1.04 QUALITY STANDARDS

- A. The chain link fence and gates shall be furnished by a single manufacturer who

shall assume sole responsibility for providing a complete system designed for long life with a minimum of required maintenance meeting the requirements specified herein and as shown on the Drawings.

- B. Manufacturer shall provide written certification that the material provided under this Specification has been amply designed and is a suitable application for these service conditions.
- C. Manufacturer's offering products that comply with these specifications include:  
  
Anchor Fence, Inc. or Approved equal.

#### 1.05 WARRANTY

- A. Provide a warranty against defective materials and workmanship in accordance with the requirements of the General Requirements of the Contract Documents.

### **PART 2 - PRODUCTS**

#### 2.01 GENERAL

- A. Zinc and aluminum coated steel and aluminum alloy fabric, posts, fittings and accessories, shall conform to AASHTO M 181.

#### 2.02 FENCE FABRIC

- A. All chain link fence shall consist of woven wire in the form of reasonably uniform two (2) inch-square mesh, having parallel sides and horizontal and vertical diagonals of approximately uniform dimensions. The wire size shall be as specified on the Drawings.
- B. TYPES
  - 1. Zinc-Coated Steel Fabric: The base metal of the fabric shall be a good commercial quality of steel wire coated with prime western spelter or better (AASHTO: M120) applied at the rate of not less than 1.2 oz. of zinc per square foot of uncoated wire surface after weaving.

- OR -

- 2. Aluminum-Coated Steel Fabric: The base metal of the fabric shall be a good commercial quality steel wire, coated with aluminum alloy applied at the rate of not less than 0.40 oz. per square foot of uncoated wire surface.
- C. Workmanship: Chain Link fence fabric shall be produced by methods recognized as good commercial practices. The zinc or aluminum coating shall be applied to the fabric in a continuous process and shall not be applied to the fabric in roll form. Both coated before weaving and coated after weaving fabric shall be given careful visual inspection to determine the quality of the coating. Excessive roughness, blisters, sal ammoniac spots, bruises, flaking bare spots, or other

obvious defects, to any considerable extent, shall be cause for rejection.

1. Tolerances: All dimensions, weights, and test methods shall conform to the applicable portions of AASHTO: M 181 or Federal Specification RR-F-191.

## 2.03 POSTS

- A. Line Posts shall be:
  1. One and seven-eighths (1 7/8) inch nominal galvanized steel "H" column minimum weight of two and seven-tenths (2.70) pounds per linear foot, or
  2. Nominal two and three-eighths (2 3/8) inches outside diameter galvanized steel pipe minimum weight three and sixty-five hundredths (3.65) pounds per linear foot, or
  3. "C" section channels measuring two and twenty-five hundredths by one and seventy hundredths (2.25" x 1.70") inches, minimum weight of two and seventy-three hundredths (2.73) pounds per linear foot.
- B. End, Corner, and Pull Posts:
  1. Zinc and aluminum-coated posts shall be:
    - a. Nominal two and seven eighths (2-7/8) inches outside diameter galvanized steel pipe weighing a minimum of five and seventy-nine hundredths (5.79) pounds per linear foot, or
    - b. Two and one half (2-1/2) inch-square posts with a minimum weight of five and seventy hundredths (5.70) pounds per linear foot, or
    - c. Three and one-half by three and one half (3-1/2 x 3-1/2) inches rolled form sections with integral fabric loops, weighing a minimum of five and fourteen hundredths (5.14) pounds per linear foot.

## 2.04 TOP RAILS AND HORIZONTAL BRACES FOR END, CORNER AND PULL POSTS

- A. Truss Bracing shall be three-eighths (3/8) inch round rod with suitable turnbuckle or takeup arrangement. Rods shall be of the approximate metal and coating according to the type of fence installation. All braces shall be furnished with suitable metal connections so that they can be securely fastened to the posts.
- B. Top rail shall be furnished in lengths of not less than fifteen (15) feet. Each section shall be provided with a suitable expansion sleeve or coupling not less than seven (7) inches long. Every fifth coupling as installed shall have a heavy spring to take up expansion and contraction of the top rail.
- C. Zinc and aluminum coated rails and braces shall be nominal:
  1. One and five-eighths (1-5/8) inch outside diameter steel pipe, minimum weight of two and twenty-seven hundredths (2.27) pounds per linear foot, or
  2. One and five-eighths by one and one-quarter (1-5/8 x 1-1/4) inches roll formed sections weighing a minimum of one and thirty-five hundredths (1.35) pounds per linear foot.

## 2.05 POST TOPS AND FITTINGS

- A. All posts shall be fitted with tops designed to fit securely over the posts and carry the top rail. The tops and fittings shall be of dimensions shown on the Drawings.

## 2.06 FABRIC FASTENERS

- A. Wire for fabric fasteners may be zinc coated or aluminum coated of the gauges specified.

## 2.07 GATES

- A. Frames, Posts, hinges, and fitting shall be in accordance with dimensions shown in Federal Specification RR-F-191, unless otherwise specified.
  - 1. Gates: Shall be provided with combination spring latch and plunger rod of approved design for padlocking.
  - 2. Hinges: Heavy-duty malleable iron or steel, industrial service type, two hundred and seventy (270) degree swing. Provide at least three (3) hinges on each gate leaf at vehicular gate openings.
  - 3. Hold-Open Device: Equip designated gate openings with galvanized steel or malleable iron stop/hold open devices with catch or plunger rod of standard manufacture and approved design.

