

**ADDENDUM TWO
AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER DEMOLITION
CONTRACT NO. Y-15-008-202
CITY OF CHATTANOOGA, TENNESSEE**

The following changes shall be made to the Contract Documents, Specifications, and Drawings:

I. Contract Documents:

The received current contract book on flash drive is out of sequential order. Find attached the corrected contract book.

July 24, 2019

/s/ Justin C. Holland, Administrator
City of Chattanooga
Department of Public Works

CONTRACT DOCUMENTS AND SPECIFICATIONS

**AVONDALE YOUTH AND FAMILY
DEVELOPMENT CENTER
DEMOLITION**

CONTRACT NO. Y-15-008-202

FOR

CITY OF CHATTANOOGA, TENNESSEE

MAYOR AND CITY COUNCIL

ANDY BERKE, MAYOR

CHIP HENDERSON

JERRY MITCHELL

KEN SMITH

DARRIN LEDFORD

RUSSELL GILBERT, SR.

CAROL B. BERZ

ERSKINE OGLESBY, JR.

ANTHONY BYRD

DEMETRUS COONROD

**WILLIAM C. PAYNE, P.E., CITY ENGINEER
DEPARTMENT OF PUBLIC WORKS**

PREPARED BY

**PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
CHATTANOOGA, TENNESSEE**

JULY 2019

**CITY OF CHATTANOOGA
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION**

CERTIFICATION AND SEAL

I hereby certify that the Project Drawings and the Contract Documents and Specifications for the following contract were prepared by me or under my direct supervision, and that I am a duly registered engineer under the laws of the state in which these projects are located:

AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER DEMILITION

Y-15-008-202



TN REGISTRATION NO. 108726

Andrew C. Hutsell, P.E.

(Date)

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REQUEST FOR BIDDER INFORMATION

Questions regarding the project or the Bid Documents must be in writing as required by the Instruction to Bidders. Questions must be written on this form and sent by email, fax or mail to the email, fax number or address listed below. Upon timely receipt, if appropriate, an Addendum will then be issued to all persons who have received Bid Documents from the Owner.

City of Chattanooga
Purchasing Department
101 E. 11th Street, Suite G13
Chattanooga, TN 37402
bidinfo@chattanooga.gov
Phone Number: (423) 643-7230
Fax Number: (423) 643-7244

**Contract: AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER
DEMOLITION**

Contract Number: Y-15-008-202

From: _____

Company: _____

Date: _____

CLARIFICATION IS NEEDED FOR THE FOLLOWING ITEMS:
(List Specification Section, Paragraph, Drawing Number and/or Detail Number)

END OF DOCUMENT

ADVERTISEMENT FOR BIDS

CITY OF CHATTANOOGA, TENNESSEE
OWNER

Separate sealed bids for furnishing all supervision, materials, labor, tools, equipment, and appliances necessary for the construction of the following described project, will be received by the City of Chattanooga at City Hall, Purchasing Department, Suite G13, located at 101 E. 11th Street, Chattanooga, TN 37402, until **2:00 p.m., local time, on Thursday, August 8, 2019**, and then at said place publicly opened and read aloud:

AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER DEMOLITION

CONTRACT NUMBER Y-15-008-202

The scope of work shall consist of operations including but not limited to the following:

Installation of erosion controls; demolition of selected portions of pavement, curbs, fences, storm drainage; disconnection/abandonment of utilities; abatement and demolition of the existing old Avondale YFD Center.

The Contract Documents may be examined at the:

City of Chattanooga
Purchasing Department
101 E. 11th Street, Suite G13
Chattanooga, TN 37402
bidinfo@chattanooga.gov
Phone Number: (423) 643-7230
Fax Number: (423) 643-7244

Specifications are available for pick up from 8:00 am until 4:30 pm, Monday through Friday. Copies of the Contract Documents may be purchased at the same location upon payment of \$35.00 per set; no part of the purchase price will be refunded.

A Pre-Bid Conference is scheduled for Tuesday, July 23, 2019 at 10:00 A.M. local time, at the existing Avondale YFD Center, located at 1305 Dodson Avenue, Chattanooga, TN 37406.

All bidders must be licensed and shall comply with all requirements of the State of Tennessee Contractor's Licensing Act.

ADVERTISEMENT FOR BIDS

Contract Number Y-15-008-202

Visit our website at: <http://www.chattanooga.gov/purchasing/bidssolicitations> for specific contract information.

The City of Chattanooga is an Equal Opportunity Employer.

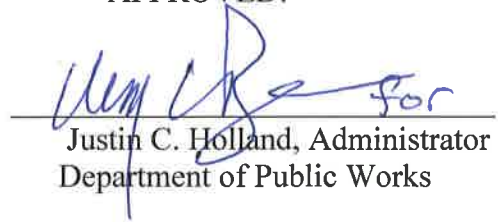
CITY OF CHATTANOOGA, TENNESSEE

RECOMMENDED FOR APPROVAL:



William C. Payne, P.E., City Engineer
Department of Public Works

APPROVED:



Justin C. Holland, Administrator
Department of Public Works

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS

1. General

Instructions to Bidders are also contained in other parts of these Contract Documents and apply with equal force to the instructions set forth in these Instructions to Bidders. All Bidders shall comply with every requirement, obligation, responsibility, and provision imposed on the Contractor by these Contract Documents even though said requirements, obligations, responsibilities, and provisions shall be complied with by the Contractor in part or in total prior to the opening of bids or the award of the Contract. If any Bidder fails to comply in every respect with any condition imposed on the Bidder or the Contractor, as the case may be, it is understood and agreed that the bid submitted may be declared by the Owner, at the sole discretion of the Owner without recourse, as non-responsive, and the Owner may award the Contract to the next lowest responsive and responsible bidder, or all bids may be rejected.

Definitions of terms used in these Instructions to Bidders and other Contract Documents are contained in the General Conditions of these Contract Documents.

2. Proposal Requirements and Conditions

The Bidder's attention is directed to Section 2, Proposal Requirements and Conditions, of the General Conditions of these Contract Documents which contains specific instructions to, and information for, Bidders. The instructions and information contained in said Section 2 are supplemented by that set forth herein and in other parts of these Contract Documents.

3. Qualification of Bidders

The Bidder must be capable of performing the work covered by these Contract Documents in a satisfactory manner and within the time specified. The Bidder shall furnish with his Bid, on forms contained in the Proposal, information and evidence required by the Owner for the Owner's use in determining the Bidder's qualifications for performing the work. The Bidder shall promptly furnish all additional information, evidence, or statements requested by the Owner, after the bids have been opened and evaluated, or his bid may be declared non-responsive.

If the Bidder is a subsidiary, division, or corporation, 50 percent or more of whose ownership is held by another corporation, firm, or person, the Bidder shall furnish the same information, evidence, and statements on the principal owner that is required to be submitted by the Bidder to the Owner by these Contract Documents.

The information and evidence required to be submitted by the Bidder shall include, but not be limited to: (1) financial statements; (2) list of subcontractors; (3) list of Bidder experience; and (4) lists of construction equipment available to the Bidder for performing the work.

4. Responsibility of Bidder to Inform Himself as to All Conditions Relating to the Work and the Project

The Bidder, by and through the submission of his Bid, agrees that he shall be held responsible: (1) for examining and fully understanding the Scope of Work, the Contract Documents, and all requirements thereof; (2) for having examined the site, the location, and the route of all proposed work; (3) for having familiarized himself fully with the construction schedule, site constraints, and the contractor's access requirements to the site; (4) for having satisfied himself as to the character of the work, the location, the surface and underground obstructions, the nature of the ground, subsurface water conditions, and all other subsurface conditions, and all other physical characteristics of the work and conditions relating thereto, in order that he may include in the prices bid, all costs pertaining to the work and thereby provide for the satisfactory completion thereof, including the removal, relocation, or replacement of any objects or obstructions which will be encountered in the performance of the work (based on the Unit Price descriptions in the Specifications).

If Bidders fail to fully understand any clause or requirement of these Contract Documents, inquiry in writing must be made of the Engineer for his interpretations of the Contract Documents five (5) calendar days in advance of the submission of a bid. Failure on the part of Bidders to thoroughly acquaint themselves with the work to be performed and the conditions under which it will be performed shall not be considered as a valid excuse for claims of any kind after the award of the Contract.

5. Familiarity with Laws and Regulations

The Bidder is required to be familiar with all Federal, State, and Local laws, ordinances, rules, and regulations that in any manner affect the work. Ignorance on the part of the Bidder shall not, in any way, relieve him from responsibility for compliance with said laws and regulations or any of the provisions of these Contract Documents.

The Bidder's attention is directed to the fact that all applicable Federal, State, and Local laws, ordinances, rules, and regulations and the regulations of any agency of government having jurisdiction over the work, or any part thereof, shall apply to the work or the performance thereof, and that said laws and regulations shall be a part of these Contract Documents, the same as if herein repeated.

6. Time for Completion and Liquidated Damages

6.01 It is understood and agreed that time is of the essence of the Contract and the Bidder agrees to complete the work within the contract time specified in the Proposal, the Contract, and other Contract Documents.

6.02 Should the Contractor fail to complete the work under these Contract Documents within the time specified in the Proposal, the Contractor shall pay to the Owner, as liquidated damages and not as a penalty, the amount specified in the Proposal per calendar day of default unless extensions of time granted by the Owner specifically provide for the waiving of liquidated damages.

7. Addenda

If a Bidder is in doubt as to the meaning of any of the Contract Documents or if he finds discrepancies or ambiguities in, or omissions from any of the Contract Documents, he shall immediately submit a written request at least five (5) calendar days in advance of the bid opening date to the Engineer for interpretation or clarification. Said request by the Bidder and reply by the Engineer in the form of an addendum shall be in conformance with the provisions of these Contract Documents. All addenda shall become a part of these Contract Documents and shall be attached to the front cover of this bound volume submitted by the Bidder as his bid. The issuance of a written addendum by the Engineer shall be the only method whereby an interpretation or clarification will be made. No oral clarifications by the Owner or the Engineer will be made. Each Bidder shall be bound by all addenda, whether or not received by him.

8. Preparation of Bids

All bids shall be submitted on the prescribed forms contained in this bound volume and shall include all items listed in the Table of Contents of this volume and all addenda. All blank spaces of the Proposal and required accompanying documents, certifications, and statements shall be filled in handwritten in ink or typewritten, and completed as required by the provisions of these Contract Documents. Failure by the Bidder to fill in and complete all blanks and to supply all required information, documents, certifications, and statements may render the bid non-responsive, at the Owner's sole discretion without recourse, and the Owner may award the Contract to the next lowest responsive, responsible bidder or all bids may be rejected.

8.01 Proposal: The Proposal bound in this volume, together with other documents, certifications, and statements required with the submission of the bid, shall be the form on which the bid is submitted and may not be removed from this bound volume. Alternately the contractor may only submit the bid documents provided separately with these specifications. Items such as bid bonds may be stapled to the appropriate pages in the documents. Modification of the Proposal or accompanying documents, certifications, and statements, may render the bid non-responsive.

The Bidder must sign the Proposal in the space provided for the signature. If the Bidder is an individual, the words "doing business as _____" or "Sole Owner" should appear beneath such signature. In the case of partnership, the signature of at least one of the partners must follow the firm name, and the words "Member of the Firm" should be written beneath such signature. If the Bidder is a corporation, the title of the officer signing the Proposal in behalf of the corporation must be stated, and evidence of his authority to sign the Proposal must be submitted.

8.02 Proposal: The total base bid for the work described in these Contract Documents shall be the sum of the prices bid for the individual bid items in the Schedule I - Base Bid Items. Any Additive Alternate may be included in the Contract at the option of the City.

The amount of the total price or total unit price bid for each individual bid item in the Schedule I - Base Bid Items will determine the lowest bid subject to qualification and other requirements of these Contract Documents, and the City may make multiple awards to the lowest bidder for each individual bid item.

The City reserves the right to make one award to the bidder whose total base bid (the sum of the bid prices bid for the individual bid items in Schedule I – Base Bid Items) is the lowest, subject to qualification and other requirements of these Contract Documents.

8.03 Sales Taxes: The attention of the Bidder is directed to the laws of the State of Tennessee. The Bidder shall include all applicable state and local sales taxes in the price bid. The Bidder will be required to comply with all applicable laws and to file any required exemption certificates.

8.04 Statement of Equipment: The Bidder shall fill out the Statement of Equipment, providing all the data requested on the form.

8.05 Financial Statement: The successful Bidder shall be required to submit a Financial Statement prior to award of the contract, if requested.

8.06 Statement of Bidder's Qualifications: The Bidder shall fill out the Statement of Bidder's Qualifications, providing all the data requested on the form.

8.07 Affidavit: The Bidder shall fill out and properly execute the Affidavit contained in the Proposal.

9. Bid Security

Each bid must be accompanied by a certified check or Bid Bond on the prescribed form included herein or an approved form in an amount not less than five percent (5%) of the amount of the bid, duly executed by the Bidder as principal and having as surety thereon a surety company acceptable to the Owner and the Owner's attorney and authorized to write such Bid Bond under the laws of the State of Tennessee. The certified checks or Bid Bonds of all unsuccessful Bidders, except the three lowest Bidders, will be returned after the opening of bids. The certified checks or Bid Bonds of the three lowest Bidders will be returned after the Owner and the accepted Bidder have executed the Contract and the accepted Bidder has filed an acceptable Contract Bond; or if the award of the Contract has not been made within 60 days after the date of the opening of bids, upon demand of any Bidder at any time thereafter, provided that he has not been notified of the acceptance of his bid.

Attorneys-in-Fact or other officers who sign bid bonds for a surety company must file with such bonds a certified copy of his power of attorney authorizing him to sign said bonds.

10. Obligation of Bidders

It is the obligation of the Bidder prior to submitting his bid:

- (1) To fully satisfy himself, using whatever means and methods he considers necessary or convenient, as to the requirements of these Contract Documents and the work covered hereunder.
- (2) To read and to be thoroughly familiar with the Drawings and other Contract Documents.
- (3) To comply with all requirements and provisions of these Contract Documents.
- (4) To make, from his own personal knowledge and experience, or professional advice, his own investigation of subsurface conditions.
- (5) To satisfy himself that the Drawings and other Contract Documents are adequate for the work to be performed hereunder.
- (6) To complete the Proposal and all accompanying documents, certifications, and statements as specified in these Contract Documents.

The failure of the Bidder to understand or comply with these obligations shall not relieve him from any responsibilities, duties, or obligations imposed by any provision of these Contract Documents. It is understood and agreed that the Bidder will not make any claims against the Owner or the Engineer for the Bidder's failure to comply with these requirements and that failure to comply may render the bid non-responsive at the Owner's sole discretion without recourse.

11. Submission of Bids

Each bid shall be submitted on the Proposal Form as furnished herein, together with a suitable bid security and with the required documents, certifications and statements, herein described. The Bidder shall submit one original of all documents in the envelope.

Each bid must be submitted in a sealed envelope. In compliance with all the requirements of Chapter No. 135, Public Acts of 1945 of the General Assembly of the State of Tennessee, and House Bill No. 2180 (Public Chapter No. 882) known as the Contractor's Licensing Act of 1976, the envelope must also bear on the outside the following:

- (1) Name of the bidder
- (2) Address of the bidder
- (3) Name of Project for which bid is submitted;
- (4) Bidder's License Number and State of Registration
- (5) Bidder's License Date of Registration
- (6) Bidder's License Category or Classification; License Amount; and
- (7) Bidder's License Expiration Date.
- (8) The names of the bidder's Subcontractors for electrical, plumbing and heating, ventilating and air conditioning work (no more than one in each category) must also appear on the face of the envelope with the license classification, license number and expiration date shown for each one.

All envelopes containing bids that are not marked as described above will be declared non-responsive, will not be opened, will be returned to the Bidder unopened, and will be handled as described in Paragraph 14 herein.

If the bid is forwarded by mail, the sealed envelope containing the Proposal shall be enclosed in another envelope addressed to the City of Chattanooga, care of City Purchasing, 101 E. 11th Street, Suite G13, Chattanooga, Tennessee 37402.

12. Modification of Bids

Bid modifications will be accepted from Bidders if addressed to the Owner and received prior to the opening of the bids.

Any Bidder may modify his bid by telegraphic communication at any time prior to the opening of bids, provided such telegraphic communication is received by the Owner prior to the opening of bids, and, provided further, the Owner is satisfied that a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the opening of bids. The telegraphic communication should not reveal the bid price but should provide the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within two (2) calendar days from the opening of bids, no consideration will be given to the telegraphic modification.

13. Withdrawal of Bids

Any bid may be withdrawn prior to the time scheduled in the Advertisement for Bids for the opening thereof. A bid may also be withdrawn 60 days after the date of the opening of the bids, provided that the Bidder has not been notified that his bid has been accepted.

14. Opening of Bids

Bids will be publicly opened and read aloud at the time and place stated in the Advertisement for Bids. The officer whose duty is to open them will decide when the specified time has arrived, and no bids received thereafter will be considered. No responsibility will be attached to any officer for the premature opening of a bid not properly addressed and identified. Bidders or their authorized agents are invited to be present.

15. Right to Accept or Reject Bids

Bids which contain modifications to the Contract Documents, or which are incomplete, unbalanced, conditional, or obscure, or which contain additions not requested or irregularities of any kind, or which do not comply in every respect with the "Instructions to Bidders" and other Contract Documents, may be declared non-responsive and rejected at the sole discretion of the Owner without recourse. The Owner reserves the right to waive any informality, to evaluate the bids, to reject any or all bids, and to re-advertise for bids.

16. Non-responsive Bids

Any bid that does not fully comply, in every respect, with all provisions, instructions, conditions, and requirements of these Contract Documents may be declared to be non-responsive by the Owner, at the Owner's sole discretion and without recourse, and the Owner may award the Contract to the next lowest responsive and responsible Bidder, or all bids may be rejected.

A bid may be declared by the Owner to be non-responsive for, but not limited to, any of the following reasons:

- (1) Failure to fill out all blanks and complete the Proposal and required accompanying documents, certifications, and statements.
- (2) Modification or alteration of the Proposal or other Contract Documents.
- (2) Failure to furnish adequate information for the Owner to determine if the Bidder is qualified.
- (3) Submission of a qualified or conditional bid.
- (4) Failure to furnish information, evidence, and statements of the principal Owner when the Bidder is owned 50 percent or more by another firm, corporation, or person.
- (5) Submission of unrealistic data, erroneous data, inaccurate data, or data that cannot be documented or substantiated.
- (7) Lack of adequate financial resources and capabilities.
- (8) Failure to comply with the requirements of Article 20 of Instructions to Bidders.

17. Disqualification of Bidders

17.01 One Proposal: Only one Proposal from a person, firm, partnership, or corporation under the same or under different names will be considered. If it is believed that a Bidder is interested in more than one Proposal for the work involved, all Proposals in which such a Bidder is interested will be declared non-responsive and will be rejected.

17.02 Collusion Among Bidders: If it is believed that collusion exists among the Bidders, the Proposals of all participants in such collusion will be declared non-responsive and will be rejected. Participants in such collusion will not be considered in future Proposals for the same work.

17.03 Debarred or Suspended Contractors: Bidders debarred or suspended under Chattanooga City Code, Part II, Chapter 2, Article XX (Ordinance No. 8259), or who are debarred or suspended by operation of any other applicable state or federal law or regulation, are not eligible to be contractors or subcontractors to this contract.

17.04 Affidavit of No Collusion by Bidder: All bidders are required to execute a notarized affidavit of No Collusion by Bidder, and a bidder who fails to do so will be disqualified.

18. Criteria for Evaluation of Bids

A contract will be awarded, if it is awarded, to the lowest responsible and responsive bidder who submits the lowest bid for each individual bid item in Schedule I in accordance with the Contract Documents. It is understood and agreed that the Owner will determine, without recourse, which Bidder is the lowest responsible and responsive Bidder for each individual bid item. The Owner reserves the right to award a single contract to the Bidder whose total base bid (the sum of the prices bid for the individual bid items in Schedule I – Base Bid Items) is the lowest. In determining the Bidder or Bidders who will receive awards, the following specific criteria will be considered.

18.01 The Bidder shall maintain a permanent place of business. This requirement applies to the Bidder where the Bidder is a division of a corporation, or where the Bidder is owned, 50 percent or more, by a person, corporation, or firm.

18.02 The Bidder shall demonstrate that he has adequate construction management experience and sufficient equipment resources to properly perform the work under, and in conformance with, these Contract Documents. This evaluation will be based upon a list of completed or active projects and a list of construction equipment available to the Bidder to perform the work.

18.03 The Bidder shall demonstrate that he is familiar with the work covered by these Contract Documents.

18.04 The Bidder shall demonstrate that he has financial resources of sufficient strength to meet the obligations incident to the performance of the work covered by these Contract Documents. The Bidder shall complete the financial statement in the Proposal form. The ability to obtain the required Performance and Payment Bonds will not alone demonstrate adequate financial capability.

The Bidder may demonstrate financial capability by submitting a suitable financial statement of an Equity Partner, provided an agreement is executed binding the Bidder and said Equity Partner, jointly and severally, to fulfill all duties, obligations, and responsibilities of the Contractor covered by these Contract Documents if the Contract is awarded to the Bidder. The agreement shall be submitted with the Bid and shall be satisfactory to the Owner's Attorney, or the bid may be declared non-responsive.

18.05 The Bidder shall furnish all data required by these Contract Documents. Failure to do so may result in the Bid being declared non-responsive. Acceptance of the Bidder's documentation and substantiation or Contract Award by the Owner does not relieve the Bidder of liability for nonperformance as covered in the Contract Documents; nor will the Bidder be exempted from any other legal recourse the Owner may elect to pursue.

19. Award of Contract

Following the opening of bids, the Engineer will evaluate the proposals. After completion of the evaluation of the proposals the Engineer will recommend to the Owner that the Bidder who is both responsive and responsible and whose bid totals the lowest number of dollars, for each individual bid item in Schedule I, should be awarded a contract. The Owner reserves the right to award a multiple contract to the Bidder based on the total of Schedule I, individual Site Locations or a combination of Site Locations based on lowest bid per each site. The Engineer will notify all Bidders in writing of the Owner's intent to award a contract or contracts. The City Council in an open public session will pass a Resolution of award of the contract or contracts to the recommended bidder(s).

20. Liquidated Damages for Failure to Enter into Contract

The certified check or Bid Bond filed with and as a part of the Proposal will be forfeited to the Owner as agreed upon as liquidated damages if the Bidder to whom the Contract is awarded shall fail to execute the appropriate Contract Documents within ten (10) days following written notice to him that such forms are ready for execution.

21. Execution of Contract

Each Bidder to whom a Contract is awarded will be required to execute, in seven (7) counterparts, the prescribed Contract form, Performance Bond form, and Payment Bond form within ten (10) days from the date of notice to him that such forms are ready for execution.

22. Security for Faithful Performance of Contract

Simultaneously with his delivery of the executed Contract form to the Owner, the Bidder to whom the Contract has been awarded shall deliver to the Owner an executed Performance Bond on the prescribed form in the amount of one hundred percent (100%) of the total amount of the accepted total bid as security for the faithful performance of his Contract, including meeting performance guarantees and for the repair and/or replacement of defective or deficient work for a period of one (1) year after the date of final acceptance of the work. At the same time, the successful Bidder shall deliver to the Owner an executed Payment Bond on the prescribed form in the amount of one hundred percent (100%) of the total amount of the accepted total bid as security for the payment of all persons performing labor or furnishing materials in connection therewith. The surety on said bonds or other security shall meet the requirements of these Contract Documents and shall be satisfactory to the Owner and the Owner's Attorney.