## 2.08 BARBED WIRE

- A. Galvanized steel barb wire shall be composed of two strands of No. 12 1/2 gauge wire with round barbs, four-point pattern, spaced five plus and minus one-half ( $5\pm 1/2$ ) inch apart conforming to ASTM: A 121, Class 2, or at the **Contractor's** option may be high tensile strength barbed wire. If the **Contractor** elects to furnish high tensile strength bared wire, it shall meet the requirements of ASTM: A 121 with the following exceptions:
  - 1. The coated line wires shall have a nominal diameter of 0.067 inch. The coated barbwires shall have a nominal diameter of 0.057 inch.
  - 2. The minimum weight of zinc coating shall be seventy-five hundredths (0.75) ounces per square foot for the line wire and seventy hundredths (0.70) ounces per square foot for the barbed wire.
  - 3. The line wire shall have a minimum tensile strength of four hundred seventy-five (475) pounds per individual strand.

## 2.09 GROUND RODS

- A. Ground Rods shall be five-eighths (5/8) inch in diameter but no less than nine-sixteenths (9/16) inch and shall be minimum eight (8) feet in length unless otherwise shown on the Plans. Ground rods shall be galvanized steel.

Galvanizing shall have a minimum coating of two (2) ounces per square foot in accordance with the requirements of ASTM: A 153.

### **PART 3 - EXECUTION:**

#### **3.01 GENERAL**

- A. Fence shall normally be constructed within the right-of-way line with no portion of the permanent installation encroaching on adjacent property. When it is necessary for the **Contractor** to trespass on private property outside of the right-of-way or easements provided on the Drawings, the **Contractor** shall obtain permission from the property owner for such intrusion.
- B. Fence shall generally follow the contour of the ground, with the bottom of fence fabric no less than one inch or more than six inches from the ground surface. The fence line shall be cleared a maximum of eight (8) feet wide and minor grading shall be performed where necessary to provide a neat appearance. Where abrupt changes in the ground profile in low areas make it impractical to maintain the specified ground clearance, longer posts may be used and multiple strands of barbed wire stretched thereon with vertical clearances between strands of barbed wire six (6) inches or less.
- C. Any of the various types of fencing materials shown in Part 2, may be used, except that posts, fabric, barbed wire, and appurtenances, including gates when required, shall be of the same or matching type for each Project, unless otherwise directed.

#### **3.02 INSTALLATION**

- A. Posts shall be located and installed as called for on the Drawings. "C" and two and three-eighths (2 3/8) inch tube-type line posts for all types of fences shall be installed using concrete encasement. Posts installed in rock shall be in accordance with Article 643.03.B.3 of the DOT Standard Specifications.
  - 1. All corner, end, and pull posts shall have concrete encasement as shown in the Drawings. Posts damaged by driving shall be replaced by the **Contractor** at its expense. When posts are set in concrete, the entire hole around the post shall be filled with Class A or B concrete. Concrete may be hand mixed for batches of one-half (1/2) cubic yard or less. The posts shall be firmly braced and held in place until the concrete has set. Distance between end, pull, and corner or angle post assemblies, shall not exceed the following:  
  
For Chain Link Fence, Straight Line: five hundred (500) feet  
For Chain Link Fence, Curved Line: two hundred fifty (250) feet
  - 2. Posts placed on concrete walls, slabs or solid rock shall be set in round holes twelve (12) inches deep or as indicated on the Drawings. The space around the post shall be filled with a cement filler approved by the **County**.

3. Posts shall be repaired after cutting or drilling. Galvanized steel posts shall be repaired in accordance with the manufacturer's recommendations.
- B. Fence Erection; Fence fabric or barbed wire, except when posts are set in concrete footings, may be installed when posts are set and braced. When posts are set in concrete footings, the installation of fabric or wire shall be delayed to allow the concrete to cure at least five (5) days. When barbed wire fence is required, three strands shall be installed unless otherwise indicated on the Drawings.
- C. Gates: Gate assemblies shall be of the length, height and type designated on the Drawings, and installed so as to provide for two hundred seventy (270) degree swing. Gate frames shall be welded units and shall be properly coated after welding. Fabric matching the fence fabric shall be stretched taut over the gate frame. Gate assemblies shall be provided with a positive type locking device, padlock, and keys.
- D. Electrical Ground: Whenever a power line carrying more than six hundred (600) volts passes over the fence, a ground rod shall be installed. The ground rod shall be installed at the nearest point directly below the point of crossing. Where possible the ground rod shall be driven into the ground for a full eight (8) feet of penetration. In rocky soil, the rod may be driven slanted, so as to provide eighteen (18) inches of cover at the tip. If solid rock is encountered, two (2) ground rods may be installed at the nearest post on each side of the power line crossing where soil conditions will permit. A length of No. 6 bare copper seven (7) stranded wire shall be attached between the fence and the ground rod with suitable clamps.

### 3.03 STORAGE OF MATERIALS

- A. Barbed wire, wire fence fabric, steel posts, hardware, and other materials, shall not be stored in contact with the ground but shall be placed in floored buildings, on platforms, or on wooden timbers or poles. Floors, platforms, or props shall be high enough to prevent the wire and steel posts from having any contact with the groundwater or surface water. Wire or steel posts that are damaged due to improper storage at any time between fabrication and final erection shall be rejected. Except when rusting occurs as a result of ponding water after erection of the fence, all wire or posts that show signs of rusting before final acceptance shall be repaired, as directed by the **County**, or removed and replaced with new material at the **Contractor's** expense.