END OF DOCUMENT

00200-9

SECTION 00201

CONTRACTOR'S IDENTIFICATION
(ALL BLANKS MUST BE FILLED. USE N/A AS NECESSARY)

This form shall be attached to the sealed envelope containing the Bid. All prime contractors and contractors for electrical, plumbing, and heating, ventilation, and air conditioning contracts for bids of \$25,000 or more and/or masonry items for \$100,000 or more are required to complete this form pursuant to TCA 62-6-119. Failure to provide all of this information on the sealed envelope shall be considered a non-responsive Bid and shall not be opened or shall automatically disqualify such bid.

BIDDER:

Complete the following for all applicable Electrical, Plumbing, Masonry and Heating, Ventilation, and Air Conditioning Subcontractors: Prime Contractor must fill in space below when performing Electrical, Plumbing, or Heating, Ventilation, and Air Conditioning Sub-Contractor work for any bids of \$25,000 or more; and for Masonry for any bids of \$100,000 for more:

Name: _____

Subcontractor: _____

Address: _____

Tennessee License No.: _____

License Expiration Date: _____

License Classification: _____

If TaxID Number (TIN) issued, list below. Otherwise, list Owner's Social Security Number (SSN).

Monetary Limit: _____

TaxID Number: _____

_____ (\$ _____)

Subcontractor: _____

Tennessee License No.: _____

Tennessee License No.: _____

License Registration Date: _____

License Expiration Date: _____

License Expiration Date: _____

License Classification: _____

Monetary Limit: _____

Monetary Limit: _____

_____ (\$ _____)

_____ (\$ _____)

Subcontractor: _____

Classification : _____

Tennessee License No.: _____

License Expiration Date: _____

License Classification: _____

Monetary Limit: _____

_____ (\$ _____)

CITY OF CHATTANOOGA
Purchasing Department
101 E. 11th Street, Suite G13
Chattanooga, Tennessee 37402

SEALED BID PROPOSAL FOR :
AVONDALE YOUTH AND FAMILY DEVELOPMENT
CENTER DEMOLITION
Contract Number: Y-15-008-202

LOCATION: City Hall, Purchasing Department
101 E. 11th Street
Suite G13
Chattanooga, TN 37402

TIME: 2:00 p.m.

Bidding
Requirements & Documents

BID PROPOSAL

Project Description: Avondale Youth and Family Development Center Demolition, Y-15-008-202

Proposal _____

_____ hereinafter called "Bidder"), doing business as

a corporation, a partnership, an individual

To the City of Chattanooga, Tennessee (hereinafter called "Owner").

Gentlemen:

The Bidder, in compliance with your Advertisement for Bids for the construction of this project having examined the Drawings and Specifications with related documents, other Contract Documents, and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all supervision, labor, materials and equipment, and to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the price stated on the attached Bid Schedule. This price is to cover all expenses including overhead and profit incurred in performing the work required under the Contract Documents, of which this proposal is a part.

Bidder hereby agrees to begin work under this contract on or before a date to be specified in written "Notice to Proceed" of the Owner and to fully complete the project within the number of consecutive calendar days stipulated in the specifications. Bidder further agrees to pay liquidated damages as hereinafter provided in the General Conditions.

Bidder acknowledges receipt of the following addenda:

Bidder agrees to perform all the construction of the project for the attached price complete with appurtenant and accessory work described in the specifications and as shown on the plans.

The attached price shall include all supervision, labor, materials, equipment, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informalities in the bidding.

The Bidder agrees that this bid shall be firm and may not be withdrawn for a period of 60 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within ten (10) days and deliver a surety bond or bonds as required by the General Conditions. The bid security attached in the sum of 5% of the total bid is to become the property of the Owner in the event the contract and bond are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Respectfully submitted:

By _____
Signature

Title _____

Business Address

ATTEST:

Name _____ (SEAL)
(Please Type)

Title _____

Note: Attest for a corporation must be by the corporate secretary; for a partnership, by another partner; for an individual, by a Notary.

END OF DOCUMENT

BID SCHEDULE

**AVONDALE YOUTH AND FAMILY DEVELOPMENT
CENTER BUILDING DEMOLITION**

Y-15-008-202

CHATTANOOGA, TENNESSEE

DESCRIPTION

The scope of work shall consist of the following operations, including but not limited to: installation of appropriate erosion controls in accordance with approved SWPPP and erosion control plans; demolition of selected portions of asphalt pavement, concrete curbs, fences, drainage pipes and structures, and other structures and obstructions on site and within the area denoted for demolition; disconnection, capping, plugging, removal, and abandonment of utility lines connected to the existing old Avondale YFD Center; abatement of asbestos and lead paint in the existing old Avondale YFD Center; demolition and filling of basement and demolition and disposal of the existing old Avondale YFD Center; protection of the demolition work areas; coordination of activities with YFD staff and other contractors on site to maintain access to the driveway and the new YFD center, and to avoid interference with center operations or ongoing construction activities.

**AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER BUILDING
DEMOLITION**

TOTAL \$ _____

BASE BID \$ _____

Note: Dollar amounts are to be shown in both words and figures. In case of discrepancy, dollar amounts shown in words will govern.

Contractor certifies that he has reviewed the plans and specifications, and that all items of work not specifically listed in the Bid Schedule are included in the prices for the various items listed on the Bid Schedule.

BIDDER:

DATE:

BY:

(Signature) TITLE:

ADDRESS:

CITY:

STATE:

ZIP CODE:

TELEPHONE NUMBER:

Bid Schedule

Contract Number Y-15-008-202

AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER BUILDING DEMOLITION

City of Chattanooga

CONTRACT NUMBER Y-15-008-202					
Item No.	Description	Estimated Qty.	Unit	Unit Price	Total Price
BASE BID					
00717	Mobilization	1	LS		
02270	Erosion Control	1	LS		
02271	Temporary Seeding	1	LS		
00023-1	Removal of Structures and Obstructions	1	LS		
00023-2	Removal of Existing Asphalt Pavement	30400	SF		
00023-3	Removal of Existing Storm Drain Pipe	560	LF		
00023-4	Removal of Existing Storm Drain Structures	10	EA		
00023-5	Removal of Concrete Pavement, Slabs, Sidewalks, Steps, Etc.	3500	SF		
00023-6	Temporary Stormwater Control	1	LS		
00023-7	Controlling and Maintaining Access (Includes Fencing, Barriers, and Gravel for Temporary Paving)	1	LS		
00023-8	Demolition of Existing YFD Building (CMU)	4800	SF		
01310-1	Abatement, Removal, and Disposal of White Duct Tape	10	SF		
01310-2	Abatement, Removal, and Disposal of Floor Tile & Mastic Adhesives	4800	SF		
01310-3	Environmental Consultant and Air Clearance	1	LS		

Y-15-008-202 TOTAL BASE BID \$

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____

as Principal, and _____

as Surety, are hereby held and firmly bound unto City of Chattanooga, Tennessee, as Owner in the penal sum of five percent of the total bid for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to City of Chattanooga, Tennessee, a certain Bid attached hereto and hereby made a part hereof to enter into a contract in writing for the construction of **Y-15-008-202, Avondale Youth and Family Development Center Demolition.**

NOW, THEREFORE,

- (a) If said Bid shall be rejected, or in the alternate,
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and Surety have executed this Bond by causing their respective names to be hereunto subscribed and their seals to be hereunto affixed by their duly authorized officers, on this the _____ day of _____, 20__.

CONTRACTOR - PRINCIPAL:

By _____

Name _____
(Please Type)

Title _____

(SEAL)

SURETY:

By _____

Name _____
(Please Type)

Title _____

WITNESS:

Name _____
(Please Type)

(SEAL)

Title _____

Note: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

END OF DOCUMENT

**CERTIFICATION OF BIDDER REGARDING
EQUAL EMPLOYMENT OPPORTUNITY**

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the Equal Opportunity Clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

CERTIFICATION BY BIDDER

Bidder's Name: _____

Address: _____

- Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause. Yes ___ No ___
- Compliance reports were required to be filed in connection with such contract or subcontract. Yes ___ No ___
- Bidder has filed all compliance reports due under applicable instructions, including SF-100. Yes ___ No ___
- If answer to Item 3 is "No," please explain in detail below.

Certification -- The information above is true and complete to the best of my knowledge and belief.

Name and Title of Signer (Please Type)

Signature

Date

END OF DOCUMENT

**Affirmative Action Plan
For
City of Chattanooga Y-15-008-202**

(Name of Contractor)

The above named Contractor is an equal opportunity employer and during the performance of this contract, the Contractor agrees to abide by the Affirmative Action Plan of the City of Chattanooga as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or handicap. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, or handicap. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay, or other forms of compensation, and selection of training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin, or handicap.
3. The Contractor will send to each labor union or representative of workers with which he/she has a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or works' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The DBE goal for this project has been set at 0%.
5. This Plan or any attachments thereto shall further provide a list of all employees annotated by job function, race, and sex who are expected to be utilized on this project.
6. During the term of this contract the following non-discriminatory hiring practices shall be employed to provide employment opportunities for minorities and women:

- a. All help wanted ads placed in newspapers or other publications shall contain the phrase "Equal Employment Opportunity Employer".
 - b. Maintain systematic contracts with minority groups and human relations organizations.
 - c. Encourage present employees to refer qualified minority group and female applicants for employment opportunities.
 - d. Use only recruitment sources which state in writing that they practice equal opportunity. Advise all recruitment sources that qualified minority group members and women will be sought for consideration for all positions when vacancies occur.
7. During the term of this contract, the Contractor, upon request of the City of Chattanooga Office of Economic and Community Development, will make available for inspection by the City of Chattanooga Office of Economic and Community Development, copies of payroll records, personnel records, documents and other records that may be used to verify Contractor compliance with these equal opportunity provisions.
8. The Contractor agrees to notify the City of Chattanooga Office of Economic and Community Development of any failure or refusal on the part of the contractor or any subcontractors to comply with the equal opportunity provisions set forth. Any failure or refusal to comply with the aforementioned provisions by the Contractor and/or Subcontractors shall be a breach of this contract.

(Signature of Contractor)

(Title and Name of Construction Company)

(Date)

STATEMENT OF BIDDER'S QUALIFICATIONS

All questions must be answered, and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he desires. Attach all additional sheets to these Contract Documents.

1. Name of Bidder.
2. Permanent main office address.
3. When organized.
4. If a corporation, where incorporated.
5. How many years have you been engaged in the contracting business under your present firm or trade name?
6. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion.)
7. General character of work performed by your company.
8. Have you ever failed to or been directed not to complete any work awarded to you? If so, where and why, and which project?
9. Have you ever defaulted on a contract? If so, where and why and which project?
10. List the most important projects recently completed by your company, stating the approximate cost for each, and the month and year completed. (See form 00400-(2))
11. List your major equipment available for this contract.
12. List experience in construction work similar in importance to this project.

13. Background and experience of the principal members of your organization, including officers.

14. Credit available: \$ _____

15. Give bank reference: _____

16. Will you, upon request, submit a detailed financial statement and furnish any other information that may be required by the City of Chattanooga?

17. The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the City of Chattanooga in verification of the recitals comprising this Statement of Bidder's Qualifications.

Dated this _____ day of _____, 20__.

Name of Bidder

By _____

Title _____

State of _____

County of _____

_____ being duly sworn deposes and says that he is _____ of _____

and that the answers to the foregoing questions and all statements therein contained are true and correct.

Subscribed and sworn to before me this _____ day of _____, 20__.

Notary Public

(SEAL)

My Commission Expires:

(Date)

END OF DOCUMENT

STATEMENT OF REFERENCES

List three (3) projects constructed by your company within the last five (5) years that are of similar scope and size as this project.

Project 1: _____

Description: _____

Approximate Cost: _____ Completed: _____

Client or Owner Contact: _____

Title: _____ Phone: _____

Project 2: _____

Description: _____

Approximate Cost: _____ Completed: _____

Client or Owner Contact: _____

Title: _____ Phone: _____

Project 3: _____

Description: _____

Approximate Cost: _____ Completed: _____

Client or Owner Contact: _____

Title: _____ Phone: _____

END OF DOCUMENT

STATEMENT OF EQUIPMENT

I/We hereby, certify that all machinery and equipment necessary to perform the scope of work contained in these contract documents is either owned by me/us or that we have made arrangements to obtain the same from others. I/We further agree that I/we will furnish a complete list of equipment/machinery with kind/size/capacity/ownership, should the owner request the same.

Signed: _____

Name: _____

Title: _____

END OF DOCUMENT

PARTNERSHIP CERTIFICATE

STATE OF _____

COUNTY OF _____

On this _____ day of _____, 20____, before me personally appeared _____

_____ known to me to be the person who executed the above instrument, who, being by me first duly sworn, did depose and say that he is a general partner in the firm of

_____ and that said firm consists of himself and _____

_____ and that he executed the foregoing instrument on behalf of said firm for the uses and purposes stated therein, and that no one except the above named members of the firm have any financial interest whatsoever in said proposed contract.

Subscribed and sworn to before me, this _____ day of _____, 20____.

Notary Public

My Commission Expires:

END OF DOCUMENT

CORPORATE CERTIFICATE

I, _____, certify that I am the Secretary of the corporation named as Contractor in the foregoing proposal; that _____, who signed said proposal in behalf of the Contractor was then _____ of said corporation; that said proposal was duly signed for and in behalf of said corporation by authority of its Board of Directors, and is within the scope of its corporate powers; that said corporation is organized under the laws of the State of _____.

This _____ day of _____, 20__.

(SEAL)

END OF DOCUMENT

Chapter No. 817 (HB0261/SB0377). "Iran Divestment Act" enacted.
Vendor Disclosure and Acknowledgement

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to § 12-12-106.

(SIGNED) _____

(PRINTED NAME) _____

(BUSINESS NAME) _____

(DATE) _____

STATEMENT OF LICENSE CERTIFICATE

Each Contractor Bidding Shall Fill In and Sign the Following:

This is to certify that _____
has fully complied with all the requirements of Chapter No. 135, Public Acts of
1945 of the General Assembly of the State of Tennessee and House Bill No. 2180
(Public Chapter No. 822), known as the Contractors Licensing Act of 1976. The
Contractor's license number and other information outlined in the Information for
Bidders, expiration date, and that part of classification applying to the bid shall
appear on the envelope containing the bid; otherwise the bid will not be considered.

The State Board for Licensing General Contractors issued to _____

Certificate No. _____, which expires on _____, 20__.

Signed: _____

Name: _____

Title: _____

END OF DOCUMENT

JOINT VENTURE QUESTIONNAIRE

In the event a joint venture bid is submitted, the following questions shall be answered, submitted with the bid and signed by the owner, partner, officer, representative, or agent of each joint venturer.

1. What is the separate bonding capability of each member of the joint venture?
2. What other work is in progress by total contract dollar amount and percentage of completion for each joint venturer?
3. Are there any particular risks associated with this Contract which contributed to the decision to joint venture, and if so, what?
4. Has consideration been given to utilization of a subcontract as opposed to formation of a joint venture, and if so, why was the joint venture format chosen?
5. Has either member of the joint venture been separately awarded a contract by the City of Chattanooga, and if so, what was the most recent contract awarded to each?
6. What will be the contribution of each participant in the joint venture with respect to personnel, equipment, and other resources of each company allocated to this Contract?
7. What will be the specific contribution of each participant of the joint venture for the completion of work to be performed and material to be supplied under this Contract?
8. Will there be separate management for the joint venture? If not, which company will supervise, or how will the contract be supervised?
9. Why will the joint venture be more efficient than the possibility of both companies separately bidding and either company being awarded the contract separately?

10. Does the formation of the joint venture promote competition on this Contract, and if so, how?
11. Has the joint venture, or any participant therein, received any legal advice with respect to the antitrust implications of formation of a joint venture, and if so, from what attorneys?

_____	_____
Name of Joint Venturer	Name of Joint Venturer
By _____	By _____
Title _____	Title _____

State of _____

County of _____

_____ being duly sworn deposes and

says that he is _____ of _____

and _____ being duly sworn deposes and

says that he is _____ of _____

and that the answers to the foregoing questions and all statements therein contained are true and correct. Subscribed and sworn to before me this _____ day of _____, 20__.

Notary Public

My Commission Expires:

(Date)

(SEAL)

END OF DOCUMENT

AFFIDAVIT OF NO COLLUSION BY PRIME BIDDER

**CONTRACT NUMBER Y-15-008-202
FOR THE CITY OF CHATTANOOGA**

STATE OF _____)

COUNTY OF _____)

The undersigned, _____, having been
duly sworn, deposes and states as follows:

1. I am the (title) _____
(sole owner, a partner, president, secretary, etc.) of _____

(Name of Corporation) (Partnership) (Limited Partnership) (Joint Venture) which is a
_____ (Corporation) (Proprietorship)
(Partnership) (Limited Partnership) (Joint Venture) in good standing formed under the law of
_____ (State of Incorporation or formation),
hereinafter referred to as "bidder."
2. I am authorized to make this affidavit on behalf of said bidder, and I have personal knowledge
of the matters set forth herein.
3. On _____, 20__ , said bidder is submitting a bid to the
City of Chattanooga for the above captioned contract. This bid was prepared under my
personal supervision and direction. During the preparation of the bid, I have taken affirmative
steps to inquire about the circumstances of the bid preparation in general and about any
contacts between or among this bidder and any other bidders or prospective bidders in
particular.

AFFIDAVIT OF NO COLLUSION BY PRIME BIDDER

**CONTRACT NUMBER Y-15-008-202
FOR THE CITY OF CHATTANOOGA**

4. I am aware of the Federal and State laws including without limitation, the Sherman Act (15 U.S.C. 1) and the Tennessee antitrust laws (T.C.A. 47-25-101, et seq.), which make it illegal to agree to fix or rig bids or otherwise agree to restrain competition in bidding for contracts with the City of Chattanooga. I am aware in particular that violations of the Sherman Act are federal crimes punishable by a fine of up to \$1.0 million for a corporation, and a fine of up to \$100,000 for an individual or by imprisonment not exceeding three years, or both.

5. I hereby certify and attest that the bid identified in paragraph 3 is based solely upon the independent knowledge, expertise and business judgment of the bidder acting through its officers and agents and is not the product of, nor was it prepared in connection with, any contract, combination, conspiracy, understanding or collusion between or among any other bidder or prospective bidder on said contract.

Signature

Subscribed and sworn to before me this _____ day of _____, 20__.

Notary Public

My Commission Expires:

(SEAL)

END OF DOCUMENT

AFFIDAVIT OF NO COLLUSION BY SUBCONTRACTOR

**CONTRACT NUMBER Y-15-008-202
FOR THE CITY OF CHATTANOOGA**

STATE OF _____)

COUNTY OF _____)

The undersigned, _____, having been
duly sworn, deposes and states as follows:

1. I am the (title) _____
(sole owner, a partner, president, secretary, etc.) of _____

(Name of Corporation) (Partnership) (Limited Partnership) (Joint Venture) which is a
_____ (Corporation) (Proprietorship)
(Partnership) (Limited Partnership) (Joint Venture) in good standing formed under the law of
_____ (State of Incorporation or formation),
hereinafter referred to as "subcontractor."
2. I am authorized to make this affidavit on behalf of said subcontractor, and I have personal
knowledge of the matters set forth herein.
3. On _____, 20__ , said subcontractor is submitting a bid
to the City of Chattanooga for the above captioned contract. This bid was prepared under my
personal supervision and direction. During the preparation of the bid, I have taken affirmative
steps to inquire about the circumstances of the bid preparation in general and any other
subcontractor or prospective subcontractors in particular.

AFFIDAVIT OF NO COLLUSION BY SUBCONTRACTOR

**CONTRACT NUMBER Y-15-008-202
FOR THE CITY OF CHATTANOOGA**

4. I am aware of the Federal and State laws including without limitation, the Sherman Act (15 U.S.C. 1) and the Tennessee antitrust laws (T.C.A. 47-25-101, et seq.), which make it illegal to agree to fix or rig bids or otherwise agree to restrain competition in bidding for contracts with the City of Chattanooga. I am aware in particular that violations of the Sherman Act are federal crimes punishable by a fine of up to \$1.0 million for a corporation, and a fine of up to \$100,000 for an individual or by imprisonment not exceeding three years, or both.

5. I hereby certify and attest that the bid identified in paragraph 3 is based solely upon the independent knowledge, expertise and business judgment of the bidder acting through its officers and agents and is not the product of, nor was it prepared in connection with, any contract, combination, conspiracy, understanding or collusion between or among any other subcontractor or prospective subcontractor on said contract.

Signature

Subscribed and sworn to before me this _____ day of _____, 20__.

Notary Public

My Commission Expires:

(SEAL)

END OF DOCUMENT

SECTION 00486

DRUG-FREE WORKPLACE AFFIDAVIT OF PRIME BIDDER

STATE OF _____

COUNTY OF _____

Comes the affiant after having first been duly sworn and testifies as follows:

1. My name is _____ I hold the principal office of _____
for _____
(Name of Principal Office) (Name of Bidding Entity)

2. _____ has submitted a bid to the
(Name of Bidding Entity)
City of Chattanooga for the construction of Contract Y-15-008-202, AVONDALE YOUTH
AND FAMILY DEVELOPMENT CENTER DEMOLITION.

3. _____ employs more than five (5) employees.
(Name of Bidding Entity)

4. In accordance with Tenn. Code Ann. §50-9-113, this is to certify that
_____ has in effect at the time of its submission of
(Name of Bidding Entity)
a bid to perform the construction of the City of Chattanooga project identified above,
a drug-free workplace program that complies with Title 50, Chapter 9 of the Tennessee Code.

5. This affidavit is made on personal knowledge.

Further the affiant saith not this _____ day of _____, 20__.

Signature

Subscribed and sworn to before me this _____ day of _____.

Notary Public

My Commission Expires:

(Date)

(SEAL)

END OF DOCUMENT

Contract Requirements

CONTRACT

ARTICLES OF AGREEMENT entered into this _____ day of _____, 20__ , between the CITY OF CHATTANOOGA, TENNESSEE, hereinafter called the City, and _____, Contractor, of the City of Chattanooga, State of Tennessee, hereinafter called the Contractor.

ARTICLE I. The Contractor hereby contracts and agrees to furnish all supervision, labor, materials and equipment and execute in a thorough and workmanlike manner, complete in every respect, in accordance with the Drawings, Specifications and other Contract Documents made therefor and hereto attached, and to the satisfaction of the City of Chattanooga, or its successor, all of the Work shown, specified and otherwise required in these contract documents, to-wit:

Y-15-008-202

AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER DEMOLITION

ARTICLE II. The prices shown in the Bid Schedule shall be the amount of the compensation to the Contractor for the proper and satisfactory completion of the work specified herein, including all contingencies, in full conformity with the Contract Documents. This compensation shall be full payment for the performance of the work and the furnishing of labor, materials, transportation, supplies, tools, equipment, taxes, employee benefits, incidentals, services, and other items necessary or convenient for completion of the work in a satisfactory and acceptable manner, and within the intent of these Contract Documents.

ARTICLE III. The Contractor agrees that he has informed himself fully of the conditions relating to the construction and labor under which the work will be or is now being performed, and this Contractor must employ, so far as possible, such methods and means in the carrying out of his work as will not cause any interruption or interference with any other contractor.

ARTICLE IV. All work and material required under this Contract shall be in such quantities, kinds and qualities, and in such places, and of such dimensions and forms as may be designated by the plans and specifications, or by the working plans provided by the Engineer.