+++ END OF SECTION 02711 +++

## **SECTION 02750 BYPASS PUMPING**

### **PART 1 - GENERAL**

#### 1.01 SCOPE OF WORK

- A. Work described in this Section includes furnishing all materials, labor, equipment, and incidentals required to install, test, and maintain a temporary bypass pumping system for the purpose of diverting all wastewater flows around the Work area.
  
- B. The objectives of flow bypass and/or diversion pumping are to:
  - 1. Maintain an efficient and uninterrupted level of service to wastewater collection system users while replacement, cleaning or internal condition assessment operations are facilitated on the segment or segments being bypassed and/or from which flow is being diverted, within the wastewater collection system
  
  - 2. Ensure all levels of wastewater flow are continuously and effectively handled around the segment or segments of sewer being bypassed and/or from which flow is being diverted by:
    - a. Providing odor control measures and systems to contain and control odors at the intake and discharge manholes or other locations
  
    - b. Ensuring that bypass and diversion pumps are adequately fueled, lubricated, and maintained
  
    - c. Ensuring that backup spare parts are expeditiously installed in the flow bypass and/or diversion pumping system in the event of component breakdown
  
    - d. Ensuring an emergency response plan is smoothly implemented in the event of system failure
  
    - e. Preventing backup, spillage, flooding or overflow onto streets, yards and unpaved areas or into buildings, adjacent ditches, storm drains, and waterways, while flow bypass or diversion pumping takes place and ensuring that installation, startup and subsequent disassembly of the flow bypass and diversion pumping system is smoothly transitioned
  
- C. At all times during pumping operations, an experienced bypass/diversion pump maintenance operator/mechanic and/or assistant shall continuously be on site to monitor the operation of the entire bypass/diversion system. The operator/mechanic and/or assistant shall comprehensively and continuously:

1. Adjust pump speed as appropriate so as not to adversely impact upstream or downstream flow condition levels.
  2. Check that the bulkheads, dams, diaphragms, plugs, valves, weirs, and all other flow control devices are working effectively and according to plan.
  3. Check the integrity of hoses and couplings along the entire bypass / diversion system.
  4. Monitor fuel tanks and refuel as necessary.
  5. Monitor lubrication levels and provide additional lubrication as necessary.
  6. Facilitate minor repairs as required.
  7. Report to the **County** on potential problems.
  8. Inspect bypass-pumping system at least hourly to ensure that the system is working correctly.
  9. Maintain adequate supply of spare parts on site as required.
  10. Monitor and maintain odor control facilities and systems.
- D. Bypass pumping systems shall include a minimum of one thousand (1,000) lineal feet discharge piping length.
- E. Related Work Specified Elsewhere
1. Section 01010 - Project Procedures
  2. Section 02920 - Site Restoration

#### 1.02 UNIT RESPONSIBILITY

- A. Bypass pumps, piping, and associated accessories shall be provided by a single supplier to ensure a completely integrated and functional system and temporary HDPE piping systems shall be tested for leakage prior to use.

#### 1.03 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of the General Requirements of the Contract Documents and Section 01300 - Submittals
- B. The design, installation, and operation of the temporary pumping system shall be the **Contractor's** responsibility. The **Contractor** shall employ the services of a vendor that can demonstrate to the **County** that the vendor specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least three (3) references of projects of a similar size and complexity as this Project, successfully performed by the vendor's firm within the past three years. Each reference shall include the name of the agency, the name of the project, the date of the project, and the agency contact (telephone, fax, and e-mail). The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- C. During the course of the project, the detailed, Work-Specific Bypass Pumping/Flow Diversion Plan for any bypass utilizing multiple pumps, or a single pump greater than or equal to a four (4) inch discharge, shall be submitted to the **County** at least ten (10) days before required. The plan shall outline all provisions and precautions, to be taken by the **Contractor**, regarding the



handling of existing wastewater flows and control of odors. The plan shall be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to insure proper protection of the facilities and control of odors. The Plan shall also include details of protection of the access and bypass pumping locations from damage due to the discharge flows, compliance with the requirements, and permit conditions specified in these Contract Documents. No Work shall begin until all provisions and requirements have been reviewed and authorized by the **County**.

- D. The **Contractor** shall submit two (2) copies of the Flow Bypass Pumping/Flow Diversion Plan, described in Item 1.03(C), for each sewer bypass set up with sufficient detail to show:
1. Staging areas for pumps
  2. Sewer plugging method and types of plugs
  3. Number, size, material, location, and method of installation of suction piping including manhole cone removal and reconstruction
  4. By-pass pump sizing criteria (i.e., force main size and length, static and dynamic head, flow velocity, maximum wastewater level depths in manholes upstream of bypass pump operations), and resulting capacity, number of each size to be on site, and power/fuel requirements
  5. Calculations for selection of bypass pump size and pump curves showing the pump operating range
  6. Standby power generator size, location
  7. Downstream discharge plan
  8. Method of protecting discharge manholes or structures from erosion and damage, including manhole cone removal and reconstruction
  9. Thrust and restraint block sizes and locations
  10. Sections showing suction and discharge pipe depth, embedment, select fill, and special backfill where required
  11. Method of noise control for each pump and/or generator
  12. Any temporary pipe supports, including rollers and elevated rollers, as well as anchoring required
  13. Design plans and computation for access to bypass pumping locations indicated on the drawings
  14. Schedule for installation of and maintenance of bypass pumping lines
  15. Plan indicating selected location of bypass pumping lines
  16. Plan indicating the means by which flows from service laterals shall be accommodated
  17. Plan for maintaining traffic access to private property and public streets
- E. All proposed flow control arrangements, including flow bypass and/or diversion pumping plans for sewers, shall also include an emergency response plan to be followed in the event of a failure of the bypass pumping and/or diversion system.

- F. The **Contractor** shall notify the **County** twenty four (24) hours prior to commencing actual flow bypass and/or diversion pumping operations. The **Contractor's** Bypass Pumping/Flow Diversion Plan and Emergency Response Plan shall be agreed to by the **County** before the **Contractor** is allowed to commence wastewater bypass pumping and/or diversion.

#### 1.04 ENVIRONMENTAL PROTECTION

- A. The **Contractor** shall take necessary precautions to ensure that bypass operations do not result in wastewater overflows, sewer backups, odors, or related threats to the public health and do not cause flooding or damage to public or private property.
- B. The pumped wastewater shall be in an enclosed hose or pipe that is adequately protected from traffic and shall be redirected to the sanitary sewer system. The dumping or free flow of wastewater on public and private property, gutters, streets, sidewalks, or into storm drains is prohibited. Open channels or trenches shall not be used to convey wastewater flow.
- C. Should any liquid or solid matter from the wastewater collection system be spilled, discharged, leaked, or otherwise deposited to the environment, the **Contractor** shall immediately notify the **County**, clean, and disinfect the affected area to meet minimum state and local standards. In addition, due care and attention shall be provided to prevent the leakage of pump fuel or lubrication oil.
- D. Any wastewater overflows, backups, leaks, odors, or property damage resulting from improper setup or failure of the bypass pumping system shall be the responsibility of the **Contractor**. The **Contractor** shall be responsible for any fines, for the complete clean up of such spills, and for all restoration of any damaged property at no additional cost to the **County**.

## **PART 2 - PRODUCTS**

#### 2.01 BYPASS PUMPS

- A. The bypass pumps used shall be fully automatic, self-priming units. The pumps shall possess dry-running capabilities to accommodate the diurnal, cyclic nature of wastewater flow.
- B. Bypass pumps shall be of sufficient capacity to accommodate the daily peak sanitary sewer flows plus any additional flows due to rain events.
- C. The bypass pumps shall be driven by either electric motor or diesel engine.
1. Diesel engines shall be provided with acoustic enclosures to minimize noise.
  2. The **Contractor** is responsible for providing all necessary and required power and control wiring and associated electrical devices when using electric motors.

- D. Unless otherwise specified or approved by the **County**, the pumping equipment shall be sound attenuated; noise levels shall not exceed seventy five (75) decibels at twenty three (23) feet.
- E. The **Contractor** shall also provide a backup, onsite, bypass pumping system that shall automatically energize upon a high water level, indicating the failure of the primary bypass pumping unit. The backup system shall be equal in all respects to the primary system.
- F. The Bypass Pumping system shall be equipped with an electronic remote monitoring device that will notify the **Contractor** and the pump operator in the event of a high water level condition or a malfunction or failure of the bypass pumping system.
- G. The bypass pump equipment supplier shall provide technical support and service twenty four (24) hours/day, seven (7) days/week.

## 2.02 SYSTEM DESCRIPTION

- A. Design Requirements:
  - 1. Bypass pumping systems shall have sufficient capacity to pump a peak flow in the pipes that are being replaced, cleaned, or inspected. The **Contractor** shall provide all pipeline plugs, pumps of adequate size to handle wet weather peak flows, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be replaced, cleaned, or inspected. The bypass pumping system shall be designed to be operated twenty four (24) hours per day.
  - 2. The **Contractor** shall have adequate standby equipment available and be ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.
  - 3. The **Contractor** shall make all arrangements for bypass pumping during the time when the main is shut down for any reason. System shall overcome any existing force main pressure on discharge if applicable.
- B. Performance Requirements:
  - 1. To prevent interruption in the flow of wastewater, the **Contractor** shall, throughout the duration of the project, provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), piping, conduits, all necessary power, and all other labor and equipment necessary to intercept the wastewater flow before it reaches the point where it would interfere with its work, carry it past its work, and return it to the existing sewer downstream of its Work.

2. The **Contractor** shall meet the requirements of all codes and regulatory agencies having jurisdiction over the design, installation, and operation of the temporary pumping system. The bypass systems shall be the **Contractor's** responsibility.
3. The **Contractor** shall provide all necessary means to safely convey the wastewater past the Work area. The **Contractor** shall not be permitted to stop or impede the main flows under any circumstances.
4. The **Contractor** shall maintain wastewater flow around the Work area in a manner that will not cause surcharging of or damage to sewers and that shall protect public and private property from damage and flooding.
5. The **Contractor** shall protect water resources, wetlands and other natural resources.