ARTICLE V. The purchase of all materials, the delivery of same, and all incidental expenses which may arise during the construction and finishing of said work above specified, shall be at the sole cost and expense of the Contractor.

ARTICLE VI. All materials which the said Contractor may procure or deliver upon or in the vicinity of said work herein specified to be incorporated in and become a part of said improvement, shall, from the time of such procurement or delivery become the property of the City of Chattanooga, except any surplus which shall remain over the final completion of this Contract.

ARTICLE VII. The Contractor hereunder contracts and agrees to complete the whole of the work contemplated in this Contract in **THIRTY (30)** calendar days. Time of the completion of the work is the essence of the Contract, and the Contractor is prepared to make completion of the work in such quantity and on such dates as are herein specified, and the parties having agreed, after estimates, that the sum of **Five Hundred dollars and no cents (\$500.00)** per day would be

liquidated damages in case of the Contractor's failure to perform, now, therefore, the aforementioned sum per day, not as a penalty but to be considered and taken as liquidated damages suffered by the City of each day's delay in completion of this Contract.

ARTICLE VIII. It is agreed that the Contractor will not assign, transfer, or sublet the said work or any part thereof without the written consent of the City of Chattanooga.

ARTICLE IX. Estimates shall be made every thirty (30) days during the progress of the work by the Contractor and submitted to the Engineer for his approval. When, in the Engineer's judgment, the estimate shall represent a fair value of such work done in accordance with the provisions of this contract, the Contractor shall be paid ninety-five (95%) percent with five (5%) percent being retained as collateral security, said five (5%) percent to be paid within sixty (60) days after completion of such work or within sixty (60) days after substantial completion of the project for work completed, whichever occurs first.

ARTICLE X. An omission to disapprove the work badly done, at the time of a monthly or other estimate, by the Engineer shall not be construed into an acceptance of any defective work.

All documents bound herein and all other documents not bound herein but given to Contractor in connection with the work shall be and are hereby made a part of this contract. These contract documents shall include, but not be limited to, the following: the Contract, Advertisement for Bids, Instructions to Bidders, Bid Proposal and Proposal Documents, Bid Bond, Performance Bond, Payment Bond, Certificates, General Provisions, Supplementary General Provisions, Specifications, Drawings, Addenda, Change Orders, Notice to Proceed, and Specifications, Drawings, and Engineering Data furnished to the Contractor.

IN TESTIMONY WHEREOF, the said parties have hereunto set their hands and seals the day and year first above written.

Attest:

CITY OF CHATTANOOGA

City Finance Officer

By:

Public Works Administrator

CONTRACTOR

Name

Attest:

By:

Title

CITY FINANCE OFFICER'S CERTIFICATE

I do hereby certify that the funds required to be paid by the City under this contract have been appropriated or a loan authorized and have been encumbered and will be available as needed for payment.

This _____ day of _____, 20__.

City Finance Officer

CITY ATTORNEY'S APPROVAL

This contract approved as to form and legality this the ____ day of _____, 20__.

City Attorney

END OF DOCUMENT

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that _____

_____, a
Name and Address of Contractor

_____ of the State of _____,
Corporation, Partnership, or Individual

the "Principal," and _____
Name and Address of Surety

_____, the "Surety," are held and firmly bound unto the
City of Chattanooga, Tennessee (the "Owner") existing under and by virtue of the laws of
the State of Tennessee, The Engineer, and their agents and employees in the sum of

_____ (\$ _____)

of the United States, for the payment of which sum in lawful money of the United States
well and truly to be made we do hereby bind ourselves, our heirs, executors, administrators,
successors, and assigns jointly and severally.

The condition of this obligation is such that whereas Principal has entered into a certain
Contract with the Owner, dated as of the _____ day of
_____, 20___, which is by reference incorporated in and made a part
hereof as fully as if copied here verbatim, for the following work:

Y-15-008-202

AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER DEMOLITION

NOW, THEREFORE, if the Principal shall in all respects comply with and perform all the terms and conditions of the Contract (which includes the Drawings, Specifications, and Contract Documents) and such alterations as may be made in said contract as the documents therein provide for, during the original term thereof and any extensions thereof which may be granted by the Owner, with or without notice to Surety, and during the one-year warranty period, and if Principal shall satisfy all claims and demands and shall fully indemnify, protect, defend, save and hold harmless the Owner, the Engineer, and their agents and employees against and from all costs, expenses, damages, injury, or conduct, want of care, skill, negligence, or default, including compliance with performance guarantees and patent infringement by the Principal, then this obligation shall be void; otherwise, Principal and Surety jointly and severally agree to pay to Owner any difference between the sum to which the Principal would be entitled on completion of the contract and that which the Owner may be obliged to pay for the completion of the work by contract or otherwise, together with any damages, direct or indirect, or consequential, which Owner may sustain on account of such work, or on account of the failure of the Principal to keep and execute all provisions of the Contract.

Principal and Surety further bind themselves, their heirs, executors, administrators, and assigns, jointly and severally, that if the Principal shall keep and perform its agreement to repair or replace defective work or equipment during the warranty period of one (1) year as provided, then this paragraph shall be void; but if default shall be made by Principal in the performance of its contract to so repair or replace said work, then this paragraph shall be in effect and Owner shall have and recover from Principal and its Surety damages for all defective conditions arising by reason of defective materials, work, or labor performed by or on the account of Principal and it is further understood and agreed that this obligation shall be a continuing one against the Principal and Surety hereon, and that successive recoveries may be had hereon for successive breaches until the full amount shall have been exhausted; and it is further understood that the obligation therein to maintain said work shall continue throughout said maintenance period, and the same shall not be changed, diminished, or in any manner affected from any cause during said time; and to fully indemnify, protect, defend, save and hold harmless the Owner, the Engineer, and their agents and employees for any damages it may be caused to pay on account of injury to person, loss of life or damage to property.

And the Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and this Bond shall in no way be impaired or affected by any extension of time, modification, omission, addition, or change in or to the contract, the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provision thereof, or by any assignment subletting or other transfer thereof, or of any part thereof, of any work to be performed, or of any moneys due to become due thereunder; and the said Surety does hereby waive notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts, and transfer, and hereby stipulates and agrees that any and all things done and omitted to be done by and in relation to executors, administrators, successors, assignees, subcontractors, and other transferees shall have the same effect as to said Surety as though done or omitted to be done by and in relation to the Principal.

IN WITNESS WHEREOF, the Principal and Surety have executed this Bond by causing their respective names to be hereunto subscribed and their seals to be hereunto affixed by their duly authorized officers, on this the _____ day of _____, 20__.

CONTRACTOR - PRINCIPAL:

By _____

Name _____
(Please Print or Type)

Title _____

ATTEST:

Name _____
(Please Print or Type)

(SEAL)

Title _____

Note: Attest for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a Notary.

SURETY:

By _____

Name _____
(Please Print or Type)

Title _____

WITNESS:

Name _____
(Please Print or Type)

(SEAL)

Title _____

Note: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

END OF DOCUMENT

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that _____

_____, a
Name and Address of Contractor

_____, of the State of _____,
Corporation, Partnership, or Individual

the "Principal," and _____
Name and Address of Surety

_____, the "Surety," are held and firmly bound unto
the City of Chattanooga, Tennessee (the "Owner") existing under and by virtue of the laws
of the State of Tennessee, in the sum of _____

_____ (\$ _____) in lawful money of the United States, for the payment of which
sum in lawful money of the United States well and truly to be made we do hereby bind
ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally.

The condition of this obligation is such that whereas Principal has entered into a certain
Contract with the Owner, dated as of the _____ day of _____, 20____,
which is by reference incorporated in and made a part hereof as fully as if copied here
verbatim, for the following work:

Y-15-008-202

AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER DEMOLITION

NOW, THEREFORE, if the Principal shall fully pay for all the labor and materials used by said Principal or any immediate or remote subcontractor or furnisher of labor or materials under him in the performance of the work in lawful money of the United States as the same shall become due, including all amounts due for materials, lubricants, oil, gasoline, electricity, coal and coke, repairs on machinery, equipment, and tools, consumed or used in connection with performance of the work and all insurance premiums and other charges incurred under said contract, then this obligation shall be void; otherwise to remain in full force and effect.

Principal and Surety further bind themselves, their heirs, executors, administrators, and assigns, jointly and severally, that they shall promptly make payments of all taxes, licenses, assessments, contributions, penalties, and interest thereon, when, and if, the same may be lawfully due the State of Tennessee or any County, Municipality, or political subdivision thereof by reason of and directly connected with the performance of the Contract, or any part thereof.

And the Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and this Bond shall in no way be impaired or affected by any extension of time, modification, omission, addition, or change in or to the contract, the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provision thereof, or by any assignment subletting or other transfer thereof, or of any part thereof, of any work to be performed, or of any moneys due to become due thereunder; and the said Surety does hereby waive notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts, and transfer, and hereby stipulates and agrees that any and all things done and omitted to be done by and in relation to executors, administrators, successors, assignees, subcontractors, and other transferees shall have the same effect as to said Surety as though done or omitted to be done by and in relation to the Principal.

IN WITNESS WHEREOF, the principal and Surety have executed this Bond by causing their respective names to be hereunto subscribed and their seals to be hereunto affixed by their duly authorized officers, on this the _____ day of _____, 20__.

CONTRACTOR - PRINCIPAL:

By _____
Name _____
(Please Print or Type)
Title _____

ATTEST:

Name _____
(Please Print or Type) (SEAL)
Title _____

Note: Attest for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a Notary.

SURETY:

By _____
Name _____
(Please Print or Type)
Title _____

WITNESS:

Name _____
(Please Print or Type) (SEAL)
Title _____

Note: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

END OF DOCUMENT

00601-3



**CITY OF CHATTANOOGA
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION**

Development Resource Center
1250 Market Street, Suite 2100
Chattanooga, TN 37402
Phone: (423) 643-6033
Fax: (423) 643-6027

CHANGE ORDER

Contract No.: _____
 Contractor: _____
 Project Name: _____

Change Order No.: _____
 Date: _____
 Council Res. #'s: _____
 (Attach Copies)
 Purchase Order # _____

Check Reason for Change Order

- Error/Omission
- Field Condition
- Field Dispute Settlement
- Owner Request
- Value Engineering
- Other: _____

Contract Days Changed: _____

Revised Completion Date: _____

Original Contract Amount \$ _____
 Net Change by Previous C.O.s \$ _____
 Contract Amount Prior to this C.O. \$ _____
 Total Amount of this C.O. \$ _____
NEW CONTRACT AMOUNT \$ _____

Description / Justification (Add more pages if necessary)

The terms and conditions of this Change Order, including the cost and time contained herein, constitute a full accord and complete satisfaction for all costs and time of performance related to the work described or referenced herein, including but not limited to, all delay and impact costs for the entire Project resulting from this Change Order. Except as amended herein, all provisions of the Contract remain in full force and effect.

APPROVALS

CONTRACTOR		ENGINEER / ARCHITECT	
Signature	Date	Signature	Date
CITY PROJECT MANAGER		CITY ENGINEER	
Signature	Date	Signature	Date
ADMINISTRATOR OF PUBLIC WORKS		CITY FINANCE OFFICER	
Signature	Date	Signature	Date



CR# _____
Date Issued: _____
PO#: _____

CHANGE REQUEST FORM (CRF)

City Contract No. _____
Project Name: _____
Engineer: _____
Contractor: _____

Requested By: _____
Drawing: _____
Problem Desc: _____

Revised Scope Description/Details

Contractor Acknowledgement:

<input type="checkbox"/> No Change in Contract Amount is required.	<input type="checkbox"/> A Change in Contract Amount is required: _____
<input type="checkbox"/> No Change in Contract Time is required.	<input type="checkbox"/> A Change in Contract Time is required: _____ days

Architect / Engineer / Inspector / RPR

Contractor

Change in Contract Amount is within the Contingency Amount authorized under Resolution No. _____

Yes No _____

Engineer / Architect Project Manager

Proceed with Execution

Yes No _____

City Project Manager

Distribution: City Engineer; Central Files

Project Close Out
Requirements & Forms

CERTIFICATE OF PROPERTY RESTORATION
(To be obtained by City Personnel)

Project _____ Date _____
Contractor _____
Property Owner _____
Property Address _____

The contractor for this project has cleaned up and restored my property to my satisfaction where the property was disturbed during construction.

- I agree
 I do not agree (please explain below)

Property Owner Date

Witness Date

Please explain why you do not agree:

Note: A copy will be forwarded to the Contractor of the Property Owner is not satisfied with the restoration for further action.

END OF DOCUMENT

CERTIFICATE OF SUBSTANTIAL COMPLETION

Contract No. _____ Engineer's Project No. _____

Project _____

Contractor _____

Contract For _____ Contract Date _____

This Certificate of Substantial Completion applies to all Work under the Contract documents or to the following specified parts thereof:

To _____
Owner

And To _____
Contractor

The work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR AND ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on:

(Date of Substantial Completion)

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. When this certificate applies to a specified part of the Work the items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

Recommended by _____
Engineer/Architect Date

Recommended by _____
Project Manager Date

END OF DOCUMENT

Contract Regulations

GENERAL PROVISIONS

SECTION 1. DEFINITION OF TERMS

- 1.1 Definitions. Wherever the words, forms or phrases defined or pronouns used in their stead, occur in these specifications, in the contract or in the advertisement or any document, or instrument herein contemplated or to which these specifications apply, the intent and meaning shall be construed and interpreted as set forth in this section.
- 1.2 Addenda. Any change in specifications after advertisement for bids which modify or interpret the contract documents, drawings or specifications by additions, deletions, clarifications, or modifications. After issuance, any addenda shall become a part of the specifications, as much as though fully contained therein.
- 1.3 Administrator. The Administrator of the Department of the City of Chattanooga under whose general administration and observation this contract is being performed.
- 1.4 Award. The formal acceptance of the proposal of the lowest responsible bidder by the City Council, subject to the execution and approval of a satisfactory contract and the required bonds therefor, and following such other conditions as may be specified or otherwise required by law.
- 1.5 Bid. The offer or proposal of the Bidder submitted on the prescribed Bid Proposal Form setting forth the Contract Price(s) for the work to be performed under these Contract Documents.
- 1.6 Bonds. Bid, Performance, and Payment Bonds and other instruments of security to be furnished by the contractor in accordance with the Contract Documents.
- 1.7 Change Order. A written agreement, executed by the City, the Contractor, the Engineer and the Architect authorizing an addition, deletion, or revision of the work within the general scope of the Contract Documents or authorizing an adjustment in the contract price or the contract time. This "change order" becomes a part of the contract when properly executed and approved.
- 1.8 City. The City of Chattanooga, Tennessee.
- 1.9 City Attorney. The person duly authorized by the City to act in the capacity of City Attorney, his authorized designee, or special counsel to the City, acting severally within the scope of the particular duties entrusted to them.
- 1.10 Contract. The written agreement between the City and the Contractor for the performance of the work in accordance with the requirements of the Contract Documents, and for the payment of the agreed consideration therefore. Whenever, in any portion of the Contract Documents, a requirement of the Contract is stated, it shall be interpreted to mean a requirement of the Contract Documents as defined herein, unless the context indicates the more restricted definition of that portion of the Contract Documents which is captioned "Contract."

- 1.11 Contract Documents. The Contract, Advertisement for Bids, Instructions to Bidders, Bid Proposal and Proposal Documents, Bid Bond, Performance Bond, Payment Bond, Certificates, General Provisions, Supplementary General Provisions, Specifications, Drawings, Addenda, Change Orders, Notice to Proceed, and Specifications, Drawings and Engineering Data furnished by the Contractor and accepted by the Owner. Whenever, in any portion of the Contract Documents, the terms "plans and specifications" or "specifications" or "contract" or words of like import appear, they shall be interpreted to mean "Contract Documents" as defined herein unless the context indicates that a more restrictive designation of a particular portion of the Contract Documents is intended.
- 1.12 Contract Time. The number of calendar days allowed by these Contract Documents, including authorized time extensions, for the completion of the work sufficient to be accepted as substantially complete by the Owner. The Contract Time shall begin ten (10) days after the date of issuance of the Notice to Proceed.
- 1.13 Contractor. The person, firm, or corporation whose proposal is accepted by the Owner and who entered into a Contract with the Owner for performance of the work covered by and in conformance with these Contract Documents.
- 1.14 Engineer. The City Engineer (or when retained by the City, an Architect or consulting engineer) and his duly authorized assistants, observers, inspectors or administrators acting severally within the scope of the particular duties entrusted to them.
- 1.15 Inspector. An authorized representative of the Engineer assigned to make necessary observations of the work performed by the Contractor.
- 1.16 Multiple Awards. The City reserves the right to award more than one contract from a single solicitation. Multiple Awards are the formal acceptance by the City Council of the proposal of the lowest responsible bidder for each individual bid item, subject to the execution and approval of a satisfactory contract and the required bonds therefore, and following such other conditions as may be specified or otherwise required by law.
- 1.17 Owner. The City of Chattanooga, Tennessee.
- 1.18 Plan or Plans. All of the drawings pertaining to the contract showing the scope and characteristics of the work or a part thereof, including such supplementary drawings as the Engineer may issue in order to elucidate other drawings or for the purpose of showing the changes in the work or for showing details not shown thereon.
- 1.19 Shop Drawings. All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the Contractor, a Subcontractor, a Manufacturer, a Supplier, or a Distributor, which illustrate how specific portions of the work shall be fabricated or installed. Shop drawings may also mean detail drawings, working drawings, construction drawings, and engineering data.
- 1.20 Specifications. The written directions, provisions and requirements contained herein pertaining to the method and manner of performing the work or to the quantities or qualities of materials, equipment, construction systems, standards or workmanship to be furnished under the contract.

- 1.21 Special Provisions. The special clauses setting forth conditions or requirements peculiar to the specific project, supplementing the General Provisions and taking precedence over any condition or requirements of the General Provisions with which they are in conflict.
- 1.22 Subcontractor. The person, firm, or corporation having a direct contract with the Contractor or with any other Subcontractor for performing a part of the work covered by these Contract Documents at the site.
- 1.23 Substantial Completion. The date of completion of the work in conformance with the Contract Documents, as determined by the Owner or Engineer, when the project or a specified part thereof can be utilized for the purposes for which it is intended.
- 1.24 Supplemental General Provisions. Modifications to these standard General Conditions.
- 1.25 Surety or Sureties. The corporate body which is bound by such bonds as are required with and for the contractor, and which engages to be responsible for the entire and satisfactory fulfillment of the contract and for any and all requirements as set out in the specifications, contract or plans.
- 1.26 The Work. The Work, including the furnishing of labor, materials, tools, and incidentals, necessary or required to complete the improvement in conformity with the directions, provisions and requirements of the specifications, limitations and conditions of the contract and in accordance with the intent of the plans.
- 1.27 Working Day. Any day, other than a legal holiday or Sunday, on which the approximate normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the work, unless work be suspended for causes beyond the contractor control.

SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

- 2.1 Contents of Proposal Form. The City will furnish bidders with proposal forms which will state the general location and description of the contemplated work.
- 2.2 Interpretation of Estimate. The quantities of the work and materials shown on the proposal form or on the plans are believed to approximately represent the work to be performed and materials to be furnished and are to be used for comparison of bids. Payment to the contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased or portions of the work omitted as hereinafter provided without in any way invalidating the bid prices. When the Bid Proposal Form contains the provision for receiving bids based on a lump sum price, the Contractor shall be held responsible for having prepared his own estimate of the quantities necessary for the satisfactory completion of the work specified in these Contract Documents and for having based the lump sum price bid on his estimate of quantities.
- 2.3 Examination of Documents and Site of the Work. Bidders are advised that the plans, specifications, estimates, addenda and bulletins of the Engineer shall constitute all the information which the City will furnish. No other information given by the City or any official thereof, prior to the execution of the contract shall ever become a part of or change

the contract, plans, specifications or estimates or be binding upon the City. Bidders are required, prior to submitting any proposal, to read carefully the specifications, the proposal, and other contract documents; to examine carefully all estimates open for examination and all plans on file in the Engineer's office; to visit the site of the work, to examine carefully local conditions; to inform themselves by their independent research of the difficulties to be encountered and judge for themselves the accessibility of the work and all attending circumstances affecting the cost of doing the work or the time required for its completion and obtain all information required to make an intelligent proposal. Bidders shall rely exclusively upon their own estimates, investigation and other data which are necessary for full and complete information upon which the proposal may be based. It is mutually agreed that submission of a proposal will be evident that the bidder has made the examination and investigations required herein.

- 2.4 Preparation of Proposal. The bidder shall submit his proposal on the forms furnished by the City with all blank spaces in the proposal form correctly filled in. Bid prices shall be either typed or legibly written with ink, both in words and in numerals, for which it is proposed to do the work contemplated or furnish the materials required. In case of conflict between words and numerals, the words will govern. Proposals shall be submitted in a sealed envelope which has the completed "Contractor's Identification" form securely attached thereto.
- 2.5 Proposal Guaranty. Proposals will not be considered unless accompanied by a certified or cashier's check on a duly organized bank payable to the order of the City of Chattanooga, Tennessee, or bidding bond made by some bonding company authorized to transact business in the State of Tennessee, for a sum of not less than five percent of the total amount of the bid. The proposal guaranty is required as evidence of good faith and as a guarantee that, if awarded the contract, the bidder will execute the contract and furnish the required bonds within ten (10) days after the award.
- 2.6 Filing of Proposal. No proposals will be considered by the City unless they are filed in sealed envelopes with the City within the time limit for receiving proposals as stated in the advertisement and shall be made on proposal forms attached to Specifications, together with the Contract Documents, Bid Bond, and Statement of Compliance with General Contractors Licensing Law and other required miscellaneous forms, all of which are to be sealed in an envelope addressed to the City of Chattanooga, Tennessee, with the completed "Contractor's Identification" form securely attached thereto.

Each proposal must contain the full name and address of each person, firm or corporation interested therein. In case of a partnership, the name and address of each partner must be stated. The firm, corporation or individual name of the bidder must be signed in the space provided for the signature on the proposal blank. In case of a corporation, the title of the officer signing must be stated, and the person signing shall also state under the laws of what State the corporation was chartered and the names and titles of the officers having authority, under the by-laws, to sign contracts. The proposal shall also be attested by its Secretary. In case of a partnership or firm, the signature of at least one of the partners must follow the firm name.

- 2.7 Withdrawal of Proposal. Permission will not be granted to withdraw or modify any proposal after it has been filed and before time set for opening of proposals. Requests for non-consideration must be made in writing addressed to and filed with the City before the

time set for opening the proposals. After other proposals are opened and read, the proposal for which withdrawal is properly requested will be returned unopened.

- 2.8 Opening of Proposals. The proposals filed with the City will be opened at the time stated in the advertisement. Bidders are invited to attend the meeting at the time set for opening of proposals, at which time they should make any protests as to procedure followed in inviting bids.
- 2.9 Irregular Proposals. Proposals will be considered irregular if they show any omissions, alterations of forms, additions or conditions not called for, unauthorized alternate bids or irregularities of any kind. However, the City reserves the right to waive technicalities and make the award in the best interest of the City.
- 2.10 Rejection of Proposals. The City reserves the right to reject any or all proposals, and all proposals submitted are subject to this reservation.
- 2.11 Disqualification of Bidders. Bidders may be disqualified and their proposal not considered for any of the following specific reasons:
 - (a) Failure to complete and sign any of the following forms:
 - Equipment Statement
 - State License Certificate
 - Proposal
 - Affidavit of No Collusion by Bidder
 - (b) Where more than one proposal for an individual, firm, partnership or corporation is filed under the same or different names and where such proposals are not identical in every respect.
 - (c) Where the bidder is in arrears on any existing contracts, interested in any litigation against the City or having defaulted on a previous contract.
 - (d) A failure to have adequate equipment.
 - (e) Uncompleted work which in the judgment of the City will hinder or prevent prompt completion of additional work, if awarded.

Nothing herein shall be deemed to limit the discretion of the City to determine whether or not a bidder not hereby disqualified is the lowest responsible bidder.

- 2.12 Conditions Precedent to Award of Contracts. The following stipulations shall all and severally be conditions precedent to the award by the City of Chattanooga of all contracts for construction, to-wit:
 - (a) No member of the City Council nor any officer, director or other person whose duty it is to vote for, let out, overlook or in any manner superintend this contract and who is related to said member within the third degree by either consanguinity or affinity, nor any other official who may be directly interested in this contract or work of any kind whatsoever under its direction. "Directly interested" means any contract with the official himself or with any business in which the official is the sole proprietor, a

partner, or the person having the controlling interest. "Controlling interest" shall include the individual with the ownership or control of the largest number of outstanding shares owned by any single individual or corporation.

- (b) It shall not be lawful for any officer, director, or other person whose duty it is to vote for, let out, overlook, or in any manner to superintend any work or any contract in which the City shall or may be interested, to be indirectly interested in any such contract unless the officer publicly acknowledges his interest and rescues himself from any of his duties which include the consideration of, voting on, letting out, overseeing, or superintending the work or contract giving rise to the conflict. "Indirectly interested" means any contract in which the officer is interested but not directly so, but includes contracts where the officer is directly interested but is the sole supplier of goods or services in a municipality or county. (See T.C.A. Section 12-4-101, et seq.)
- (c) The essence of all the contracts shall be excellence of quality, integrity and durability of the completed product as specified; and the contractor hereunder shall be held responsible therefor.
- (d) The contractor shall maintain and guarantee the integrity of the completed work for a full period of one year after the completion as set forth more fully in Section 4 of these General Provisions.
- (e) The decisions of the Engineer, as to quality, integrity and durability of the work shall be final and conclusive as to all parties to said contract, whether it be directly by and between the contractor and said City or by and between him and another party; and said Engineer shall have full authority to condemn by written notice to contractor, or his agent or foreman on job, and shall order the removal, reconstruction and restoration of all work that in his opinion, is in any respect inferior, defective or faulty, or that shows signs of disintegration and failure, at any time before final estimate is issued and payment made therefor, or within a period of one year after the completion and acceptance thereof in writing by the City.
- (f) Contractor shall remove, reconstruct and restore all such condemned work in full conformance with the specifications, and in complete compliance with the requirements of the official notice, in writing, of said Engineer relating thereto, and within the period of time designated in the notice.

Should the contractor neglect, refuse, or fail to remove, reconstruct and restore all of the defective work so condemned and rejected, within the period of time, as required by said official notice, then and in event of such failure on contractor's part, whether said work was executed by contract directly with the City or by private contract directly with other parties, the City of Chattanooga will look to and require, respectively, the surety on the Performance Bond, executed by the contractor under contract directly with said City, to make good and have all such defective and condemned work removed, reconstructed and restored in complete compliance with the requirements of the official notice of said Engineer to that effect; and likewise, in the event that such work was done under private contract, as aforesaid, the City of Chattanooga will look to and require the surety on the Performance Bond executed by said contractor to make good and have all such defective and condemned work removed, reconstructed and

restored in complete compliance with the requirements of the official notice of said Engineer to that effect, in each instance as the case may be.

- (g) The unit price bid by the contractor for any and all work and the compensation to be paid therefore shall cover and include the cost of all materials, forms, supports, labor, work and things necessary for a complete workmanlike job, and shall also include the cost of all services, duties and obligations of said contractor and of the corresponding surety on the Performance Bond collateral therewith as stipulated in subsections above set out, to the satisfaction and approval of the Engineer.

SECTION 3. AWARD AND EXECUTION OF CONTRACT

- 3.1 Consideration of Proposal. After the proposals are opened, the unit prices will be tabulated for comparison on the basis of the quantities shown in the approximate estimate. Until the final award of the contract, the City reserves the right to reject any and/or all proposals, to waive technicalities; and to advertise for new proposals or to have the improvements done by said City.
- 3.2 Award of Contract. The City acting by and through the City Council will either award the contract or reject all proposals received thereon after the formal opening of proposals and evaluation of the bids.

The award of the contract, if it is awarded, will be to the lowest responsible bidder whose proposal complies with the requirements of the City.

Projects will be awarded only to responsible bidders, and an award will not be made in any case, until all necessary investigations have been made into the responsibility of the low bidder.

If the project is funded in part by a state or federal grant, then the award may be subject to the concurrence of the granting contract agency.

All references to contract include each to be awarded where multiple awards are made.

- 3.3 Return of Proposal Guaranty. As soon as the proposal prices have been compared, the Engineer may, in his discretion, return the proposal guaranties accompanying those proposals which in his judgment would not be considered in making the award. After the award is made, only each successful bidder's proposal will be retained until the required contract and bonds have been executed, after which it will be returned to the bidder.
- 3.4 Surety Bonds. With the execution and delivery of the contract, the contractor shall furnish and file with the City in the amount herein required, the following bonds which must be approved by the City Attorney.

A good and sufficient Performance Bond in an amount equal to one hundred percent (100%) of the total amount of the contract, guaranteeing the full and faithful execution of the work and performance of the contract according to its terms, which bond shall remain in effect for twelve (12) months after the completion of the work.

A good and sufficient Payment Bond in an amount equal to one hundred (100%) percent of the total amount of the contract, guaranteeing full payment for all of the labor and materials used in the performance of the work and all other charges incurred under this contract.

No surety will be accepted who is now in default or delinquent on any bond. All bonds shall be executed by surety companies licensed to do business in the State of Tennessee and acceptable to the City Attorney, and in the event the contract is funded in part by federal or state grants, then said bonds must also be satisfactory to the granting agency. Each bond shall be executed by the contractor and the surety.

Should any surety on the contract be determined unsatisfactory at any time by the City, notice will be given to the contractor to that effect and the contractor shall forthwith substitute a new surety or sureties satisfactory to the City Attorney. No payment will be made under the contract until the new surety or sureties, as required, have qualified and been accepted by the City Attorney.

- 3.5 Execution of Contract. The contract shall be made in the name of the City of Chattanooga, and shall be executed on behalf of the City by the Administrator following approval by the City Council.
- 3.6 Failure to Execute Contract. Upon failure of the bidder to execute the required bonds or to sign the required contract within ten (10) days after the contract is awarded, he will be considered to have abandoned his proposal and the City may annul the award. By reason of the uncertainty of market prices of materials and labor, and it being impracticable and extremely difficult to fix the amount of damages to which the City would be put by reason of said bidder's failure to execute said bonds and contract within ten (10) days, the proposal guaranty accompanying the proposal shall be the agreed amount of damages which the City will suffer by reason of such failure on the part of the bidder and shall thereupon immediately be forfeited to the City. The filing of a proposal will be considered as an acceptance of this provision.

SECTION 4. SCOPE OF WORK.

- 4.1 Intent of Contract Documents. The intent of the contract documents including the plans and specifications is to prescribe a complete work or improvement which the Contractor undertakes to do, in full compliance with the contract documents. The Contractor shall do all the work as provided in the plans, specifications, proposal and contract and shall do such additional, extra and incidental work as may be considered necessary to complete the work in a satisfactory and acceptable manner. He shall furnish all labor, materials, products, supplies, tools, equipment and incidentals necessary to the prosecution of the work.

The Contractor shall provide all work and materials not shown in detail but necessary for completion of the project as indicated or specified including a proper and suitable foundation preparation, base or support and a reasonable finish consistent with adjacent work which is shown or specified. The Contractor shall make plural and complete all work which, to avoid needless repetition or for the sake of brevity, has been shown singly or partially indicated. The Contractor shall follow the drawings and execute all work in strict accordance therewith and with the kind and quality of materials indicated and specified. Materials or work described in words which, when so applied, have a well-known technical

or trade meaning shall be held to refer to such recognized standards. Any deviation from the Drawings, Specifications, and other Contract Documents which may be required by the exigencies of construction, shall in all cases conform to the written instruction of the Engineer. The applicable provisions of the Contract Documents shall apply with equal force to all work, including extra work, performed under these Contract Documents, whether performed either directly by the Contractor or by any Subcontractor.

- 4.2 Special Provisions. Should any work or any condition which is not thoroughly or satisfactorily stipulated or covered by the Standard Specifications be anticipated on any proposed work, "Special Provisions" for such work may be prepared and shall be considered as a part of the specifications and contract, the same as though contained fully therein.
- 4.3 Increase or Decrease Quantities. The City shall have the right to increase or decrease the amount of work to be done under these Contract Documents at any time or times during the life of the Contract, when and, as found necessary and the Contractor shall perform the work as altered, increased or decreased at the contract unit price. The City shall have the right to delete any bid item in its entirety.

Any such changes will be set forth in a Change Order which will specify, in addition to the work to be done in connection with the changes made, adjustment of contract time, if any, and the basis of compensation for such work, if any. A Change Order will not become effective until approved by the City. After approval, the Change Order will become a part of the Contract Documents.

- 4.4 Alterations of Plans and Specifications. The City reserves the right, at any time, to make such changes in the plans and the character of the work as may be necessary or desirable to insure completion in the most satisfactory manner, provided such changes do not materially alter the original plans and specifications or change the general nature of the work as a whole. Such changes shall not be considered as waiving or invalidating any condition or provision of the contract.
- 4.5 Extra Work. When any work is necessary to the proper completion of the project of which no prices are provided in the proposal or contract, the Contractor shall do such work, but only when and as ordered by the Engineer. Payment for the extra work will be made as hereinafter provided.

Extra work is defined as: (1) that additional work of a different character or function or for that work for which no basis of payment is prescribed in these Contract Documents; such as a lump sum contract, or (2) that work involving revisions of the details of the work in such manner as to render inequitable payment under items upon which the Contractor bid; or (3) that additional work of a similar nature and character as that done under the unit prices named in these Contract Documents. (See para. 8.9 of this Section)

No claim for extra work will be considered unless said extra work was ordered in writing as aforesaid, and the claim presented in writing to the Engineer within 30 days after receipt by the Contractor of the written order to perform said extra work.

If the performance of the extra work results in additional time being required by the Contractor to complete the work covered by these Contract Documents, said Change Order will provide for an equitable extension in the contract time.

- 4.6 Final Cleaning Up. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall clean and remove from the site of the work surplus and discarded materials, temporary structures, stumps or portions of trees and debris of any kind. He shall leave the site of the work in a neat and orderly condition and shall obtain a signed release from the owners of private property upon which the work has been done. Waste materials removed from the site of the work shall be disposed of at locations satisfactory to the Engineer.
- 4.7 Maintenance of the Work. The Contractor shall maintain the work during construction and until the work is accepted. The notice of final acceptance by the City shall also notify him that he is relieved of the maintenance except as otherwise provided in Section 4.8. Portions of the work shall be opened for use by the City or the general public, and this shall not be interpreted to mean that the Contractor is relieved of maintenance.

All costs of maintenance work during construction and before the work is finally accepted shall be included in the Contract Price bid for the work, and the Contractor will not be paid any additional amount for maintenance work.

- 4.8 Maintenance of the Work After Completion. The Contractor shall maintain and keep in good repair the work covered by these Contract Documents for a period of one (1) year from the date of acceptance by the City. The Contractor shall promptly (a) perform all necessary work, (b) repair or replace all defective materials or products, and (c) correct any defective condition resulting from defective materials, products, work, or labor performed by the Contractor under these Contract Documents which may appear or be discovered during said period. It is further understood and agreed that the Contractor shall fully indemnify, protect, defend, save and hold harmless the City, the Engineer, and their agents and employees from all liabilities on account of injury to persons, loss of life, or damage to property resulting from said defective conditions or failure to promptly correct said defective conditions.

The Contractor will not be required to perform any routine maintenance, repairs resulting from normal wear and tear, or repairs necessary due to acts of the City, its employees, or agents.

- 4.9 Guarantee. The Contractor shall guarantee the equipment, materials, products, and workmanship furnished under these Contract Documents to be as specified and to be free from defects for a period of one year after the date of final acceptance by the City. In addition, the equipment furnished by the Contractor shall be guaranteed to be free from defects in design.

Upon notification, the Contractor shall promptly make all adjustments, repairs, or replacements which, in the opinion of the Engineer or the City, arose out of defects and became necessary during the guarantee period.

The cost of all materials, parts, labor, transportation, supervision, special tools, and supplies required for replacement or repair of parts and for correction of defects shall be paid by the Contractor or by the Surety.

This guarantee shall be extended to cover all repairs and replacements furnished under the guarantee, and the period of the guarantee for each such repair or replacement shall be one year after installation or completion of said repair or replacement.

If within ten (10) days after the City has notified the Contractor of a defect, failure, or abnormality in the work, the Contractor has not started to make the necessary repairs or adjustments, or if the Contractor fails to complete the repairs or adjustments in a timely and satisfactory manner, it is understood and agreed that the City is hereby authorized to make the repairs or adjustments or to order the work to be done by a third party, the cost of the work to be paid by the Contractor or by the Surety.

In the event of an emergency that occurs when the Contractor or his representative cannot be immediately contacted, and where the emergency is such that, in the sole judgment of the City, delay could cause serious loss or damage or presents an imminent hazard to others, repairs or adjustments may be made by the City, or a third party chosen by the City, without advance notice to the Contractor, and the cost of the work shall be paid by the Contractor or by the Surety.

SECTION 5. CONTROL OF WORK AND MATERIALS.

5.1 Authority of the Engineer. The Engineer shall administer the Contract. All work shall be done to the satisfaction of the Engineer. The Engineer shall consult with the Architect or other Project Engineer when appropriate, and the Engineer shall decide all questions which arise as to quality and acceptability of materials furnished, work performed, manner of performance, rate of progress of the work, sequence of construction, interpretation of plans and specifications, acceptable fulfillment of the contract, compensation and suspension of work. He shall determine the amount and quality of work performed and materials furnished, and his decision and estimates shall be final.

The Contractor may request and shall receive written instructions from the Engineer upon any important item.

5.2 Conformity With Plans; Allowable Deviations. All work shall conform to the lines, grades, cross-sections and dimensions shown on the plans. Any deviation from the plan which may be required by the exigencies of construction will be determined by the Engineer and authorized by him in writing.

5.3 Coordination and Interpretation of Contract Documents. The parts of the Contract Documents are complementary, each part being an essential part of these Contract Documents which are intended to describe and provide for a complete work. A requirement occurring in one is as binding as though occurring in all.

The Contractor shall carefully study and compare all Drawings, Specifications, and other instructions; shall test all figures on the Drawings before laying out the work; shall notify the Engineer of all errors, inconsistencies, or omissions which he may discover; and shall obtain specific instructions before proceeding with the work. The Contractor shall not take

advantage of any error or omission which may be found in the Drawings or other Contract Documents. The Engineer will make such corrections therein and interpretations thereof as he may deem necessary for the fulfillment of the intent of the Contract Documents, and his interpretations shall be final. The Contractor shall be responsible for all errors in construction which could have been avoided by such examination and notification and shall correct at his own expense all work improperly constructed through failure to notify the Engineer and request specific instruction.

In case of unresolved conflict between items of the Contract Documents, the following order of precedence shall govern, with the higher item taking precedence over a lower item:

- Contract (including Supplemental Agreements and Change Orders thereto)
- Addenda
- Bid Proposal
- Supplementary General Provisions
- General Provisions
- General Conditions
- Specifications
- Governing Standard Specifications
- Schedules on Drawings
- Notes on Drawings
- Details on Drawings
- Large Scale Drawings
- Small Scale Drawings
- Dimensions Given in Figures
- Scaled Dimensions

In the event of any discrepancy between any drawing and the figure written thereon, the figures, unless obviously incorrect, shall be taken as correct.

When measurements are affected by conditions already established or where items are to be fitted into constructed conditions, it shall be the Contractor's responsibility to verify all such dimensions at the site, and the actual job dimensions shall take precedence over scale and figure dimensions on the Drawings.

Wherever a stock size of manufactured item or piece of equipment is specified by its nominal size, it shall be the responsibility of the Contractor to determine the actual space requirements for setting and for entrance to the setting space and to make all necessary allowances and adjustments therefor in his work without additional cost to the City.

- 5.4 Governing Standard Specifications. The Governing Standard Specifications specified herein shall be considered a part of these Specifications and other Contract Documents the same as if herein repeated.

All materials and other work and the prosecution and control of the work shall be in conformance with the applicable requirements of Governing Standard Specifications unless specifically modified or superseded in these Contract Documents. In case of conflict between the Governing Standard Specifications and other parts of these Contract Documents, these Specifications and other Contract Documents bound herein shall govern. All sections of Governing Standard Specifications relating to measurement and payment

shall not apply to the work specified herein. Where terms such as Engineer, Purchaser, City, Department, or other terms of similar import are used in the Governing Standard Specifications, it shall be understood that they will be appropriately interpreted to mean the City or the Engineer as specified herein.

Various Governing Standard Specifications referred to throughout these Contract Documents are frequently indexed by number and year (i.e., AWWA C110-71). When the year has not been designated or no year is associated with the referenced specification, the Governing Standard Specification in effect on the date of the Advertisement shall govern. Tentative specifications shall be construed as current unless otherwise noted. Where obsolete Federal Specifications have been referenced, they shall be superseded by the Federal Specification in effect on the date of the Advertisement.

All standard specifications, manuals, standard details, publications, or other standard items referred to in the Drawings or other Contract Documents shall be considered a part of these Contract Documents the same as if herein repeated.

- 5.5 Authority of the City Engineer. If the City has retained an Architect or consulting engineer to assist the City Engineer in administering the contract, then the authority of the City Engineer should be as specified herein. If the administration of the contract is performed by the City Engineer without having an Architect or consulting engineer, then the authority of the City Engineer shall be as specified in this section and the following section captioned "Authority of the Project Engineer." The general administration and observation of the performance and execution of the work under these Contract Documents is vested in the City Engineer. The detailed administration and observation of the performance and execution of the work is vested in the Project Engineer as set forth below.

The City Engineer may authorize a person to act as the City Engineer's authorized representative or agent in carrying out the duties specified in these Contract Documents. The instructions of the City Engineer, or authorized representative, shall be strictly and promptly followed in every case.

The City Engineer, or authorized representative, shall have authority to suspend operations at any time, without additional cost to the Owner, when the work, in the City Engineer's opinion, is not being carried out in conformity with the Drawings, Specifications, and other Contract Documents.

The City Engineer, or authorized representative, may appoint Inspectors as are necessary to observe the performance of the work under these Contract Documents and the amount, character, and quality of materials supplied.

- 5.6 Authority of the Project Engineer. The Project Engineer (severally referred to in the Contract documents simply as "Engineer") is an Architect, consulting engineer, or other person designated by the City to perform certain duties of the City, specified herein, as a duly authorized representative or agent of the City. When such specified duties are indicated herein to be performed by the "Engineer" or by the City's "authorized representative," said duties shall be performed by the Project Engineer acting for the City and solely as an agent or representative of the City. The City may specifically designate that other duties will be performed by the Project Engineer by notifying the Contractor and the Project Engineer that said duties will be performed by the Project Engineer.

The Project Engineer shall have free access to the materials and the work at all times for measuring or observing the same, and the Contractor shall afford him all necessary facilities and assistance for so doing. After written authorization to proceed with the work, the Project Engineer shall:

- 5.6.1 Make periodic visits to the site to observe the progress and quality of the executed work and to determine in general if the work is proceeding in accordance with the Contract Documents; he will appoint a Resident Project Representative and Inspectors to make periodic and timely on-site observations to check the quality and quantity of the work; he will not supervise the contractor's work; he will not act as foreman or superintendent for the Contractor, nor will he manage or interfere with management of the contractor's work; he will not be responsible for the techniques, construction means, methods, sequences or procedures, time of performance, or the safety precautions and programs incident thereto; and he will not be responsible for the Contractor's failure to perform the construction work in accordance with the Contract Documents. During such visits and on the basis of his on-site observations and professional judgment, the Project Engineer will keep the City informed of the progress of the work, will exercise reasonable care to guard the City against defect and deficiencies in the work of the Contractor, and will advise the City immediately verbally and by written notifications of any work he knows to be defective or not conforming to the requirements of these Contract Documents.
- 5.6.2 Review engineering data, samples, catalog data, schedules, shop drawings, laboratory, shop, and mill tests of materials and equipment and other data which the Contractor is required to submit, only for conformance with the design concept of the project and compliance with the information given by these Contract Documents; and assemble written guarantees which are required by these Contract Documents.
- 5.6.3 Advise and consult with the City during the performance of the work; and act as the City's representative to issue instructions of the City to the Contractor.
- 5.6.4 Based on his on-site observations and on his review of the Contractor's payment requests, determine the amount owed to the Contractor and approve in writing payment to the Contractor in such amounts; such approvals of payment to constitute a representation to the City, based on such observations and review and the data comprising such requests, that the work has progressed to the point indicated and that, to the best of his knowledge, information, and belief, the quality of the work is in accordance with these Contract Documents, subject to the results of any subsequent test called for in these Contract Documents and any qualifications stated in his approval.
- 5.6.5 Conduct, in company with the City, a final inspection of the project for conformance with the design concept of the project and compliance with the information given by these Contract Documents, and approve a Final Payment request.
- 5.6.6 Prepare and submit for the City's approval proposed change orders.

- 5.7 Authority and Duties of Resident Project Representative. The Resident Project Representative and Inspectors are authorized to observe all work done and materials furnished under these Contract Documents, but will not be on-site at all hours the work is in progress. Such observation will extend to all or to any part of the work and when appropriate to the preparation, fabrication, or manufacture of the materials or products to be incorporated in the work.

The authority and duties of the Resident Project Representative and Inspectors are to examine the materials and products furnished, observe the work done, call to the attention of the Contractor any deviation from these Contract Documents and report the results of the examinations and observations to the Engineer.

The Resident Project Representative and/or Inspectors will not be authorized to revoke, alter, enlarge, or relax any requirements of these Contract Documents, nor to approve or accept any portion of the work, nor will they be authorized to issue instructions contrary to these Contract Documents. They will in no case act as foremen nor will they interfere with management of the work.

- 5.8 Inspection. The Engineer and authorized representatives thereof shall be given every facility for ascertaining whether or not the work performed and materials used are in accordance with the requirements and intent of these Contract Documents.

Failure of the Engineer or authorized representatives during the progress of the work to discover defects or deficiencies in the work or to reject materials, products, or work not in accordance with these Contract Documents shall not be considered to relieve the Contractor, under any circumstances, from his obligations under these Contract Documents or the acceptance thereof or a waiver of defects therein; and payment to the Contractor or partial or entire occupancy by the City shall not be construed to be an acceptance of the work or materials which are not strictly in accordance with these Contract Documents.

Moreover, the undertaking of inspections by the Engineer or authorized representatives thereof shall not be construed as supervision of actual construction nor make the Engineer or authorized representative responsible for providing a safe place or safe conditions for the performance of work under the Contract by the Contractor, or Contractor's employees or those of Suppliers or Subcontractors, or for access, visits, use, work, travel, or occupancy by any person and the Contractor agrees to fully indemnify, protect, defend, save and hold harmless the City, the Engineer, and their agents and employees from all claims for damages for personal injury (including accidental death) and property damage which may arise from any operations under this contract, including claims by employees of the Contractor or of any Subcontractor or Supplier.