## **PART 3 - EXECUTION**

### 3.01 PLANNING

- A. The **Contractor** shall be solely responsible for planning and executing wastewater flow control, bypass, and diversion pumping operations. The **Contractor** shall be entirely liable for damages to private or public property that may result from its operations and for all cleanup, disinfection, damages, and resultant fines in the event of a spillage, flooding or overflow.
- B. The **Contractor** shall coordinate the bypass pump installation and start-up with the **County**.
  1. A minimum of forty eight (48) hours advance written notice shall be given before starting bypass operations. The bypass pumping system shall be tested for a minimum of twenty four (24) hours without incident prior to taking any part of the collection system, including pump stations, out of service. Should any incident occur, the test period shall be restarted. Bypass operations shall not start or restart on Fridays.
  2. The **County** reserves the right to delay the start of bypass operations (e.g., in the event of forecasted adverse weather).

### 3.02 GENERAL

- A. Precautions:
  1. The **Contractor** is responsible for locating any existing utilities in the area the **Contractor** selects to locate the bypass pipelines. The **Contractor** shall locate the bypass pipelines to minimize any disturbances to existing utilities and shall obtain approval of the pipeline locations from the **County**. Costs associated with relocating utilities and obtaining approvals shall be paid by the **Contractor**.

2. During all bypass pumping operations, the **Contractor** shall protect sewer lines and manholes from damage caused by any equipment. The **Contractor** shall be responsible for all physical damage caused by its activities.

### 3.03 PLUGGING OR BLOCKING

- A. The **Contractor** shall insert sewer line plug into the line at a manhole upstream from the manhole or sewer that is to be cleaned or inspected. Flow-through plugs shall be used in the manhole or sewer that is to be cleaned or inspected where possible to save on discharge piping and the environment.
- B. Plugging or blocking of wastewater flows shall incorporate primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance or work, it is to be removed in a manner that permits the wastewater flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

### 3.04 FLOW BYPASS AND/OR DIVERSION PUMPING SCHEDULING

- A. If the **County** is operating or maintaining conventional pumping facilities and/or flow bypass and/or diversion pumping in the construction area of the present Contract, the **Contractor** shall coordinate with the **County** as necessary to determine and effect optimum working arrangements.
- B. The **Contractor** shall immediately cease bypass and/or diversion pumping when so ordered by the **County**.

### 3.05 PIPE RESIDUE

- A. When flow bypass and diversion pumping operations are complete, the residual contents of wastewater in piping shall be drained into the existing sewer prior to disassembly.

+++END OF SECTION 02750+++

## SECTION 02920 SITE RESTORATION

### PART 1 - GENERAL

#### 1.01 SCOPE

- A. This section includes disposition of materials and structures encountered in the Work; ground preparation; mulching; seeding; fence reset; cleanup; and any other similar, incidental, or appurtenant operation that may be necessary to properly complete the Work.
- B. The **Contractor** shall provide all services, labor, materials, and equipment required for all site restoration and related operations necessary or convenient to the **Contractor** for furnishing a complete Work as shown on the Plans or specified in these Specifications.
- C. Related Work Specified Elsewhere:
  - 1. Section 01210 - Measurement and Payment
  - 2. Section 02200 - Earthwork
  - 3. Section 02231 - Tree Protection and Trimming
  - 4. Section 02324 - Trenching and Trench Backfilling
  - 5. Section 02510 - Pavement Repairs
  - 6. Section 02535 - Gravity Flow Sanitary Sewers

#### 1.02 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of the General Requirements of the Contract Documents and Section 01300. In addition, the following specific information shall be provided:
  - 1. Certificates of inspection as required by government authorities. The **Contractor** shall submit manufacturers' or vendors' certified analysis for soil amendments and fertilizer materials. The **Contractor** shall submit other data substantiating that materials comply with specified requirements.
  - 2. Typewritten instructions recommending procedures to be established by the **County** for maintenance of site restoration work for one (1) full year.
  - 3. Seed vendors certified statements for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed for each grass seed species.
  - 4. Proposed planting schedules, indicating dates for each type of planting work during normal seasons for such work in the site of the Work. The **Contractor** shall correlate with specified maintenance periods to provide

maintenance from the Date of Substantial Completion. Once accepted, the **Contractor** shall revise dates only as approved in writing, after documentation of reasons for delays.

### 1.03 QUALITY ASSURANCE

- A. Reference Standards: The **Contractor** shall comply with the applicable provisions and recommendations of the latest editions of the following standards, except as otherwise shown on the Plans or specified in these Specifications.
  - 1. ASTM C602 - Standard Specification for Agricultural Liming Materials.
  - 2. Turfgrass Producers International.
- B. The **Contractor** shall ship site restoration materials with certificates of inspection required by authorities having jurisdiction. The **Contractor** shall comply with regulations applicable to site restoration materials.
- C. If specified site restoration materials are not obtainable, the **Contractor** shall submit proof of non-availability to the **County** together with proposal for use of equivalent material.
- D. The **Contractor** shall package standard products with manufacturers' certified analysis. For other material, the **Contractor** shall provide analysis by recognized laboratory, in accordance with methods established by the Association of Official Agricultural Chemists, as applicable.

### 1.04 SAFETY REQUIREMENTS

- A. Hazards Control:
  - 1. The **Contractor** shall store volatile wastes in covered metal containers, and remove from the site of the Work daily.
  - 2. The **Contractor** shall prevent accumulation of wastes that create hazardous conditions.
  - 3. The **Contractor** shall provide adequate ventilation during use of volatile or noxious substances.
- B. The **Contractor** shall conduct cleaning and disposal operations in compliance with local ordinances and environmental laws and regulations.
  - 1. The **Contractor** shall not burn or bury rubbish and waste materials on the site of the Work without prior written permission from the **County**.
  - 2. The **Contractor** shall not dispose of volatile wastes such as mineral spirits, oil, or fuel in open drainage ditches or storm or sanitary drains.