The payment of any compensation, irrespective of its character or form, or the giving of any gratuity, or the granting of any valuable favor, directly or indirectly, by the Contractor to any authorized representative of the City or Engineer is strictly prohibited, and any such act on the part of the Contractor will constitute a breach of the Contract.

Any advice or consultation offered to the Contractor by a representative of the City or Engineer shall not be construed as binding on the City or Engineer or as releasing the Contractor from fulfilling all the terms and conditions of these Contract Documents.

All materials and products shall be inspected before their use in the work, and the Contractor shall notify the Engineer in time to enable him to inspect any work or materials before being covered. The Contractor shall furnish necessary personnel and facilities for such inspection. The presence or absence of a representative of the Engineer shall not lessen or otherwise affect the responsibility of the Contractor to properly perform the work.

- 5.9 Additional Instructions and Detail Drawings. The Contractor may be furnished additional instructions and detail drawings by the Engineer as necessary to carry out the work required by these Contract Documents. The additional instructions and detail drawings furnished shall become a part of these Contract Documents. The Contractor shall perform the work in accordance with the additional instructions and detail drawings.
- 5.10 Review of Engineering Data. Engineering Data covering all equipment and fabricated products to be furnished under these Contract Documents shall be submitted to the Engineer for review. These data shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and operation of component materials and devices; the external connections, anchorages, and supports required; performance characteristics; and dimensions needed for installation and correlation with other materials and equipment. Data submitted shall include drawings showing essential details of any changes proposed by the Contractor and all required wiring and piping layouts.

At the time of each submission, the Contractor shall in writing call the Engineer's attention to any deviations that the Engineering Data may have from the requirements of these Contract Documents.

The Engineer will review the engineering data submitted in a timely and expeditious manner, provided the data is submitted in accordance with these Contract Documents, is complete, and is suitable for his review.

Seven (7) copies of each drawing and necessary data shall be submitted to the Engineer. Each drawing or data sheet shall be clearly marked with the name of the project, the Contractor's name, and references to applicable specification paragraphs and drawing sheets. When catalog pages are submitted, the applicable items shall be identified. Each drawing or data sheet shall bear the Contractor's stamp of approval which shall be construed as certification that he has reviewed, checked, and approved the Engineering Data and that the data are in conformance with the requirements of these Contract Documents and that he has determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data required for preparation, accuracy, and sufficiency of the Engineering Data.

When the drawings and data are returned marked "NOT APPROVED," the corrections shall be made as noted thereon and as instructed by the Engineer and seven (7) corrected copies resubmitted.

Unless otherwise directed by the Engineer, when drawings and data are returned marked "APPROVED AS NOTED," the changes shall be made as noted thereon and not less than seven (7) corrected copies shall be furnished. All corrections and changes made on the drawings or data sheets other than those noted by the Engineer shall be clearly identified with a revision symbol and shall be suitably documented on the drawing with a brief description and date.

When drawings are submitted after final review (after being returned marked "APPROVED" or "APPROVED AS NOTED"), one (1) of the copies shall be a reverse reading translucent matte finish mylar reproducible (ozalid process). The Engineer's review of drawings and data submitted by the Contractor will cover only general conformity to the drawings and specifications, external connections, and dimensions which affect the layout. The Engineer's review of drawings returned marked "APPROVED" or "APPROVED AS NOTED" does not indicate a thorough review of all dimensions, quantities, and details of the material, equipment, device, or item shown and shall not in any way be deemed to relieve the Contractor from any responsibility for errors or deviations from the requirements of these Contract Documents or from full responsibility for complete and accurate performance of the work in conformance with these Contract Documents, or from any liability placed upon him by any provisions of these Contract Documents.

All drawings and data, after final processing by the Engineer, shall become a part of these Contract Documents, and the work shown or described thereby shall be performed in conformity therewith unless otherwise authorized by the City.

The schedule of submittals of engineering data and submittals of samples of materials or products, if required, shall be made by the Contractor in accordance with the requirements in the section entitled "Submittals" of the Detailed Specifications.

- 5.11 Oral Statements. It is understood and agreed that the written terms and provisions of these Contract Documents shall supersede all oral statements of representatives of the City, and oral statements shall not be effective or be construed as being a part of these Contract Documents.
- 5.12 Notice and Service Thereof. Any notice to the Contractor from the City or the Engineer relating to any part of these Contract Documents shall be in writing, and shall be considered delivered and the service thereof completed when said notice is mailed to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the work.
- 5.13 Rejected Work, Materials, or Products. The Contractor, upon written notice from the Engineer, shall remove all work, including materials and products, rejected as defective, unsound, improper, or, in any way, failing to conform to the requirements of these Contract Documents. All removal and replacement work shall be done at the Contractor's expense. The Contractor shall at his sole expense make good all work damaged by such removal and shall promptly replace materials damaged or improperly worked by him and re-execute his own work in accordance with these Contract Documents. This includes re-executing or replacing the work of any other contractor or the City that is in any way affected by the removal of the defective work. The obligations of the Contractor under this section shall not extend to defective materials or equipment supplied by the City.

Should the Contractor fail or refuse to begin to remove and renew any defective work, or to make any necessary repairs in an acceptable manner and in accordance with the requirements of these Contract Documents within ten (10) days of the written notice, the City may cause the unacceptable or defective work to be removed and replaced, or such

repairs as may be necessary, to be made at the Contractor's expense. Any expense incurred by the City in making these replacements or repairs, which the Contractor has failed or refused to make, shall be paid for out of any monies due the Contractor or which may become due under the provisions of these Contract Documents, or may be charged against the Contract Performance Bond. Continued failure or refusal on the part of the Contractor to make any or all necessary repairs promptly, fully, and in an acceptable manner shall be sufficient cause for the City to declare the Contract forfeited, in which case the City, at its option, may contract with any other person, firm, or corporation to perform the work. All costs and expenses incurred thereby shall be charged against the defaulting Contractor and the amount thereof deducted from any monies due, or which may become due him, or shall be charged against the Contract Performance Bond. Any special work performed, as described herein, shall not relieve the Contractor in any way from his responsibility for the work performed by him.

- 5.14 Substantial Completion of the Work. Upon receipt of written notice from the Contractor that the work, or acceptable portion thereof, is substantially complete in conformance with these Contract Documents and submission of a list of items to be completed or corrected, the Engineer, in company with the City, will promptly make an inspection for substantial completion of the work, including any tests of operation, performance tests, material tests, and such other tests as specified or as the Engineer deems necessary, desirable, or proper. After completion of the inspection and tests and preparation of a detailed list of items to be completed or corrected, as determined by the inspection, the Engineer, if all things are satisfactory to him, and if, in his professional judgment and opinion the Contractor's statement appears correct, will inform the City in writing that he has examined the work, that it is substantially complete in conformance with these Contract Documents, and that he recommends the work be accepted as substantially complete. The written recommendation of acceptance of the work as substantially complete from the Engineer shall be accompanied by the list of items to be completed or corrected. It is understood and agreed that such notice from the Engineer does not in any way relieve the Contractor from any duties, responsibilities, and obligations of these Contract Documents.

Should the Engineer consider that the work is not substantially complete, he will immediately notify the Contractor, in writing, stating the reasons for his determination. The Contractor shall complete the work and send another written notice to the Engineer certifying that the work or designated portion thereof is substantially complete. The Engineer, in company with the City, will reinspect the work.

If the Engineer's recommendation is acceptable to the City, the City will notify the Contractor in writing that the work is accepted as substantially complete and will establish the date of substantial completion after which time charges shall cease, and the City will begin use of the work. It is understood and agreed that said notice from the City shall not in any way be construed to relieve the Contractor from any duties, responsibilities, or obligations of the Contract Documents or from his responsibility to deliver a complete work in accordance with the intent of these Contract Documents.

- 5.15 Final Inspection. Upon receipt of written notice from the Contractor that all items listed for completion or correction during the inspection for substantial completion have been performed and that the work has been completed in conformity with the Contract Documents, the Engineer shall promptly examine the work, in company with the City, making additional tests and investigations as he may deem proper and using due care and

judgment normally exercised in the examination of the completed work by a properly qualified and experienced professional engineer and shall satisfy himself that the Contractor's statement appears to be correct. The Engineer shall then inform the City and, when applicable, regulatory agencies that the work is, in his opinion, complete in apparent conformity with these Contract Documents and shall schedule the final inspection.

Should the Engineer consider that the work is not finally complete, he will notify the Contractor in writing, stating reasons for his determination. The Contractor shall take immediate steps to remedy the stated deficiencies and/or conditions and, after correction of the deficiencies and/or conditions, send another written notice to the Engineer certifying that the work is complete. The Engineer, in company with the City, will re-inspect the work.

After the final inspection and after the submission by the Contractor of acceptable Project Record Documents, operation and maintenance data and other items required by these Contract Documents, the Engineer shall notify the City in writing that he has examined the work and that, in his opinion, it appears to conform to these Contract Documents and therefore recommends acceptance of the work and final payment to the Contractor. It is understood and agreed that such statement by the Engineer does not in any way relieve the Contractor or his Sureties from any duties, responsibilities, and obligations under these Contract Documents.

- 5.16 Final Acceptance of the Work. After the Engineer recommends acceptance of the work covered by these Contract Documents and final payment to the Contractor, the City will, if it concurs in the Engineer's recommendation, promptly notify the Contractor in writing that the work is accepted. If the City does not concur in the Engineer's recommendation, the City will promptly notify the Contractor in writing that it does not accept the work as complete and stating the deficiencies and/or conditions that shall be corrected or resolved before final acceptance will be made. After the deficiencies and/or conditions are corrected or resolved and the City is satisfied that the work is complete, the City will notify the Contractor in writing that the work is considered complete and final acceptance is made. The guarantee period(s), as specified in these Contract Documents, shall begin on the date the Contractor is notified by the City that final acceptance of the work is made. Final acceptance of the work by the City will not be made until the Project Record Documents, operation and maintenance data and other required items are acceptable to the City.

It is understood and agreed that said notice of final acceptance or final payment by the City shall not in any way be construed to relieve the Contractor, or his Sureties from any duties, responsibilities or obligations under or in connection with these Contract Documents.

- 5.17 Discrepancies. The Contractor shall check all dimensions, elevations, and quantities shown on the drawings and schedules. The Contractor shall verbally notify the Engineer immediately confirming the notice in writing soon thereafter of any discrepancy between the drawings and the conditions on the ground or any discrepancies, errors, or ambiguities in, or omissions from, the Drawings, Specifications, or other Contract Documents which he may discover at any time during the performance of the work. The Contractor shall also notify the Engineer of any discrepancies, errors, or ambiguities in the layout as given by stakes, points or instructions which he may discover during the course of the work. The Engineer will promptly investigate the matters and will furnish full instructions in writing correcting such discrepancies, errors, ambiguities, or omissions and the Contractor shall

carry out such instructions as if originally specified. If, knowing of such discrepancy, error, ambiguity, or omission and prior to reviewing written instructions from the Engineer regarding correction thereof, the Contractor proceeds with the work, any of the work so done shall not be considered as work done under these Contract Documents and in performance thereof unless and until duly approved and accepted by the Engineer. The Contractor shall not take any advantage of any discrepancy, error, ambiguity, or omission in the Drawings, Specifications, or other Contract Documents.

- 5.18 Equivalent Materials and Equipment. Whenever a material, product, article, or piece of equipment is specified or described in these Contract Documents by using the name of a proprietary product or the name of a particular manufacturer or vendor and catalog number, it is understood and agreed that the specific item is named for the purpose of establishing the type, function, dimension, appearance, quality, durability, performance, or other salient requirements and that other materials, products, articles, or pieces of equipment of equal capacities, quality and function will be considered. The Contractor may request the substitution of material, product, article, or piece of equipment of equal substance and function for those designated in these Contract Documents. The Contractor shall request substitution in writing to the Engineer stating in detail how the substituted product differs in composition and performance from the designated product and furnishing suitable complete data on which the Engineer may make the determination on the merits of the proposed substitution. If, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that designated, the Engineer may approve its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract Price, and the Contract Documents shall be appropriately modified by a change order. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the project will result. Incidental changes or extra component parts required to accommodate the substitute shall be made by the Contractor without a change in the Contract Price or Contract Time. Requests relative to substitutions for materials, products, articles or pieces of equipment specifically designated on the Drawings or in the Specifications will not be considered until after the award of the Contract.

It is understood and agreed that (1) the Engineer is to use his own judgment whether or not any material, product, article, or piece of equipment proposed to be substituted is equal to that specified; (2) the decision of the Engineer on all such questions of equality shall be final and binding upon the Contractor; and (3) in the event of any decision of the Engineer that is considered adverse by the Contractor, no claim of any sort by the Contractor shall be made or allowed against the City or the Engineer.

- 5.19 Materials. The materials, fixtures, and apparatus furnished shall be new, except as otherwise provided herein, unused and of good quality, and shall be incorporated into the work in an undamaged condition. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials. Whenever materials are sold by the manufacturer in sealed packages, they shall be so delivered to the site of the work. The materials shall be manufactured, handled, and used in a workmanlike manner to provide a completed work in accordance with these Contract Documents.

Materials, products, and equipment designated for permanent installation in the work shall be properly stored by the Contractor in a manner to ensure protection against deterioration of any type. These items shall be so placed as to cause a minimum of interference with the

prosecution of the work and to the public. The method of storing shall be so as to facilitate inspection. Deterioration of any kind or to any degree shall be cause for rejection. Stored materials, even though meeting the requirements of these Contract Documents before being stored, shall be inspected prior to incorporation in the work and shall meet the requirements of these Contract Documents at the time of incorporation in the work. If material, products, or equipment stored by the Contractor and paid for under the terms of these Contract Documents is damaged, or otherwise becomes unsuitable, before its permanent incorporation into the work, the amounts paid the Contractor for the damaged material shall be deducted from the next progress payment.

- 5.20 Contractor's Responsibility for Materials. The Contractor shall be responsible for the condition of all materials, products, and equipment which he has furnished, and shall replace at his own expense all such material found to be defective or which has been damaged after delivery. This includes the replacement of material which is found to be defective at any time prior to expiration of the guarantee period.
- 5.21 Testing of Materials and Equipment. The testing of materials shall be made by a competent laboratory or other person selected and paid for by the City. The Contractor shall submit samples of materials for testing as required by the Engineer. The cost of all retests made necessary by the failure of materials to conform to the requirements of these Contract Documents shall be paid by the Contractor.

The testing of equipment and products shall be performed as provided in the Specifications.

- 5.22 Access to the Work. The Engineer and his authorized representatives shall at all times have access to the work. Authorized representatives of the regulatory agencies shall have access to the work and to the materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The Contractor shall provide proper facilities for such access and observation of the work and records and also for any inspection or testing of the work.
- 5.23 Uncovering Completed Work. If any work is covered contrary to the written instructions of the Engineer it must, if requested by the Engineer, be uncovered for his observation and replaced at the Contractor's expense.

If the Engineer considers it necessary or advisable that covered work be inspected or tested by others, the Contractor, at the Engineer's request, will uncover, expose, or otherwise make available for observation, inspection, or testing as the Engineer may require that portion of the work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection and satisfactory reconstruction. If, however, such work is not found to be defective, the Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction, and an appropriate change order shall be issued.

- 5.24 Minimum Requirement for Materials and Workmanship. Unless otherwise definitely specified, it is a general requirement of these Contract Documents that all materials, products, and workmanship shall meet the requirements of the applicable standard

specifications of the American Society for Testing and Materials, or of the Federal Specifications Board as minimum requirements.

- 5.25 Equipment Operation Experience Clauses. In cases where experience clauses are used for manufacturers or suppliers, in lieu of experience, a bond or cash deposit may be accepted from manufacturers or suppliers which do not meet the specified experience period. The bond or cash deposit provided by the manufacturers shall guarantee replacement of the equipment or process in the event of failure or unsatisfactory service. The period of time for which the bond or cash deposit is required shall be the same as the experience period of time specified.
- 5.26 Surveys. The City will furnish all boundary surveys and establish all base lines for locating the principal component parts of the work together with a suitable number of bench marks adjacent to the work. From the information provided by the City, unless otherwise specified in these Contract Documents, the Contractor shall develop and make all detailed surveys needed for construction such as slope stakes, batter boards, stakes for pile locations, and all other working points, lines, elevations, and cut sheets.

SECTION 6. LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

- 6.1 Cooperation with Public Utilities. The Contractor shall notify the owners of adjacent utilities when the prosecution of the work may affect the utility facilities or operation. The Contractor shall perform and carry on the work so as not to interfere with or damage utility facilities in the vicinity of the work. The Contractor shall take every possible precaution to properly protect and preserve, including temporary supports and bracing where necessary, the utility facilities from damage, injury or displacement. The Contractor shall remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the contractor, any Subcontractor or any person directly or indirectly employed or engaged by the Contractor or a Subcontractor or any person for whose acts the Contractor or a Subcontractor is liable.

The City and the Engineer will not be responsible for any delay in performing the work resulting from the existence, removal or adjustment of any utility facilities. Additional costs incurred by the Contractor as a result thereof shall be borne solely by the Contractor.

Utility facilities, such as water mains, gas mains, storm sewers, sanitary sewers, telephone lines, power lines and buried facilities and structures in the vicinity of the work are indicated on the drawings only to the extent such information has been made available to or discovered by the Engineer during the course of preparing the drawings. The actual locations of the utility facilities may vary from the locations shown, and there may be utility facilities existing that are not indicated on the drawings. It is understood and agreed that there is no guarantee as to the accuracy or completeness of the utility information indicated on the drawings, and all responsibility for the accuracy or completeness thereof is expressly disclaimed. Generally, service connections are not indicated on the drawings.

The Contractor shall be solely responsible for locating all existing underground facilities, including service connections, in advance of excavating, trenching or other work, by contacting the owners of the facilities or prospecting. The Contractor shall use his own information and shall not rely upon the information shown on the drawings concerning utility facilities.

In the event of accidental damage to or disruption of utilities by the Contractor or any of his Subcontractors or agents, the Contractor shall immediately take all necessary steps to replace any pieces of damaged equipment and all damaged materials, make all necessary repairs and restore all services to normal. The Contractor shall engage any and all required additional labor, individuals, subcontractors or other outside services which may be deemed necessary, to operate on a continuous "around-the-clock" basis until services are restored. He shall also provide and install all required equipment and materials to maintain temporary emergency services for uninterrupted use of facilities. All costs involved in making the repairs and restoring the disrupted service to normal shall be borne by the Contractor responsible for such disruption of services, and he shall be fully responsible for any and all damage claims resulting from such disruption.

Under no circumstances shall the Contractor or any of his subcontractors or agents disrupt or disconnect any type of facility whatsoever without first obtaining the written permission of the utility owner to do so. Request for disruption or disconnection shall state:

1. The location of the required disconnect and which utility is concerned.
2. The exact date and time at which the disconnect will be required.
3. The duration of the proposed disconnect or interruption.

Where it is necessary to temporarily interrupt services, the Contractor shall notify the utility owner, both before the interruption and again immediately before service is resumed. Before disconnecting any pipes or cables, the Contractor shall obtain permission from the owners thereof, or shall make suitable arrangements for their disconnection by the owners. Where it is necessary to temporarily interrupt house services, the Contractor shall notify the house owner or occupant, both before the interruption and again immediately before service is resumed. Should underground utilities or structures be encountered that are in minor conflict with the alignment or gradient of the proposed work, the proposed work may be adjusted by the Engineer where such adjustment is feasible and will not interfere with the operation of the proposed system. No payment will be made for these adjustments.

Where major conflicts in the proposed work and existing utilities or structures occur and adjustment of the new work is not feasible, then the Engineer may revise the alignment and/or grade to suit these conditions. If, in the opinion of the City, these revisions are necessary and are outside the scope of the bid items, they will be paid for as extra work.

- 6.2 Railway Crossings. When the work encroaches upon the right-of-way of any railway, the City will secure for the Contractor all the necessary easements or authority to enter upon such right-of-way for the prosecution and completion of the work. Where railway tracks are to be crossed, the railway company will construct the necessary bridges, trestles, cribs or other structures for safe operations of the trains or cars across any excavation during the time of construction of the work. Where such crossings require a change of grade, such change shall be made by or at the expense of the railway company. Contractor shall, however, take such special precaution for the safety of the work and the traveling public as may be necessary, by sheeting, bracing, and thoroughly supporting the sides of any excavation and supporting and protecting any adjacent structures.

- 6.3 Protection of Public and Private Property. The Contractor shall protect from damage all property in the vicinity of the work or that is in any way affected by the work, the removal or destruction of which is not called for by the Contract Documents. This applies to public and private property, utility facilities, trees, grass, shrubs, crops, signs, monuments, fences, pipe, underground structures, public roadways, sidewalks, curb and gutters, driveways and any other natural or man-made terrain features. Whenever such property is damaged due to the Contractor's performance of the work, the Contractor shall immediately restore it to condition equal to or better than that existing before such damage or injury was done by the Contractor. The Contractor shall make good all such damage or injury in an acceptable manner at his own expense. In case of failure of the Contractor to restore such property, or to make good such damage or injury, the City may, upon forty-eight (48) hours' notice, under ordinary circumstances and without notice when a nuisance or hazardous condition results, proceed to repair, rebuild or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due the Contractor under the terms of these Contract Documents.

Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

The Contractor shall not enter upon private property for any purpose without first obtaining permission, and he shall be responsible for the preservation of all public and private property. The Contractor shall at all times while the work is in progress use extraordinary care to see that adjacent buildings are not endangered in any way by reason of fire, water, or construction operations, and to this end shall take such steps as may be necessary or directed to protect the property therefrom, and the same care shall be exercised by all Contractor's and Subcontractor's employees. The Contractor shall give due notice to any controlling person, department, or public service company, prior to adjusting items to grade and shall be held strictly liable to the City if any such items are disturbed, damaged or covered up during the course of the work. The Contractor shall not disturb, remove or relocate any land monuments and property marks until an authorized agent has witnessed or otherwise referenced their location.

Any temporary drains and drainage which may be required by the Contractor during the construction period shall be furnished, installed and maintained by him. No such drains or drainage systems shall be installed or used without the prior approval of the Engineer. At the completion of the work, all such drains and drainage systems shall be removed and the premises returned to a neat and clean condition.

Fire hydrants on or adjacent to the work shall be kept accessible to the fire-fighting apparatus at all times, and no material or obstruction shall be placed within 10 feet of any hydrant. Adjacent premises must be given access, as far as practicable, and obstruction of sewer inlets, gutters and ditches will not be permitted.

- 6.4 Safety and Protection of Work. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work.

The Contractor shall take all necessary precautions for the safety of employees on the work, and shall comply with all applicable provisions of Federal, State and Local safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. The Contractor shall comply with the Department of Labor's Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) as amended and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54) as amended. Copies of these regulations may be obtained from the U.S. Government Printing Office, 275 Peachtree Street, N.E., Atlanta, Georgia 30303.

The Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards, including sufficient lights and danger signals on or near the work; he shall erect suitable railings, barricades, covers, or other protective devices about unfinished work, open trenches, holes, embankments or other hazards and obstructions; where hazards to workmen or the public exist. The Contractor shall provide, at all times, all necessary watchmen on the project, for the safety of employees, delivery personnel, and the general public, and to diligently guard and protect all work and materials, including Owner-furnished equipment. Construction equipment shall be suitably night-marked and lighted as necessary for safety considerations. No separate payment will be made for providing lights on vehicles and equipment, signs, barricades, lights, flags, watchmen and other protective devices, and the costs thereof shall be included in the Contract Price(s).