### 1.05 DELIVERY

- A. The **Contractor** shall deliver packaged materials in containers showing weight, analysis, and name of manufacturer. The **Contractor** shall protect materials from deterioration during delivery, and while stored at the site of the Work.

### 1.06 JOB CONDITIONS

- A. All bare earth areas within the limit of work shall be grassed, mulched, or covered with other plant material as shown on the Plans. Final restoration of existing lawn areas (i.e. private residences, schools, and parks) shall be sod.
- B. On a continuous basis, the **Contractor** shall maintain the site of the Work free from accumulations of waste, debris, and rubbish caused by its operations.
- C. At completion of the Work, the **Contractor** shall remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all sight-exposed surfaces. The **Contractor** shall leave the site of the Work clean and ready for occupancy.
- D. The **Contractor** shall proceed with the complete site restoration work as rapidly as portions of the site of the Work become available, working within seasonal limitations for each kind of site restoration work required. The **Contractor** shall not be allowed to postpone cleanup and seeding until the end of the Work.
- E. The **Contractor** shall determine the locations of underground utilities and perform Work in a manner that shall avoid possible damage. The **Contractor** shall hand excavate, as required. The **Contractor** shall maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- F. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, the **Contractor** shall notify the **County** before planting.
- G. The **Contractor** shall install materials during normal planting seasons for each type of site restoration work.
- H. The **Contractor** shall plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to the **County**. If planting of trees and shrubs occurs after lawn work, the **Contractor** shall protect lawn areas and promptly repair damage to lawns resulting from planting operations.
- I. The **Contractor** may, at its option, employ additional measures (other than those specified) to prevent loss of, or damage to the Work resulting from the effects of wind and/or water. No additional compensation shall be made for the employment of such additional measures.



## PART 2 - PRODUCTS

### 2.01 TOPSOIL

- A. Topsoil for site restoration may not be available at the site of the Work in sufficient quantities and shall be furnished as specified.
- B. New topsoil shall be fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay, lumps, brush, weeds, and other litter, and free of roots, stumps, stones, and other extraneous or toxic matter harmful to plant growth.
- C. The **Contractor** shall obtain topsoil from local sources or from areas having similar soil characteristics to that found at the site of the Work. The **Contractor** shall obtain topsoil only from naturally, well-drained sites where topsoil occurs in depths of not less than four (4) inches. The **Contractor** shall not obtain topsoil from bogs or marshes.

### 2.02 MATERIALS

- A. Grass seed shall meet the requirements of the State of Georgia Seed Laws and Rules and Regulations except that the requirements as to purity, germination, and noxious weeds shall be specified in this section.

- 1. Quality: Grass seed quality shall be as shown in the Table below:

| <b>Grass Seed Quality</b> |               |                   |                           |
|---------------------------|---------------|-------------------|---------------------------|
| Seed                      | Purity Min. % | Germination Min % | Noxious Weed Max. Per Lb. |
| Sahara Bermuda Grass      | 98            | 90                | None                      |
| Annual Rye Grass          | 98            | 90                | None                      |
| Rebel II Turf Type Fescue | 85            | 85                | None                      |

- 2. Seed shall be approved by the **County** before sowing. Seed shall have been tested by the Georgia Department of Agriculture, and no seed shall be acceptable with a date of test more than six (6) months prior to the date of sowing. Such testing, however, shall not relieve the **Contractor** from responsibility for furnishing and sowing seed that meet the requirements of these Specifications at the time of sowing seed. When required by the **County**, samples of seed shall be furnished by the **Contractor** early enough before seeding to permit further testing before the seed is used. When a low percentage of germination causes the quality of the seed to fall below the minimum pure live seed specified, the **Contractor** may choose to increase the rate of seeding to obtain the minimum pure live seed content specified, provided that such an increase in seeding rates does not cause the quantity of noxious weed seed per square yard to exceed the quantity that would be allowable at the regular rate of seeding.

3. Seed that has become wet, moldy, or otherwise damaged shall not be acceptable.
- B. All fertilizer shall be of the grades specified and shall meet the requirements of the State Plant Food Act in effect thirty (30) days prior to the taking of bids. It shall be uniform in composition, dry and free flowing and shall be delivered to the site of the Work in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer that is caked or otherwise damaged, making it unsuitable for use, shall not be accepted.
- C. Mulch shall meet the following requirements:
1. Be acceptable to the **County**.
  2. Be of such consistency that, when properly loosened, it can be distributed in a uniform application.
  3. Be capable of producing the desired results.
  4. Meet State and Federal Quarantine Restrictions pertaining to fire ants, Japanese beetles, and white fringed beetles.
  5. Shall have a moisture content of twelve (12) percent or less.
  6. Contain no excessive amounts of noxious weed seeds.
  7. All materials shall carry the following certification: "This material is certified as free for movement under the State and Federal Imported Fire Ant, Japanese Beetle, and White Fringed Beetle Quarantines."
  8. Mulch shall be threshed rye, oat straw, wheat straw, or Bermuda grass hay.
- D. Agricultural lime shall be a pulverized limestone having the following properties:
1. Total carbonate, not less than eighty five (85) percent.
  2. Passing ten (10) mesh screen at least one hundred (100) percent.
  3. Passing one hundred (100) mesh screen at least twenty five (25) percent.
- E. Hydro mulch: Wood cellulose fiber containing no germination, inhibiting, or growth inhibiting agent. Characteristics shall be as follows:
1. Percent moisture content: Nine (9.0%) percent  $\pm$  3.0 percent.
  2. Percent organic matter: Nine and two-tenths (9.2%) percent  $\pm$  0.8 percent.
  3. Percent ash content: One and eight-hundredths (1.08%) percent  $\pm$  0.2 percent.
  4. pH: four and eight tenths (4.8) ( $\pm$  0.5).
  5. Water holding capacity: one thousand one hundred fifty (1150) grams water/ one hundred (100) grams fiber minimum.
- F. Sod. Sod shall meet the requirements of Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, Section 700 and 890, latest edition.