The Contractor shall comply with all applicable provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, and shall maintain an accurate record of all cases of death and all cases of occupational disease and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on the work under these Contract Documents.

The Contractor shall solely be responsible for the safety, efficiency and adequacy of his plant, appliances and methods and for any damage which may result from their failure or their improper construction, maintenance or operation.

- 6.5 Public Safety and Convenience. The Contractor shall conduct his operations in a manner that will offer the least possible obstruction and inconvenience to the public and he shall not have under construction an amount of work greater than he can prosecute properly with due regard to the rights of the public.

Construction operations shall be conducted in a manner that will cause as little inconvenience as possible to abutting property owners. Convenient access to driveways, houses, buildings or other facilities in the vicinity of the work shall be maintained and temporary access facilities for public roadways shall be provided and maintained in satisfactory condition.

- 6.6 Maintenance of Existing Traffic. Satisfactory facilities shall be provided by the Contractor for maintaining public access and travel, and every effort shall be made to reduce any necessary inconveniences to a minimum.
- 6.7 Emergencies Affecting Property or Safety. In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Contractor, without special

instruction or authorization from the Engineer or City, shall act to prevent threatened damage, injury or loss. He will give the Engineer prompt written notice of any significant changes in the work or deviations from these Contract Documents caused thereby, and a Change Order shall thereupon be issued covering the change and deviations involved.

- 6.8 Indemnification. It is understood and agreed that the Contractor shall be deemed and considered an independent contractor in respect to the work covered by these Contract Documents, and shall assume all risks and responsibility for casualties of every description in connection with the work, except that he shall not be held liable or responsible for delays or damage to work caused by acts of God, acts of public enemy, quarantine restrictions, general strikes throughout the trade, or freight embargoes not caused or participated in by the Contractor. The Contractor shall have charge and control of the entire work until completion and final acceptance of the work by the City. The Contractor shall be alone liable and responsible for, and shall pay, any and all loss and damages sustained by any person either during the performance or subsequent to the completion of the work these Contract Documents, by reason of injuries to person and damage to property, buildings and adjacent work, that occur either during the performance or subsequent to the completion of the work covered by these Contract Documents, or that may be sustained as a result or consequence thereof, irrespective of whether or not such injuries or damage be due to negligence or to the inherent nature of the work. The Contractor shall fully indemnify, protect, defend, save and hold harmless the City, the Engineer, and their agents and employees from any and all liability and from all suits and actions of every kind and description brought or which may be brought against them or any of them relative to the performance of the work or other responsibilities of the Contractor under these Contract Documents.
- 6.9 Claims for Labor and Materials. The Contractor shall indemnify and save harmless forever the City from all claims for labor, materials and services furnished under these Contract Documents. When requested by the City, the Contractor shall submit satisfactory evidence that all persons, firms, or corporations who have done work or furnished materials under these Contract Documents, for which the City may become legally liable, have been fully paid or satisfactorily secured. In case such evidence is not furnished or is not satisfactory, an amount will be retained from money due the Contractor which in addition to any other sums that may be retained will be sufficient, in the opinion of the City, to liquidate all such claims. Such sum will be retained until the claims as aforesaid are fully settled or satisfactorily secured.

Before final acceptance of the work by the City, the Contractor shall submit to the Engineer in duplicate a notarized affidavit stating that all subcontractors, vendors, persons, or firms who have furnished labor materials, or services for the work have been fully paid and that all taxes have been paid. A statement from the Surety shall also be submitted consenting to the making of the final payment.

- 6.10 Defense of Suits. In case any action in court is brought against the City or the Engineer, or any officer, agent or employee of any of them, for the failure, omission, or neglect of the Contractor to perform any of the covenants, acts, matters, or things by this contract undertaken; or for injury or damage caused by the alleged negligence of the Contractor or his subcontractors or his or their agents, or in connection with any claim based on lawful demands of subcontractors, workmen, material-men, or suppliers, the Contractor shall indemnify, defend and save harmless the City and the Engineer and their officers, agents

and employees, from all losses, damages, costs, expenses (including attorneys' fees), judgments, or decrees arising out of such action.

- 6.11 Familiarity with Laws. It is understood and agreed that the Contractor shall be familiar with and shall observe and comply with, all Federal, State, County, and City laws, codes, ordinances, regulations, orders, and decrees, including air and water pollution and noise abatement regulations, existing, or enacted subsequent to the execution of the Contract, that in any manner affect those engaged or employed in the work, or the materials or equipment used in the work, or which in any way affect the conduct of the work. The Contractor shall strictly observe all applicable laws and regulations as to public safety, health and sanitation. No pleas of misunderstanding or ignorance on the part of the Contractor will in any way serve to modify or mitigate the provisions of these Contract Documents. The Contractor and his Surety shall indemnify and save harmless the City and the Engineer and all their officers, agents, and servants against any claim or liability arising from, or based on the violation of, any such law, code, ordinance, regulation, order or decree, whether by himself, his agents or his employees.

The Contractor shall give all notices relating to all laws, codes, ordinances, regulations, orders and decrees bearing on the conduct of the work. If the Contractor observes that the Contract Documents are at variance therewith, he shall promptly notify the Engineer, in writing, and any necessary changes shall be adjusted as provided in these Contract Documents for changes in the work. If the Contractor performs any work contrary to such laws, codes, ordinances, regulations, orders, and decrees, and without such notice to the Engineer, he shall bear all costs arising therefrom.

- 6.12 Taxes, Permits and Certification. The Contractor shall pay all applicable taxes levied by Federal, State, and Local Governments and obtain all permits on any part of the work as required by law in connection with the work. It is understood and agreed that the cost of said taxes is included in the Contract Price(s) for the work.

The Contractor shall procure all temporary and permanent permits and licenses, necessary and incidental to the due and lawful prosecution of the work, and shall pay all charges and fees, and all costs thereof shall be deemed to be included in the Contract Price(s) for the work.

- 6.13 Patents and Royalties. Royalties and fees for patents covering materials, articles, apparatus, devices, or equipment (as distinguished from processes) used in the work, shall be included in the Contract Price(s). The Contractor shall satisfy all demand that may be made at any time for such royalties or fees and he shall be liable for any damages or claims for patent infringements. The Contractor shall, at his own cost and expense, defend all suits or proceedings that may be instituted against the City for alleged infringement of any patents involved in the work and, in case of an award of damages, the Contractor shall pay such award. The Contractor, however, will not be held liable for the defense of any suit or other proceeding nor for the payment of any damages or other costs for the infringement of any patented process required by these Contract Documents; except if the Contractor has information that the process so required is an infringement of a patent, the Contractor shall be liable for any damages or claims in connection therewith unless he promptly notifies the City and Engineer of such infringement.

6.14 Requirements for Insurance Coverage. The Contractor shall not commence work under these Contract Documents until he has obtained all insurance required herein, nor shall the Contractor allow any Subcontractor to commence work on his subcontract until similar insurance required of the Subcontractor has been obtained by the Subcontractor. Insurance shall be placed by the Contractor with one or more insurance carriers licensed to do business in the State of Tennessee. Each insurance policy shall be renewed ten (10) days before the expiration date of the policy.

Certificates of insurance shall be filed with the City prior to commencement of the Work. These certificates shall contain a provision that coverage afforded under the policies will not be changed or canceled unless at least fifteen (15) days' written notice has been given to the City. The Contract shall not be binding upon the City until the insurance coverage required herein has been obtained and certificates have been filed with the City.

Adequate insurance coverage shall be maintained by the Contractor at all times. Failure to maintain adequate coverage shall not relieve the Contractor of any responsibilities or obligations under these Contract Documents. In the event any insurance coverage is canceled or allowed to lapse, the Contractor will not be permitted to prosecute the work until adequate and satisfactory insurance has been obtained and Certificates of Insurance furnished to the City. Failure to keep insurance policies in effect will not be cause for any claims for extension of time under these Contract Documents.

All such policies shall be subject to approval by the City Attorney. Should the City Attorney at any time in his sole discretion determine that the insurance policies and certificate provided may not be sufficient to protect the interests of the City because of the insolvency of the insurance company or otherwise, the Contractor shall replace such policies with policies meeting his approval.

Added from the City of Chattanooga's Standard Terms and Conditions:

- i. City of Chattanooga, its agents, representatives, officers, directors, officials and employees must be named an Additional Insured under the following policies:
 - a) Commercial General Liability
 - b) Auto Liability

The Contractor shall procure and maintain at his own expense, during the Contract Time, insurance as hereinafter specified:

6.14.1 Workmen's Compensation Insurance that shall protect the Contractor against all claims under applicable state workmen's compensation laws shall be maintained. The Contractor shall also be protected against claims for injury, disease or death of employees which, for any reason, may not fall within the provisions of a workman's compensation law. This policy shall also include an endorsement providing coverage in all states in which work is performed. The Contractor shall require all Subcontractors to provide similar Workmen's Compensation Insurance for all the Subcontractors' employees on the work unless such employees are covered by the protection afforded by the Contractor. The liability limits shall not be less than that required by statute.

6.14.2 General Public Liability and Property Damage Insurance that shall be written in comprehensive form and shall protect the Contractor against all claims arising from injuries including death, to members of the public or damage to property of others arising out of any act or omission of the Contractor or his agents, employees, or subcontractors. In addition, this policy shall specifically insure the contractual liability assumed by the successful bidder to defend and indemnify the City and Engineer against such claims or suits.

To the extent that the work may require blasting, explosive conditions, or underground operation, the comprehensive general public liability and property damage coverage shall contain no exclusion relative to blasting, explosion, collapse of buildings, or damage to underground property.

The comprehensive general public liability and property damage coverage shall also protect the Contractor against all claims resulting from damage to:

1. Private driveways, walks, shrubbery and plantings
2. Public utility facilities
3. U.S. Government monuments

The liability limits shall not be less than:

Bodily Injury	\$ 500,000 each person 1,000,000 each occurrence
Property Damage	\$ 500,000 each occurrence \$ 2,000,000 aggregate

The general public liability and property damage insurance shall carry an endorsement in form satisfactory to the City to the effect that the Contractor shall save harmless the City from any claims and damage whatsoever, including patent infringement. General public liability and property damage insurance shall be kept in force at all times during the course of the work until such time as the work covered by these Contract Documents has been completed and accepted by the City.

6.14.3 Comprehensive Motor Vehicle Liability and Property Damage Insurance that shall be written in comprehensive form and shall protect the Contractor against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, and shall cover operation on or off the site of all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired.

The liability limits shall not be less than:

Bodily Injury	\$ 250,000 each person \$ 500,000 each occurrence
Property Damage	\$ 100,000 each occurrence

6.14.4 Builder's Risk Insurance that shall be written in completed value form and shall protect the Contractor, the City, and the Engineer against risks of damage to buildings, structures, and materials and equipment not otherwise covered under installation floater insurance, from the perils of fire and lightning, the perils included in the standard extended coverage endorsement, and the perils of vandalism and malicious mischief. The amount of such insurance shall be not less than the insurable value of the work at completion less the value of the materials and equipment insured under installation floater insurance.

Equipment such as pumps, engine-generators, compressors, basin equipment, motors switch-gear, transformers, panel boards, control equipment and other similar equipment shall be insured under installation floater insurance when the aggregate value of the equipment exceeds \$10,000.

If the work does not include the construction of building structures, builder's risk insurance may be omitted providing the installation floater insurance fully covers the work.

Builder's risk insurance shall provide for losses to be payable to the Contractor and the City as their interests may appear and shall contain a waiver of subrogation rights against the insured parties.

6.14.5 Installation Floater Insurance that shall protect the Contractor, the City, and the Engineer from all insurable risks of physical loss or damage to materials, products and equipment not otherwise covered under builder's risk insurance, while in warehouses or storage areas, during installation, during testing, and after the work is completed. It shall be of the "all risks" type, with coverages designed for the circumstances which may occur in the particular work under these Contract Documents. The coverage shall be for an amount not less than the insurable value of the work at completion, less the value of the materials, products and equipment insured under builder's risk insurance. The value shall include the aggregate value of the City-furnished equipment, products and materials to be erected or installed by the Contractor not otherwise insured under builder's risk insurance.

Installation floater insurance shall provide for losses, to be payable to the Contractor and the City as their interests may appear and shall contain a waiver of subrogation rights against the insured parties.

If the aggregate value of the City-furnished and Contractor-furnished equipment is less than \$10,000, such equipment may be covered under builder's risk insurance, and if so covered, this installation floater insurance may be omitted.

Certificates of insurance covering installation floater insurance shall quote the insuring agreement and all exclusions as they appear in the policy; or in lieu of certificates, copies of the complete policy may be submitted.

6.15 Sanitary Conditions. The Contractor shall provide and maintain adequate and satisfactory sanitary facilities. All sanitary facilities shall conform to the requirements of the Tennessee Department of Public Health and the Chattanooga-Hamilton County Health Department.

- 6.16 Contract Provisions Required by Law. It is understood and agreed that each and every provision and clause required by Local, State and Federal laws and regulations to be inserted in these Contract Documents shall be deemed to be inserted herein in their entirety and the Contract Documents shall be read and enforced as though they were included herein. If through mistake or otherwise, any such provision or clause is not inserted, or is not correctly inserted, these Contract Documents shall forthwith be physically amended to make such insertion or correction upon the application of either party of the Contract.
- 6.17 Preservation of Monuments and Stakes. The Contractor shall carefully preserve all monuments, bench marks, property markers, reference points, and stakes. In case of his destruction thereof, the Contractor will be charged with the expense of replacement and shall be responsible for any mistake or loss of time that may be caused. Permanent monuments or bench marks which must be removed or disturbed shall be protected until properly referenced for relocation. The Contractor shall furnish materials and assistance for the proper replacement of such monuments or bench marks.

SECTION 7. PROSECUTION AND PROGRESS

- 7.1 Subcontracts. The Contractor shall give his personal attention to the fulfillment of the Contract and shall at all times keep the work under his control.

The Contractor may subcontract portions of the work; however, he shall not award any work to any Subcontractor without prior written approval of the City. The City's approval will not be given until the Contractor submits to the City a satisfactory statement concerning the proposed award to a Subcontractor. The Contractor shall perform with his own organization and employees not less than fifty (50%) percent of the labor costs of the project. The Contractor and each Subcontractor shall provide information to the City concerning labor costs and other employee information on forms provided by the City within one week following each payroll. These forms shall include information concerning total labor costs, job classifications, and the race and sex of each person directly employed on the project.

The Contractor shall be as fully responsible to the City for the acts and omissions of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for acts or omissions of persons directly employed by him. Nothing contained in these Contract Documents shall create any contractual relation between any Subcontractor and the City. All Subcontractors shall be deemed to be agents of the Contractor.

The approval of the City of any Subcontractor shall not, under any circumstances, operate to relieve the Contractor or his sureties of any of his or their obligations under these Contract Documents. It is understood and agreed that all subcontracts and approvals of Subcontractors shall be based upon the requisite of performance by the Subcontractor in accordance with these Contract Documents; and should any Subcontractor fail to perform his work to the satisfaction of the Engineer, the City shall have the absolute right to rescind his approval at once and to require the performance of such work by the Contractor entirely or in part through other approved subcontractors.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bid subcontractors to the Contractor by the terms of these Contract Documents insofar as applicable to the work of Subcontractors and to give the Contractor

the same power as regards terminating any subcontract that the City may exercise over the Contractor under any provisions of these Contract Documents.

The Contractor shall inspect all work performed by Subcontractors for compliance with these Contract Documents.

- 7.2 The Contractor shall not sell, transfer, assign or otherwise dispose of the Contract or any portion thereof, or of his right, title or interest therein, or his obligations thereunder, without written consent of the City.

The Contractor shall not assign any monies due or to become due to him under this Contract without the prior written consent of the City. In the event that the Contractor undertakes to assign all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a provision substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the work called for in these Contract Documents.

- 7.3 Beginning of Work. The Contractor shall begin the work within ten (10) days after receiving the Notice to Proceed and shall diligently prosecute the work to completion within the contract time. The Contractor shall notify the City and the Engineer two working (2) days in advance of the date he will begin operations.

- 7.4 Distribution of the Work. The Specifications and other Contract Documents may be arranged in Sections under general titles descriptive of the principal materials or trade practices as far as seems practical without unreasonable complicated or minute breakdown. Under many divisions it has seemed proper to include items of other trades or types of materials, the use or the installation of which is closely related to the principal subject of that division. Such arrangement shall not operate to make the Engineer or the City an arbitrator to establish subcontract limits between Contractor and Subcontractor.

The Contractor and all Subcontractors shall study the Drawings, Specifications and other Contract Documents in sufficient detail to assure that all required items are included. It shall be the Contractor's responsibility to so arrange and distribute the work that all required items are provided by the proper trades and at the proper times, without controversy as to contract obligations, or as to jurisdiction, and he shall make all necessary adjustments to this end.

- 7.5 Supervision of Work by Contractor. The Contractor shall supervise and direct the work. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor shall employ and maintain on the work a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site. The supervisor shall have full authority to act on behalf of the Contractor, and all communications given to the supervisor shall be as binding as if given to the Contractor. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the work.

The Contractor shall be responsible for complete supervision and control of his Subcontractors as though they were his own forces. Notice to the Contractor shall be considered notice to all affected subcontractors.

- 7.6 Labor. The Contractor shall employ only workmen who are competent to perform the work assigned to them and, in the case of skilled labor, who are adequately trained and experienced in their respective trades and who do satisfactory work.

If any person employed by the Contractor on the work appears to the Engineer to be incompetent or to act in a disorderly or improper manner, the person shall be discharged immediately on the request of the Engineer, and such person shall not again be employed on the work.

All labor described in these Contract Documents or indicated on the Drawings and the work specified shall be executed in a thoroughly substantial and workmanlike manner by persons skilled in the applicable trade. All materials, fixtures and apparatus shall be installed in an undamaged condition.

The Contractor shall enforce strict discipline and good order among his employees. No intoxicating liquor or drugs will be allowed on the project.

The Contractor and all Subcontractors shall comply with all ordinances, laws and regulations applicable to the work regarding labor and mechanics.

- 7.7 Methods of Operation. The Contractor shall inform the Engineer in advance concerning his plans for carrying on each part of the work, but the Contractor alone shall be responsible for the safety, adequacy, and efficiency of his plant, equipment, and methods.

Any method of work suggested by the City or Engineer, but not specified, shall be used at the risk and responsibility of the Contractor; and the City and Engineer will assume no responsibility therefore.

Review by the City or Engineer of any plan or method of work proposed by the Contractor shall not relieve the Contractor of any responsibility therefor, and such review shall not be considered as an assumption of any risk or liability by the City or Engineer, or any officer, agent, or employee thereof. The Contractor shall have no claim on account of the failure or inefficiency of any plan or method so reviewed.

The sequence of the work performed under these Contract Documents will be left to the Contractor unless otherwise specified herein. Should the Engineer order the Contractor to increase his forces or working hours in order to maintain the progress of the work consistent with the required progress necessary for completion of the work within the Contract time, the Contractor shall comply with such order without additional cost to the City.

- 7.8 Lands and Right-of-Way. Prior to the issuance of the Notice to Proceed, the City will have obtained most of the land and rights-of-way, including easements, necessary for carrying out and for the completion of the work to be performed pursuant to these Contract Documents, unless mutually agreed or specified in the Specifications.

The City will provide to the Contractor information which delineates and describes the lands owned and rights-of-way, including easements, acquired.

The Contractor shall provide, at his own expense and without liability to the City, any additional land and access thereto that the Contractor may acquire for temporary construction facilities, or for storage of materials.

In the event all land and rights-of-way have not been obtained as herein contemplated before construction begins, the Contractor shall begin the work upon such land and rights-of-way as the City may have previously acquired, and no claim for damages whatsoever will be allowed by reason of the delay in obtaining the remaining land and rights-of-way. Should the City be prevented or enjoined from proceeding with the work, or from authorizing its prosecution, either before or after the commencement, by reason of any litigation, or by reason of its inability to procure any lands or rights-of-way for the work, the Contractor shall not be entitled to make or assert claim for damage by reason of said delay, or to withdraw from the contract except by consent of the City; but time for completion of the work will be extended to such time as the City determines will compensate for the time lost by such delay, such determination to be set forth in writing.

- 7.9 No Waiver of Legal Rights. Neither the inspection by the City or Engineer or any of their officials, employees, or agents, nor any order by the City or Engineer for payment of money, or any payment for, or acceptance of, the whole or any part of the work by the City or Engineer, nor any extension of time, nor any possession taken by the City or its employees, shall operate as a waiver of any provision of these Contract Documents, or of any power herein reserved to the City, or any right to damages herein provided, nor shall any waiver of any breach in this Contract be held to be a waiver of any other or subsequent breach.

Any waiver of any provisions of these Contract Documents shall be specific, shall apply only to the specified item or matter concerned and shall not apply to other similar or dissimilar items or matters.

- 7.10 Project Record Documents. The Contractor shall prepare and maintain at the site of the work complete and detailed Project Record Documents of the completed work. Throughout the course of the work, the Contractor shall make all measurements and record the work as actually constructed on the Drawings and shall record on the record set of Specifications and other Contract Documents all materials or other items of construction actually used. The Project Record Documents shall represent the work as actually constructed. The Project Record Documents shall be submitted to and be acceptable to the Engineer before the final payment will be made to the Contractor.

The City will furnish the Contractor one set of reverse reading translucent matte finish mylar reproducible (ozalid process) copies of the contract drawings for the Contractor's use in preparing the record drawings.

- 7.11 Changes in the Work. The City reserves the right to make at any time, without prior notice to the Surety, such alterations in the drawings or in the character of the work as the City may consider necessary or desirable to complete the proposed work in a satisfactory manner and consistent with the intent of these Contract Documents. Notice of every such

alteration or change shall be given in writing to the Contractor by the Engineer, and no such alteration or change shall be considered as constituting a waiver of any of the provisions of these Contract Documents, or as nullifying or invalidating any of such provisions. Should any such alteration or change result in an increase or decrease in the quantity or the cost of the work or materials described in these Contract Documents, the total amount payable under the Contract will be accordingly modified. If alterations or changes result in additional time being needed by the Contractor to complete the work, the Contract Time will be correspondingly modified, if the Contractor so requests, before commencing the work attributable to such alterations or changes.

7.12 Extra Work and Changes in Contract Price. The Contract Price may be changed only by a Change Order.

7.12.1 It is understood and agreed that the Contractor shall perform all extra work that may be ordered in writing by the Engineer acting on the specific authority of the City arising out of the modification of the specifications or drawings made or approved by the City. For this extra work, the Contractor shall be compensated as provided hereinafter and in the Change Order covering the extra work.

Extra work is defined as: (1) that additional work of a different character or function and for which no basis of payment is prescribed in these Contract Documents; or (2) that work involving revisions of the details of the work in such manner as to render inequitable payment under items upon which the Contractor bid; or (3) that additional work of a similar nature and character as that done under the unit prices named in these Contract Documents.

No claim for extra work will be considered unless said extra work was ordered in writing as aforesaid, and the claim presented in writing to the Engineer within 30 days after receipt by the Contractor of the written order to perform said extra work.

If the performance of the extra work results in additional time being required by the Contractor to complete the work covered by these Contract Documents, said Change Order will provide for an equitable extension in the Contract time.

7.12.2 The Contractor shall be compensated for said extra work in accordance with one of the following methods and as set forth in the Change Order:

7.12.2.1 At the unit prices bid for items of work of a similar nature and character as set forth in the Bid Schedule on the Bid Proposal of these Contract Documents or as set forth in a previous Change Order.