## 2.03 GRASSING

- A. Grass seed shall be as specified on the table below depending on the season or as instructed by the **County**. See the table below for seasonal application rates:

| <b>Seasonal Seed Application Rates</b> |                             |                                   |
|--|-----------------------------|-----------------------------------|
| <b>Season</b>                          | <b>Type of Seed</b>         | <b>Application: lbs. per Acre</b> |
| Jan. 1 – May 15                        | Rebel II Turf Type Fescue   | 250                               |
| May 16 – Sept. 15                      | Sahara Hybrid Bermuda Grass | 75                                |
| Sept. 16 – Dec. 31                     | Rebel II Turf Type Fescue   | 250                               |

- B. Disturbed Area Stabilization (Temporary Seeding) shall be planted with seeds listed in Table 2.

### **PART 3 - EXECUTION**

#### **3.01 DISPOSITION OF MATERIALS AND STRUCTURES ENCOUNTERED IN THE WORK**

- A. Existing materials or structures that may be encountered (within the lines, grades, or trenching sections established for completion of the Work), if unsuitable or unacceptable to the **County** for use in the Work, and for which the disposition is not otherwise specified, shall either be disposed of by the **Contractor** or shall remain the property of the **County** as further provided in this section.
- B. At the option of the **County**, any existing materials or structures of "value" encountered in the Work shall remain the property of the **County**. The term "value" will be defined by the **County**.
- C. Any existing materials or structures encountered in the Work, and determined not to be of "value" by the **County**, shall be disposed of by the **Contractor**, in an approved manner, except as otherwise specified in Section 02200 - Earthwork

#### **3.02 GROUND PREPARATION**

- A. All ground to be sodded, sprigged, overseeded, or grassed shall be prepared by plowing, disking, and harrowing to a depth or not less than six (6) inches. After plowing, topsoil shall be spread on the prepared area to a depth of four (4) inches, and smoothed to a uniform depth. The finished surfaces shall present a smooth, uniform, loose, well broken soil. All large clods, boulders, stumps, large roots, roots, debris, and other particles two (2) inches in diameter or greater and which will interfere with the Work shall be removed from the site of the Work.
- B. Lime shall be uniformly spread over the area to be planted or sowed at the rate of two thousand (2,000) pounds per acre. Commercial grade five (5) percent nitrogen-ten percent phosphorus – ten percent potassium (5-10-10) fertilizer or approved equal shall also be uniformly spread over the area at the rate of one thousand five hundred (1,500) pounds per acre or as recommended by the manufacturer. The fertilizer and the lime shall then be thoroughly mixed into the

top six (6) inches of the soil. All surface areas distorted by mixing of line and fertilizer into the soil shall be restored to the proper line and grade before any more work is done on the area.

### 3.03 MULCHING

- A. The quantity of mulch to be applied shall be that required to evenly cover the ground to a depth of at least three (3) quarters of an inch and not more than one and one-half (1½) inches, according to the texture and moisture content of the mulch material. It is intended that mulch allow some sunlight to penetrate and air to circulate while at the same time shading the ground and conserving soil moisture.
- B. Mulch: Mulch shall be uniformly applied manually or with special blower equipment. When a blower is used, baled material shall be thoroughly loosened before it is fed into the machine so as to obtain a uniform coating of mulch and to prevent placement of unbroken clumps. After initial distribution, thick clumps that are dense enough to prevent new grass from emerging shall be loosened and redistributed. Mulch shall not be applied on windy days when the velocity of the wind is sufficient to prevent uniform distribution of mulch.
- C. Hydro mulch: If Hydro mulch is used, it shall be mixed to provide equivalent quantities of fertilizer and seed as specified in this section.

### 3.04 SEEDING

- A. Seed shall be uniformly sown at the rates specified, by the use of approved mechanical seed drills, rotary hand seeders, or other type of equipment that shall produce a uniform application of the seed. The **Contractor** shall not distribute seed by hand.
- B. In order to obtain an even distribution, seeds shall be sown separately except that seeds of approximately the same size may be mixed and sown together. No sowing shall be done during windy weather that prevents even distribution of the seeds, when the prepared surface is crusted, frozen, wet, or otherwise in non-tillable condition.
- C. Immediately after seeding, all areas shall be rolled.
- D. Watering: After seeding of areas are complete, watering shall be continued daily as long as necessary to promote a rapid growth except that no water shall be applied between the hours of 10 A.M. and 4 P.M. to prevent "crushing over" from the sun.
- E. First Application of Nitrogen (All areas): The first application of nitrogen shall be made on all areas when there is evidence that a satisfactory stand of grass will be obtained. For seeded areas, the young grass shall have reached a height of at least one (1) inch. At this time, nitrate of soda, or other approved commercial fertilizer high in nitrogen content shall be applied at a rate sufficient to furnish seventy (70) pounds of nitrogen per acre. No fertilizer shall be applied to unsatisfactory areas that will have to be replanted.