7.12.2.2 At new unit prices for new items of work as negotiated and mutually agreed upon by the City and the Contractor prior to proceeding with the extra work.

7.12.2.3 For the lump sum price for the complete extra work as negotiated and mutually agreed upon by the City and the Contractor prior to proceeding with the extra work.

7.12.2.4 At the actual cost for labor, direct overhead, materials, supplies, equipment and other services necessary to complete the extra work plus an amount to cover the cost of general overhead and profit negotiated and agreed upon by the City and the Contractor prior to proceeding with the extra work.

7.12.3 When compensation for extra work is provided under paragraph 7.12.2.4 above, the Contractor's representative and the Engineer shall compare records of extra work done at the end of each day. Such records shall be made in duplicate upon a form provided for such purpose by the Engineer and shall be signed by both the representatives referred to herein, one copy being submitted to the Engineer and the other being retained by the Contractor.

7.12.4 The compensation provided herein shall be received and accepted by the Contractor as payment in full for all extra work done.

7.13 Time for Completion. The date of beginning and the time for completion of the work are essential conditions of these Contract Documents, and the work embraced shall be commenced within 10 days of the date of the Notice to Proceed.

The Contractor will proceed with the work at such rate of progress to insure full completion within the Contract Time. It is understood and agreed that the contract time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.

7.14 Extensions of Time. Extensions of time will be granted to the Contractor upon receipt of written request for such extensions, provided that such delays were occasioned by the City or by causes judged by the Engineer, subject to the City's concurrence, to be entirely beyond the Contractor's control or anticipation. In the event additional time is earned by the Contractor under the terms of these Contract Documents, or is granted by the City, such fact shall not be interpreted as a waiver of the full obligation on the part of the Contractor to complete the work within the extended time. Requests for extension of time made after ten (10) days following the event occasioning the delay, will not be considered by the City.

7.15 Suspension of the Work. The Contractor shall not suspend the work and shall not remove any equipment, tools, supplies, materials, or other items without the written permission of the City.

The City shall have the authority to suspend the work wholly or in part, for such period as may be necessary, due to unsuitable weather, such other conditions as are considered unfavorable for the suitable prosecution of the work; or due to the failure on the part of the Contractor to carry out orders given, supply sufficient skilled workmen, supply suitable material, prosecute the work satisfactorily and in a workmanlike manner, make prompt payments to Subcontractors or for labor, materials, or equipment, or to perform any obligations or requirements of these Contract Documents. The Contractor shall immediately comply with the written order of the City to suspend the work wholly or in part. The suspended work shall be resumed when conditions are favorable and methods are corrected, as ordered or approved in writing by the City.

In the event that a suspension of the work is ordered by the City, the Contractor shall, at his expense, do all the work necessary to secure the work and the area affected by the work and to protect all previously completed work as specified herein or as directed by the City. The suspension of the work by the City shall not relieve the Contractor of any duties, obligations, or responsibilities set forth in these Contract Documents. In the event the Contractor fails to secure and protect the work and area as specified or as ordered, the City will perform, or cause to be performed, all work considered necessary, and the cost thereof will be deducted from monies due or to become due the Contractor under the terms of these Contract Documents.

- 7.16 Liquidated Damages for Delay in Completion of the Work. As time is of the essence in this Contract, should the Contractor fail to complete the work, or specified portion thereof, sufficient for acceptance as substantially complete by the City within the Contract Time and extensions thereof, it is understood and agreed that the Contractor shall pay the City, as acknowledged liquidated damages, an amount determined, affixed and agreed (as stipulated in the Contract hereof) per calendar day that he is delinquent. The amount of liquidated damages shall be reported by the Engineer and shall be paid by the Contractor to the City or shall be deducted and withheld by the City from the monies due or to become due the Contractor under the terms of these Contract Documents.

The number of days used in determining the amount of liquidated damages to be paid by the Contractor for delay in completing the work shall be determined by subtracting the Contract Time, and any time extensions thereof, from the time actually required for the completion of the work. The time actually required for the completion of the work is defined as the total number of calendar days from the date 10 days after the date of the Notice to Proceed to the date of substantial Completion.

This provision for liquidated damages shall be effective between the parties ipso facto without necessity for demand or putting in default by any notice or other means than by the terms of these Contract Documents, the Contractor hereby waiving any such other notice of default and acknowledging that the Contractor shall be deemed to be in default by the mere act of his failure to complete the work within the Contract Time, or within any valid extension of such time hereunder.

It is understood and agreed that these liquidated damages are not a penalty, but constitute liquidated damages for loss to the City because of increases in expenses for administration, legal counsel, accounting, engineering, construction supervision, inspection, and any other expenses incurred directly as a result of the delay of the Contractor in completing the work.

- 7.17 Liability for Failure to Satisfy Guarantees and Warranties. Should the Contractor fail to furnish equipment, materials, and products meeting the guarantees and warranties specified herein, the Contractor shall be in default under the Contract and subject to all of the remedies of the City, including payment to the City of the additional operation and/or construction costs resulting from the system's nonperformance in the amounts specified in these Contract Documents and recourse for such payments to the Performance Bond. It is understood and agreed that these payments are not a penalty, but constitute reimbursement for loss to the City because of increased expenses of operation and/or construction of the project as a result of the failure of the Contractor to furnish equipment, materials, and products in conformance with these Contract Documents.

7.18 Equipment and Construction Plant. All equipment and construction plant shall be suitable to produce the quality of work and materials required for the satisfactory completion of the work within the Contract Time and shall be satisfactory to the Engineer. The Contractor shall provide adequate and suitable equipment and construction plant to meet the requirements of the work as specified in these Contract Documents. The Contractor shall remove unsuitable equipment from the work and add to the construction plant when ordered to do so by the Engineer.

The Contractor shall obtain written permission from the City prior to constructing temporary buildings or other structures on land owned or leased by the City. If a permit is granted, said buildings or other structures shall comply with all applicable regulations regarding their construction and maintenance and shall be satisfactory to the City.

7.19 Relations with Other Contractors. The Contractor shall cooperate with all other contractors who may be performing work in behalf of the City and workmen who may be employed by the City on any work in the vicinity of the work to be done under these Contract Documents, and he shall so conduct his operations as to interfere to the least possible extent with the work of such contractors or workmen. The Contractor shall promptly make good, at his own expense, any injury or damages that may be sustained by other contractors, the City or employees of the City at his hands. Any difference or conflict which may arise between the Contractor and other contractors or between the Contractor and workmen of the City in regard to their work shall be adjusted as determined by the Engineer. If the work of the Contractor is delayed because of any acts or omissions of any other contractor, the Contractor shall have no claim against the City on that account other than an extension of time.

Whenever there is interference with work under other contracts, the Engineer shall decide the manner in which the work shall proceed under each contract.

7.20 Unfavorable Construction Conditions. During unfavorable weather, wet ground, or other unsuitable construction conditions, the Contractor shall confine his operations to work which will not be affected adversely thereby. No portion of the work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by the Contractor to perform the work in a proper and satisfactory manner.

7.21 Sunday, Holiday and Night Work. No work shall be done between 6:00 p.m. and 7:00 a.m. nor on Sundays or locally observed national holidays without the written permission of the Engineer. However, emergency work may be done without prior permission. Night work will not be established as a regular procedure, excluding emergencies, except with written permission. Such permission, if granted, shall be upon such terms and conditions deemed appropriate in the Engineer's sole discretion.

7.22 Sewage, Surface, Subsurface and Flood Flows. The Contractor shall furnish all necessary equipment, materials and labor, at his expense, for handling, passing and disposing of all sewage, seepage, surface, subsurface and flood flows encountered at any time during the prosecution of the work. It is understood and agreed that the Contractor shall bear all risks associated with said flows; shall indemnify the City and the Engineer from any liabilities resulting from said flows; and shall not make any claim for additional compensation for

delays or damage resulting from said flows. The manner of providing for these flows shall be satisfactory to the Engineer and in conformance with all applicable laws and regulations.

SECTION 8. MEASUREMENT AND PAYMENT

8.1 **Scope of Payment.** The Contractor shall accept compensation provided in these Contract Documents as full payment for furnishing all labor, materials, supplies, tools, equipment, taxes, fees, contingencies, and other items necessary or convenient to the completed work and for performing all work contemplated and embraced in these Contract Documents; also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the acceptance by the City and for all risks of every description connected with the prosecution of the work; also for all expenses incurred in consequence of the suspension or discontinuance of the work as provided in these Contract Documents; and for completing the work in accordance with these Contract Documents. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material or of any provisions of these Contract Documents.

No compensation will be made in any case for loss of anticipated profits.

8.2 **Basis of Payment.** The basis of payment shall be the Contract Unit Prices and/or Contract Lump Sum Price(s) named in these Contract Documents.

8.3 **Measurement of Quantities.** The measurement of quantities shall be made by the Engineer in accordance with the Specifications and other Contract Documents.

If the Contract is based on a Unit Price Bid, the items of work to be measured and the units of measurement shall be as set forth in the Bid Proposal Form. Only net quantities of finished work will be measured. Any items of work not set forth in the Bid Proposal Form, but necessary or convenient for the satisfactory completion of the work under the terms of these Contract Documents, shall not be measured separately and shall be considered a part of said items of work set forth in the Bid Proposal Form.

If the Contract is based on a Lump Sum Bid, the measurement of quantities for progress estimates and progress payments requests will be made by the Contractor, subject to the Engineer's approval, and will be based on items of work and the value thereof contained in the Contractor's Schedule of Values. A final measurement of quantities will not be required.

8.4 **Progress Payment Requests and Partial Payments.** On the first day of each month the Contractor may submit to the Engineer, on forms furnished by the Engineer, a progress payment request for the amount of work accomplished, products finished, and products stored at the site (See 01630-1.02,B) during the previous month. Ten (10) signed copies of each request shall be furnished.

The progress payment request shall be signed by the Contractor and be supported by such data as the Engineer may reasonably require. If payment is requested for products not incorporated in the work but delivered and suitably stored at or near (See 01630 1.02,B) the site, the progress payment request shall also be accompanied by such supporting data.

satisfactory to the City, as will establish the City's title to said products and protect its interest therein, including appropriate insurance. The Contractor shall furnish a proper and duly executed written authorization designating those persons who will be authorized to sign and/or certify progress payment requests for the Contractor.

The Engineer will, within ten (10) days after receipt of each progress payment request, either indicate in writing his approval of the progress payment request and present it to the City, or return the progress payment request to the Contractor, indicating in writing his reasons for refusing to approve it.

The City will, within thirty (30) days after receipt of the approved progress payment request, pay the Contractor a partial payment on the basis of the approved progress payment request, less the retainage and other deductions pursuant to the terms of these Contract Documents.

The City will retain five (5%) percent of the total amount of partial payments for the work covered by these Contract Documents until substantial completion. After the work is accepted as substantially complete, the City, at its sole discretion and with the full knowledge and consent of the Contractor's surety, may reduce the retainage to an amount sufficient, in the Engineer/Architect's opinion, to complete the work should the Contractor default. A cash bond or an irrevocable letter of credit, provided by the Contractor and satisfactory to the City Attorney, may be accepted by the City in lieu of all or part of the cash retainage specified herein.

It is understood and agreed that the approval of the progress payment request and the paying of a partial payment shall not be construed as acceptance of any work, materials, or products and shall not relieve the Contractor in any way from his responsibilities and obligations under these Contract Documents.

A partial payment will not be made when, in the judgment of the City or the Engineer, the work is not proceeding in accordance with any of the provisions of these Contract Documents.

8.5 Retainage Held as Security. Notwithstanding any other provision of this Contract to the contrary, in the event the City shall have reasonable grounds to suspect that:

- (a) The Contractor or associated person has breached the Affidavit of No Collusion contained in these Contract Documents or has breached such an affidavit in any other contract which Contractor may have with City; or
- (b) The Contractor or associated person has violated or participated in a violation of the Sherman Act (15 U.S.C. Sec. 1-2), or the Racketeer Influenced and Corrupt Organizations Act (18 U.S.C. Sec. 1961-1968), or the Hobbs Act (18 U.S.C. Sec. 1951), or the mail or wire fraud statutes (18 U.S.C. Sec. 1341, 1343), the false statements statement (18 U.S.C. Sec. 1001), or other similar provision of Federal or State law in connection with this Contract or with any other contract which the Contractor or associated person has, had, or shall have with the City (including without limitation the submission of bids on such a contract); then the City shall have the right to withhold and retain any retainage described in this section as security for any damage claim arising from such action.

For purposes of this section, the term "associated person" shall include (a) in the case of a corporation: the corporation, its officers, directors, shareholders, employees and agents, and its parents, subsidiaries or affiliates, whether in existence at the time of the violation or subsequently formed or acquired; (b) in the case of a partnership or joint venture: the partnership or joint venture, its general or limited partners and joint venturers, its officers, employees and agents; and (c) in the case of a sole proprietorship: the individual proprietor, and his employees and agents. Where a partner or joint venturer is a corporation, the partnership or joint venture shall have attributed to it the actions of persons attributable to the corporation under paragraph (a) of this subsection.

The City shall promptly notify the Contractor in writing of the exercise of its right to retain such amounts. In the event the work is more than fifty (50%) percent complete and the City has reduced its retainage to five (5%) percent, then following such notice the City shall thereafter retain ten (10%) percent from progress payments.

The City shall have the right to retain such funds until the City's damage claims are finally determined. The claim shall be "finally be determined" when a court of competent jurisdiction enters judgment on the merits of any claim made for damages by the City (unless City appeals that judgment, in which event, when the appeal is decided). In the event that City voluntarily waives his damage claim by written instrument signed on City's behalf, then such claim shall be "finally determined" at the time such waiver is effective. City covenants that it will commence an action for damages with respect to its damage claim as soon as practicable after it exercises its right for retaining such amounts for the causes set forth in this paragraph.

In the event such a claim is finally determined in favor of City, any amount of retainage for such claim shall be applied to satisfy the judgment. Any excess of retainage hereunder over the amount of such judgment, or in the event that a damage claim is finally determined in favor of Contractor or its associated person, the amount shall be promptly paid to Contractor, together with interest, at the applicable rate for post-judgment interest set forth in T.C.A. Sec. 47-14-121, provided that interest shall not be paid upon amounts which City could have otherwise properly retained under other provisions of this Contract.

Any claim, dispute, or other matter arising out of or relating to City's retention of payment for a damage claim under this section shall not be subject to arbitration. The City's failure to retain all or a portion of any payment due under this Contract pursuant to this section, even if grounds for such retention exists, shall not constitute a waiver of any of City's rights under this section.

- 8.6 Final Payment. Upon completion of the work and after final acceptance of the work by the City, the Engineer will be authorized to prepare a final estimate of the work performed by the Contractor under these Contract Documents and to prepare a final payment request. Preparation of the final estimate and final payment request will not be authorized until the affidavits, releases of liens, certificate of occupancy issued by City of Chattanooga Inspection Department and other statements and certifications required of the Contractor under these Contract Documents have been received by the City. The Contractor shall also file the Notice of Completion with the appropriate office at the Hamilton County Tennessee Courthouse. The Engineer will submit to the City the final estimate and the final payment request, together with a certification stating that the work is complete and in substantial

conformance with these Contract Documents. The entire balance found to be due the Contractor, including retained percentages, but except such sums as may be retained under any provisions of these Contract Documents, will be paid to the Contractor.

Final payment to the Contractor by the City shall not serve to release the Contractor or his sureties from their obligations or responsibilities under or in connection with these Contract Documents.

- 8.7 Acceptance of Final Payment as Release. The acceptance by the Contractor of final payment shall be and shall operate as a release to the City of all claims and all liability to the Contractor other than claims in stated amounts as may be specifically excepted by the Contractor for all things done or furnished in connection with the work under these Contract Documents and for every act and neglect of the City and others relating to or arising out of this work.
- 8.8 Contractor's Schedule of Values. If the Contract is based on a lump sum bid, or contains one or more lump sum items for which progress payments are desired, the Contractor shall prepare and submit to the Engineer a schedule of values covering each lump sum item. The schedule of values, showing the value of each kind of work, shall be acceptable to the Engineer before any progress payment estimate and progress payment request are prepared. Such items as bond premium, temporary construction facilities, and plant may be listed separately in the schedule of values, provided the costs can be substantiated.

The sum of the items listed in the schedule of values shall equal the contract lump sum price(s). Overhead and profit shall not be listed as separate item.

An unbalanced schedule of values providing for overpayment of the Contractor on items of work which would be performed first will not be accepted. The schedule of values shall be revised and resubmitted until acceptable to the Engineer.

- 8.9 Changes/Extra Work for Lump Sum Contracts. The basis for payment for alterations on additions or extra work or decrease in scope of work shall be based on the Schedule of Values provided by the Contractor under para. 8.8 (above) or may be based upon the latest publication "Bid Data on Current Municipal Works." The maximum payment shall not be greater than an average of Contractor's Schedule of Values and the publication's average of the lowest bids.

SECTION 9. MISCELLANEOUS SPECIAL PROVISIONS

- 9.1 Use of Work by City. Prior to substantial completion, the City may use any completed or substantially completed portions of the work, provided that such use will not substantially affect the Contractor's rights and obligations under the contract. It is understood and agreed that said use shall not constitute an acceptance of any such portions of the work.

The City, or another Contractor under contract to the City, shall have the right to enter the premises for the purpose of doing work not covered by these Contract Documents. This provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the work, or the restoration of any damaged work except such as may be caused by agents, employees, or other contractors of the City.

- 9.2 Inspection by Public Agencies. Authorized representatives of the Environmental Protection Agency, Department of the Interior, Tennessee Department of Public Health, and other governmental agencies having jurisdiction over the work or any part thereof shall have access to the work and any records relevant to the prosecution and progress of the work. The Contractor shall provide proper facilities for such access and inspection.
- 9.3 Chemicals. All chemicals used during project construction, or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with the manufacturer's or Engineer's instructions.
- 9.4 Siltation and Bank Erosion. The Contractor shall take necessary steps to minimize siltation and soil erosion during construction to the satisfaction of the Engineer.
- 9.5 Contractor Licensing Act. The "Contractor Licensing Act of 1976," as amended, T.C.A. Sec. 62-6-101, et seq, in its entirety is to be considered a part of these Contract Documents and incorporated herein as though specifically set forth. Copies of this Act can be obtained from the Contractor's Licensing Board, Nashville, Tennessee. Among other provisions, this Act requires that any contractor undertaking to construct, erect, alter, or repair any structure or municipal work, including sewerage and drainage systems, highways, roads, bridges, and similar structures or projects where the cost of the completed work will be equal to or in excess of Fifty Thousand (\$50,000.00) Dollars shall be licensed as required by the Act. Subcontracts involving Fifty Thousand (\$50,000.00) Dollars or more of electrical work, plumbing work, masonry work, or heating, ventilating or air conditioning work must be done by licensed contractors. The Contractor is required to be a licensed general contractor, and where required by the Act, subcontractors must be licensed.
- 9.6 Hindrances and Delays. The Contractor expressly agrees that the construction period named in these Contract Documents includes allowance for all hindrances and delays incident to the work. It is understood and agreed that no claim shall be made by the Contractor for hindrances or delays from any cause during the progress of the work, except as provided otherwise under the terms of these Contract Documents.
- 9.7 Losses from Natural Causes. It is understood and agreed that all loss or damage arising out of the nature of the work, or from the action of the elements, or from floods or overflows, or from ground water, or from seepage, or from any unusual obstruction or difficulty, or from any other natural or existing circumstance either known or unforeseen, which may be encountered in the prosecution of the work, shall be sustained and borne by the Contractor at his own cost and expense.
- 9.8 New Job Opportunities. The Contractor shall, to the maximum extent practicable, follow hiring and employment practices that will insure the availability of new job opportunities for unemployed and underemployed persons. The Contractor shall insert, or cause to be inserted, a similar provision in each contract with Subcontractors or Suppliers.

END OF DOCUMENT

00830-43

EQUAL EMPLOYMENT OPPORTUNITIES SPECIFICATIONS

Following is the standard language which must be incorporated into all solicitations for offers and bids on all construction contracts or subcontracts in excess of \$10,000 to be performed in designated geographical areas:

"Minority" includes:

- a. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
- b. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
- c. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
- d. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

END OF DOCUMENT

EQUAL EMPLOYMENT OPPORTUNITY CLAUSE

The City of Chattanooga is an equal opportunity employer and during the performance of this contract, the Contractor agrees to abide by the equal opportunity goals of the City of Chattanooga as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
3. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. In all construction contracts or subcontracts in excess of \$10,000 to be performed for the City of Chattanooga, any Contractor and/or subcontractor is further required to file in duplicate within ten (10) days of being notified that it is the lowest responsible bidder, an affirmative action plan with the EEO Director of the City of Chattanooga. This plan shall state the Contractor's goals for minority and women utilization as a percentage of the work force on this project.
5. This Plan or any attachments thereto shall further provide a list of employees annotated by job function, race and sex who are expected to be utilized on this project. This plan or attachment thereto shall further describe the methods by which the Contractor or subcontractor will utilize to make good faith efforts at providing employment opportunities for minorities and women.
6. The Contractor will include the portion of the sentence immediately preceding Paragraph 1 and the provisions of Paragraphs 1 through 6 in every subcontract so that such provisions will be requested of each subcontractor. The Contractor agrees to notify the City of Chattanooga of any subcontractor who refuses or fails to comply with these equal opportunity provisions. Any failure or refusal to comply with these provisions by the Contractor and/or subcontractor shall be a breach of this contract.

END OF DOCUMENT

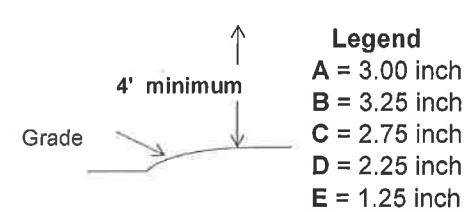
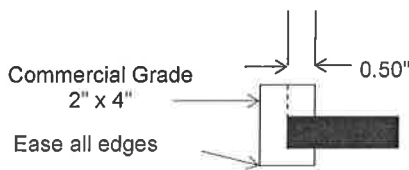
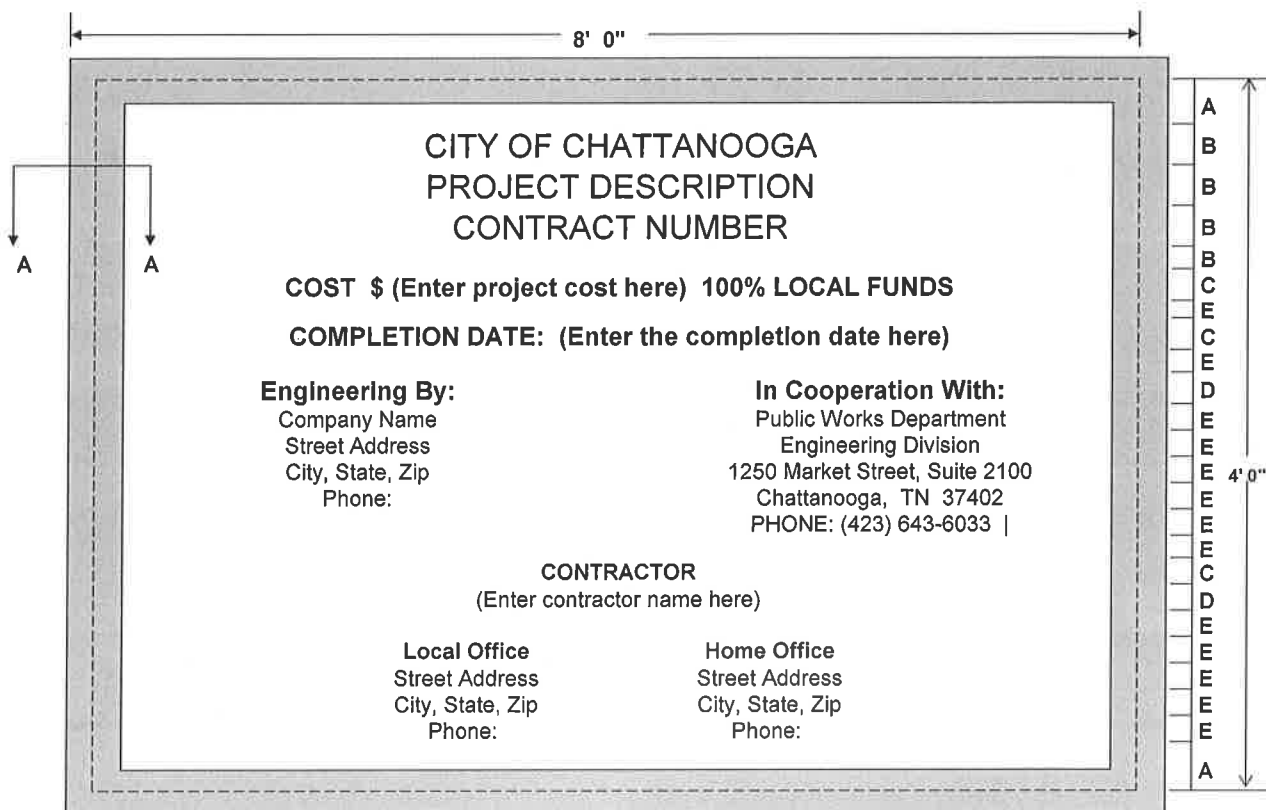
00832-1

SECTION 00835

PROJECT SIGN

The Contractor shall erect two signs identifying the construction project at locations to be designated by the Engineer. The sign shall be substantially in accordance with the drawing on page 00835-1 and shall be made of oil base paint on 3/4-inch exterior plywood and maintained in good conditions until completion of the work defined under these Contract Documents. The Contractor shall submit a layout of the sign for approval by the Engineer.