- F. Second Application of Nitrogen (all areas): A second application of nitrogen shall be made thirty (30) days after sufficient moisture has been applied to make the first application available for plant growth. Second application shall also furnish seventy (70) pounds nitrogen per acre.
- G. Maintenance: The **Contractor** shall provide all maintenance necessary to keep all seeded and turf areas in a healthy, satisfactory, and weed-free condition until the Work is finally accepted. This includes repairing washed-out areas, and correctly applying additional seed, fertilizer, and water if they are needed.
- H. Satisfactory Stand Defined:
  - 1. A stand of grass shall be considered satisfactory by the **County** only if there is full cover over the seeded area with perennial grass that is alive and growing, leaving no bare spots larger than one (1) square foot or the total of all bare spots within a given area shall constitute no more than one one-hundredth (1/100) of the total area.
  - 2. If it is necessary to repeat any or all of the work necessary to produce a viable stand of perennial grass, including repairing washed-out areas, soil preparation, re-fertilizing, liming, re-seeding, sprigging, watering, or mulching, the **Contractor** shall repeat these operations until satisfactory stand is obtained and approved by the **County**.
- I. The **Contractor** shall remove all stumps, fallen trees, uprooted trees, dead trees, and debris from the edge of the right-of-way.

### 3.05 SOD

- A. Furnish and install sod in all lawn areas or as designated by the **County**.
  - 1. Use only Common Bermudagrass (*Cynodon dactylon*) or one of the following Bermudagrass varieties:
    - a. Tifway 419
    - b. Tifway II Hybrid
    - c. Tift 94
    - d. Tifton 10
    - e. Midlawn
    - f. Midiron
    - g. GN-1 Hybrid
    - h. Vermont
  - 2. No dwarf Bermuda types shall be used. Sod shall be nursery-grown and accompanied with a Georgia Department of Agriculture Live Plant License Certificate or Stamp. Sod shall consist of live, dense, well-rooted material free of weeds and insects as described by the Georgia Live Plant Act.

3. Place sod by hand or by mechanical means so that joints are tightly abutted with no overlaps or gaps. Use soil to fill cracks between sod pieces, but do not smother the grass.
  4. Once sod is placed and staked as necessary, tamp, or roll it using adequate equipment to provide good contact with soil.
  5. Use caution to prevent tearing or displacement of sod during this process. Leave the finished surface of sodded areas smooth and uniform.
- B. After the sod has been placed and rolled or tamped, water it to promote satisfactory growth. Additional watering will be needed in the absence of rainfall and during the hot, dry summer months. Water may be applied by Hydro Seeder, Water Truck or by other means approved by the **County**.
- C. Sod will be inspected by the **County** at the end of the first spring after installation and at the time of Final Inspection. Replace any sod that is not live and growing. Any cost for replacing any unacceptable sod shall be at the **Contractor's** expense.
- D. Apply nitrogen at approximately fifty (50) pounds/acre when specified by the **County** after plants have grown to two (2) inches high. One application is mandatory and shall be applied before Final Acceptance. Apply nitrogen with mechanical hand spreaders or other approved spreaders capable of uniformly covering the grassed areas. Do not apply nitrogen on windy days or when foliage is damp. Do not apply nitrogen between October 15 and March 15.

### 3.06 FENCE RESET

- A. Should the construction of the sewer require or result in removal or damage to an existing fence, the **Contractor** shall replace the fence in kind to the satisfaction of the fence owner.

### 3.07 CLEANUP

- A. During site restoration work, the **Contractor** shall keep pavements clean and the site of the Work in an orderly condition.
- B. The **Contractor** shall protect site restoration work and materials from damage due to site restoration operations, operations by other contractors, and trades and trespassers. The **Contractor** shall maintain protection during installation and maintenance periods. The **Contractor** shall treat, repair, or replace damaged site restoration work as directed by the **County**.
- C. Throughout the progress of the Work, the **Contractor** shall keep the construction area, including storage areas used by the **Contractor**, free from accumulations of waste material or rubbish, and shall keep its materials and equipment in a neat and orderly manner. Immediately upon completion of any section of the Work and before payment therefore has been made, the **Contractor** shall remove from the site of the Work all construction equipment, temporary structures, and debris, and shall restore the site of the Work to a neat, workmanlike condition; the

**Contractor** shall not remove barricades and warning and direction signs until directed by the **County**. The **Contractor** shall not postpone cleanup and seeding until the end of the Work. Waste materials shall be disposed of at locations satisfactory to the **County** or affected regulatory agencies.

- D. After completion of all Work contemplated under the Contract and before final payment has been made, the **Contractor** shall make a final cleanup of each separate part of the Work; shall restore all surfaces to a neat and orderly condition; and shall remove all construction equipment, tools, and supplies.

### 3.08 INSPECTION AND ACCEPTANCE

- A. When site restoration work is completed, including maintenance, the **County** will, upon request, make an inspection to determine acceptability.
- B. Where inspected site restoration work does not comply with the requirements of the **County**, the **Contractor** shall replace rejected work and continue specified maintenance until reinspected by the **County** and found to be acceptable. The **Contractor** shall remove rejected plants and materials promptly from the site of the Work.

+++ END OF SECTION 02920 +++