No separate payment will be made for the signs. Payment shall be included in the unit or lump sum prices bid for other sections of work.



- Notes:**
1. Sign to be 3/4 inch thick exterior grade plywood.
 2. Provide adequate supports to keep sign above prevailing grade to permit public viewing.
 3. Edge, trim, and letters shall be dark blue; background shall be white.

PROGRESS PAYMENT REQUEST

PAY ESTIMATE NUMBER: _____

PERIOD: FROM _____ **TO** _____

CONTRACT NUMBER: _____

P.O. NUMBER: _____

PROJECT NAME: _____ **RESOLUTION NUMBER:** _____

SUBMITTED BY:

According to the best of our knowledge and belief, we certify that all items and amounts shown on the face of this periodic estimate for partial payment are correct, that all work has been performed and/or materials supplied in full accordance with the requirements of the referenced contract, and/or duly authorized deviations, substitutions, alterations, and/or additions that the foregoing is a true and correct statement of the contract account up to and including the last day of the period covered by this periodic estimate and that no part of the Balance Due in this payment has been received.

As per contract specification requirements we understand and agree that the approval of this progress payment shall not be construed as acceptance of any work, material, or products and shall not relieve us in any way from our responsibilities and obligations under this contract, including but not limited to, a final reconciliation of quantities and related costs.

TOTAL INVOICE AMOUNT _____

RETAINAGE WITHOLDING _____

NET AMOUNT DUE _____

SIGNED BY _____

SIGNATURE _____

DATE: _____

TITLE _____

APPROVALS

I certify that the above process payment request appears to be accurate and is in general compliance with the amount of work completed during progress payment period.

REVIEWED BY	_____	_____	_____
	(Print Name)	(Print Name)	(Print Name)
SIGNATURE & DATE	_____	_____	_____
	Inspector	Project Coordinator / Project Manager	Engineering Manager
TITLE			

APPROVED FOR PAYMENT

BY: _____

DATE: _____

DEPARTMENTAL AUTHORIZATION

General Conditions

SECTION 01010
SUMMARY OF WORK

PART 1 – GENERAL

1.1 Section Includes

- A. Description of Work
- B. Items regulating the execution of the Work

1.2 Description of the Work

- A. The work covered by this Contract consists of :

The scope of work shall consist of the following operations, including but not limited to: installation of appropriate erosion controls in accordance with approved SWPPP and erosion control plans; demolition of selected portions of asphalt pavement, concrete curbs, fences, drainage pipes and structures, and other structures and obstructions on site and within the area denoted for demolition; disconnection, capping, plugging, removal, and abandonment of utility lines connected to the existing old Avondale YFD Center; abatement of asbestos and lead paint in the existing old Avondale YFD Center; demolition and filling of basement and demolition and disposal of the existing old Avondale YFD Center; protection of the demolition work areas; coordination of activities with YFD staff and other contractors on site to maintain access to the driveway and the new YFD Center, and to avoid interference with center operations or ongoing construction activities.

- B. The City Engineer reserves the right to substitute, add, delete, increase, decrease in any form or fashion as necessary the scope of work under the provisions of this Contract, including the projects noted above.
- C. This project shall be assigned a unique project number by the Engineer. The Contractor shall execute this project in complete compliance with the requirements of this contract. All records of the Contractor shall conspicuously identify them to be associated with the unique project number assigned by the Engineer.
- D. The work covered under this project shall consist of furnishing all materials, equipment and labor for the full depth reclamation of designated streets including but not limited to mobilization, parking sign placement, public notification, placement of traffic control devices per MUTCD, cleaning and conditioning of the roadways, repair of base failures as needed, the adjustment of sanitary manholes and other publicly owned structures as required, milling as directed, cement and water addition, grading, compaction, saw cutting and installation of traffic signal loop wires where required and placement of temporary and permanent pavement markings as required.

- E. The Engineer shall provide a set of standard City details, as needed, which shall be applicable to this project. The Contractor shall be called in for a Pre-Construction meeting at which time the Engineer shall issue notice to proceed. The Contractor shall have ten (10) days or an agreed to start date to start construction.

1.3 Items regulating the Execution of the Work.

- A. Attention to Work

For this project, the Contractor shall give his personal attention to and shall supervise the work to the end that it shall be prosecuted faithfully; and, when he is not personally present on the work, he shall at all times be represented by a competent superintendent or foreman who shall be present at the work and who shall receive and obey all instruction or orders given under this Contract, and who shall have full authority to execute the same, and to supply materials, tools and labor without delay, and who shall be the legal representative of the Contractor. The Contractor shall be liable for the faithful observance of any instructions delivered to him or to his authorized representatives.

- B. Access to Work

The Contractor shall at all times provide proper facilities for access and inspection of the work by representatives of the Owner and of such official Governmental agencies as may be designated by the Owner as having jurisdictional rights to inspect the work.

- C. No Parking Signs

The Contractor shall place "NO PARKING" signs 48 hours prior to beginning work at a project location. The Contractor shall notify the City's designated Inspector/ Project Manager when the signs have been placed and if vehicles have not been moved at such time as work is scheduled to begin. No additional cost shall be paid to the Contractor while the Owner is making arrangements to get the vehicle moved or towed.

- D. Work on State Highway

Where the work on this project encroaches upon the right-of-way of any State or Interstate Highway right-of-way, the owner will execute a contract with proper authorities for the proposed work.

The Contractor shall notify the proper authorities prior to entering upon such right-of-way and shall be responsible for all damage and for satisfying the requirements of these authorities.

- E. Work on Private Property

Where the work on this project encroaches upon private property, the Owner shall provide easements and/or right-of-entry in or onto said property. Work performed in such easements is subject to the provisions of the easement agreement on file with the City of Chattanooga Engineering Department.

The Contractor shall be responsible for obtaining any additional agreements which may be deemed necessary for the storage of equipment or materials outside

of public easements or rights of ways for this project. The Contractor shall obtain a written agreement between the Contractor and Land Owner and forward it to the Engineer prior to use of said property.

The Contractor shall be responsible for the preservation of and shall use every precaution to prevent damage to all trees, shrubbery, fences, culverts, mailboxes, bridges, pavements, driveways, sidewalks, houses or building and all water, sewer, gas, telephone and electric lines thereto and all other private and public property along or adjacent to the work.

Any damage that occurs will be restored to a like condition as existed prior to construction, in the Contract Documents, unless otherwise indicated or specified.

Forty-eight (48) hours prior to construction on any easement or streets the Contractor shall notify in writing the affected property owners in the area. This notification shall include the Contractor's name and the name and phone number of the contact person.

F. Monthly Job Site Meetings

Once a month, on a date mutually agreed upon by the Contractor and the Engineer, a job site meeting shall be held for review of the Project, including, but not limited to: The construction schedule, traffic control, pending submittals, and any other issues that may arise. This meeting shall be used to review the contractor's monthly applications for payment.

G. Contract Working Hours

All work shall be performed during regular working hours unless mutually agreed upon and approved in writing by the City Engineer. The Contractor will not permit overtime work or the performance of work on Sunday or any legal holiday without the Owner's written consent given after prior 24 hour written notice to the Engineer. Saturday work shall also require prior 24 hour written notice. Regular working hours are Monday through Saturday from 7:00 A.M. to 8:00 P.M. The actual costs of the Owner's and Engineer's inspection of the work performed outside of regular working hours will be billed to the Contractor and deducted from the Contractor's application for payment as they occur.

END OF DOCUMENT

SECTION 01025
UNIT PRICES

1.01 UNIT PRICES: Contractor shall include among the other Work in the Lump Sum Base Bid Assigned Unit Prices which are described on the Bid Schedule and in Section 02200, Earthwork.

- A. Unit Prices are a price per unit of measurement for complete work based on the units listed in each Unit Price description.
- B. Each Unit Price includes all labor, material, overhead, profit, all applicable taxes, waste and all other incidentals for all Contractors and Subcontractors involved in the Unit Price Work.
- C. The Owner reserves the right to reject the Contractors measurements of work-in-place that involves use of established Unit Prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

END OF DOCUMENT

SECTION 01035

WEATHER DELAYS

1. GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Standards set for weather delays.
- B. Procedures for claim submittals.

1.2 EXTENSIONS OF CONTRACT TIME

- A. If the basis exists for an extension of time in accordance with Paragraph 12.3 of the General Conditions, then an extension of time on the basis of weather may be granted only for the number of weather delay days in excess of the number of weather days listed as the Standard Baseline for that month.

1.3 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

- A. The Engineer has reviewed weather data available from the National Oceanic and Atmospheric Administration and determined a Standard Baseline of average climatic range for the State of Tennessee.
- B. The Standard Baseline shall be regarded as the normal and anticipated number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is to be included in the work and not eligible for an extension of the contract time.
- C. The Standard Baseline is as follows:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
10	10	10	10	11	8	11	7	9	8	9	12

1.4 ADVERSE WEATHER AND WEATHER DELAY DAYS

- A. Adverse weather is defined as the occurrence of one or more of the following conditions which prevents only exterior construction activity or access to the site within a 24 hour period:
 - I. Precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure.

2. Temperatures which do not rise above 32 degrees F by 10:00 AM.
 3. Standing snow in excess of one inch (1.00").
- B. Adverse weather may include, if appropriate, "dry-out" or "mud" days when all of the following conditions are met:
1. For rain above the Standard Baseline.
 2. Only if there is a hindrance to site access or site work, such as excavation, backfill, and footings.
 3. At a rate no greater than 1 make-up day for each day or consecutive days of rain beyond the Standard Baseline that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the Engineer.
- C. A weather delay day may be counted only if adverse weather prevents work on the project for 50 percent or more of the Contractor's scheduled work day, including a weekend day or holiday if the Contractor has scheduled construction activity that day.

1.5 DOCUMENTATION AND SUBMITTALS

- A. Submit Daily Jobsite Work Log showing which and to what extent construction activities have been affected by weather on a monthly basis.
- B. Submit actual weather data to support a claim for the time extension obtained from nearest NOAA weather station or other independently verified source approved by the Engineer at the beginning of the project.
- C. Maintain a rain gauge, thermometer, and clock at the jobsite. Keep daily records of precipitation, temperature, and the time of each occurrence throughout the project.
- D. Use the Standard Baseline data provided in this section when documenting actual delays due to weather in excess of the average.
- E. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and submit in accordance with the procedures for claims established in Paragraphs 7.14 of the General Provisions, Section 00830.
- F. No extra cost will be incurred by the Owner for any extra time increase to the contract.

2. PRODUCTS
NOT USED

3. EXECUTION
NOT USED

END OF SECTION

SECTION 01080
APPLICABLE CODES AND STANDARDS

1.01 GENERAL

A. All materials, equipment, fabrication, and installation practices shall comply with the following applicable codes and standards, except in those cases where the Contractor's quality standards establish more stringent quality requirements, as determined by the Engineer.

1. Pressure Piping and Tubing
ANSI (American National Standards Institute)
API (American Petroleum Institute)
ASME (American Society of Mechanical Engineers)
AWWA (American Water Works Association)
NSF (National Sanitation Foundation)
2. Materials
AASHTO (American Association of State Highway and
Transportation Officials)
ANSI (American National Standards Institute)
ASTM (American Society for Testing and Materials)
3. Painting and Surface Preparation
NACE (National Association of Corrosion Engineers)
SSPC (Steel Structures Painting Council)
4. Gear Reducers and Bearings
AFBMA (Anti-Friction Bearing Manufacturers Association)
AGMA (American Gear Manufacturers Association)
5. Ventilating Fans
AMCA (Air Moving and Conditioning Association)
PFMA (Power Fan Manufacturer Association)
6. Electrical and Instrumentation
EIA (Electronic Industries Association)
IEEE (Institute of Electronic Electrical Engineers)
IPC (Institute of Printed Circuits)
IPCEA (Insulated Power Cable Engineers Association)
ISA (Instrument Society of America)
NEMA (National Electrical Manufacturers Association)
NFPA (National Fire Protection Association)
UL (Underwriter's Laboratories)
7. Aluminum Structures
AA (Aluminum Association)
AAMA (Architectural Aluminum Manufacturer's Association)
8. Steel Structures

AISC (American Institute of Steel Construction)

9. Concrete Structures
ACI (American Concrete Institute)
10. Welding
ASME (American Society of Mechanical Engineers)
AWS (American Welding Society)
11. Safety
OSHA (Occupational Safety and Health Administration)
MUTCD (Manual on Uniform Traffic Control Devices)
12. General Building Construction
FM (Factory Mutual Fire Insurance Company)
NFPA (National Fire Protection Association)
SBC (Southern Building Code)
13. Subgrades and Pavement
SSRBC (Standard Specifications for Road and Bridge
Construction, Tennessee Department of Transportation)
14. Ductwork and Sheet Metal Work
SMACNA (Sheet Metal and Air Conditioning Contractors
National Association)
15. Plumbing
AGA (American Gas Association)
NSF (National Sanitation Foundation)
PDI (Plumbing Drainage Institute)
SPC (SBCC Standard Plumbing Code)
16. Refrigerating, Heating, and Air Conditioning
ARI (American Refrigeration Institute)
ASHRAE (American Society of Heating, Refrigeration, and
Air Conditioning Engineers)
17. Pressure Vessels
ASME (American Society of Mechanical ENGINEERS)

In addition, all work shall comply with the applicable requirements of local codes, utilities, and other authorities having jurisdiction.

- B. All material and equipment, for which a UL Standard, an AGA approval, or an ASME requirement is established, shall be so approved and labeled or stamped. Label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.

END OF DOCUMENT

01080-2

SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SCOPE

This section describes the methods by which measurement will be made of the quantities for which payment will be made for the project. It is the intention of this Specification that payment will be made for those items listed in the Bid Schedule only. All items of work not specifically listed in the Bid Schedule shall be included in the prices for the various items listed on the bid schedule.

PART 2 - PRODUCTS

2.01 MEASUREMENT AND PAYMENT

Partial payment shall be made for approved materials stored at the project site at the presentation of material invoices in the proper manner.

PART 3 - EXECUTION

3.01 OTHER SECTIONS

- Section 01080 Applicable Codes and Standards
- Section 01090 Abbreviations
- Section 01150 Measurement and Payment
- Section 01220 Progress Meetings
- Section 01300 Submittals
- Section 01620 Transportation and Handling
- Section 01630 Storage and Protection
- Section 01700 Cleaning
- Section 01720 Project Record Documents
- Section 01730 Guarantees and Warranties
- Section 02751 Preparatory Cleaning of Sewers
- Section 02753 Sewer Flow Control
- Section 03110 Concrete Formwork

3.02 SECTION 02120, VIDEO TAPING

Payment for furnishing all labor, material, equipment, and services required for the video taping of easement areas prior to construction with one set of tape(s) presented to the Owner shall be made at the lump sum price bid in the Bid Schedule.

3.03 SECTION 02220, EARTHWORK

A. Measurement and Payment

1. Excavation

- a. No separate measurement or payment will be made for trench earth excavation for sewers and other pipelines, nor for any other appurtenant facilities such as manholes, inlets, outlets, headwalls, collars, saddles, piers, and pipe protection or encasement. Payment for all such excavation shall be included in the unit prices bid per linear foot of the various sizes of pipe laid for the respective trench depths as provided for in the contract Bid Schedule. Trench depths shall be the vertical distance between the ground surface and the invert elevation of the pipe. Where special bedding or cradles are shown on the Drawings or required by the Engineer, no allowances shall be made for extending earth excavation in trenches to the bottom of such bedding or cradles; such costs shall be included in the unit price bid per cubic yard of bedding material or cradle.
- b. The removing of all pavements, pavement foundations, sidewalks, driveways, etc., will be included in the trench excavation for which payment will be made as provided for in Paragraph a. above. No separate payment will be made for these items.
- c. No separate payment shall be made for pumping, bailing, draining, clearing, grubbing, backfilling, borrow excavation, removing vegetable growth, debris, buildings, or waste material nor for the disposal of any materials or similar work. Where sewers or structures are located in, near, or across streambeds or drainage ditches, no separate payment shall be made for diverting the stream flow or drainage and dewatering each section as the work progresses.

2. Sheet piling and Shoring

No measurement or payment will be made for sheet piling and shoring left in place in trenches in accordance with these Specifications.

3. Crushed Rock Backfill Under Pavement

Crushed rock backfill as required by these Specifications and/or shown on the Drawings shall be expressed in linear feet of crushed rock backfill at the applicable depth for each size and type of pipe as shown in the Bid Schedule and shall be measured linearly along the centerline of the trench at the surface level for sewer mains and service lines placed in or across existing paved streets, driveways and parking areas. No separate payment will be made for (48) inches of crushed rock backfill.

4. Crushed Rock Bedding Material

Crushed rock bedding material as required by these Specification and/or shown on the Drawings shall be measured by the cubic yard of bedding required in excess of Class C bedding. Payment for crushed stone or gravel placed as required by the Drawings or Specifications or as directed by the Engineer shall be made for the quantities determined in the manner specified above at the unit price bid per cubic yard of crushed rock bedding material in the Bid Schedule and shall include the cost of removing all subgrade materials regardless of classification to the required or specified bottom of the crushed stone bedding.

5. Rock Excavation

No separate measurement or payment will be made for trench rock excavation for sewers and other pipelines, nor for any other appurtenant facilities such as manholes, inlets, outlets, headwalls, collars, saddles, piers, and pipe protection or encasement. Payment for all such excavation shall be included in the unit prices bid per linear foot of the various sizes of pipe laid for the respective trench depths as provided for in the Bid Schedule for this contract. Where special bedding or cradles are shown on the Drawings or required by the Engineer, no allowance shall be made for extending rock excavation in trenches to the bottom of such bedding or cradle.

3.04 SECTION 02242, CLAY OR FLOWABLE MORTAR FILL FOR CUTOFF WALLS

Clay or flowable mortar fill cutoff material as required by these Specifications and/or shown on the Drawings shall be measured by the cubic yard required. Payment for cutoffs placed as required by the Drawings or Specifications or as directed by the Engineer shall be made for the quantities determined in the manner specified above at the unit price bid per cubic yard of cutoff material in the Bid Schedule and shall include the cost of removing all subgrade materials regardless of classification to the required or specified bottom of the bedding.

3.05 SECTION 02270, SLOPE PROTECTION AND EROSION CONTROL

A. Measurement and Payment

1. Measurement and payment for temporary silt fence, baled straw checks, and temporary sediment basins shall be for the materials labor, equipment, etc., for the complete installation of these items included in the unit price bid in the Bid Schedule.
2. No separate payment shall be made for incidental or unlisted erosion control measures nor for cleaning and/or replacement of any measures which become loosened, torn, undermined, or washed out. The cost of this work is to be included in the unit price bid for items under Section 02270.

3.06 SECTION 02485, SEEDING AND MULCHING

A. Measurement and Payment

1. No separate payment will be allowed for seeding and mulching. The payment for all materials, labor, equipment, etc., necessary for the completion of work under this section shall be included in the unit or lump sum prices bid for other items of work.

3.07 SECTION 02560, MANHOLES

A. Measurement and Payment

1. The quantities of standard manholes as shown on the Drawings for which payment shall be allowed shall be the actual number of each type, size, and applicable depth of manhole, 6 feet deep or less, installed by the Contractor and accepted by the Engineer.
2. The depth of standard manholes will be measured from the top of the manhole frame to the invert of the sewer leaving the manhole. The depth of special manholes constructed on top of concrete junction chambers, precast concrete tee manhole bases or curved manhole bases, cast in place, will be measured from the top of the manhole frame to the top of the concrete of the junction chamber, precast concrete tee base or curved manhole base, cast in place.
3. For manholes more than 6 feet in depth, payment will be allowed for extra depth per vertical foot for each foot thereof over 6 feet at the applicable unit price provided for in the Bid Schedule. Fractions of a foot of extra depth shall be accumulated until one extra foot has been constructed and then considered for payment.
4. Payment for precast concrete tee manhole bases shall be the actual number of each size furnished and installed by the Contractor and accepted by the Engineer.
5. Junction Chamber - Payment for furnishing all materials, labor, etc., including unclassified excavation, concrete, reinforcing steel, toe pockets, maintenance of existing sewage flow, required adjustment of existing sewers, topsoil, and seeding, all required to complete the junction chamber as shown on the Drawings and in the applicable Specifications shall be included in the applicable lump sum price bid for junction chambers listed in the Bid Schedule. Payment for pipe sewer will not be allowed through the junction chamber.
6. All other items such as pavement replacement, plugged stubs, etc., shall be paid for under their respective items in the Bid Schedule as elsewhere provided herein.
7. Payment for all manholes as constructed under these Specifications shall be made for the quantities determined in the manner specified above as listed under the applicable pay items in the Bid Schedule. These amounts, so paid, shall constitute full compensation to the Contractor under this item and shall cover the cost of furnishing all labor, materials, tools, plant, equipment, services, and other expenses in connection with the construction of manholes, complete in place, including unclassified excavation, backfill, masonry, all castings, concrete, reinforcing steel, inspection, and test, all as herein specified.

8. Payment for connections to existing manholes by boring and booting shall be made for the actual number furnished and installed regardless of size and accepted by the Engineer.
9. All drop manholes shall be measured and paid for as specified for standard manholes and, in addition, extra payment will be allowed at applicable contract unit price for each drop connection, including excavation, pipe specials, riser pipe, and concrete encasement as provided for in the Bid Schedule.
10. Payment for manhole adjusting rings furnished for future paving shall be made of the actual number furnished by the Contractor and accepted by the Engineer.
11. Payment for curved manhole bases, cast-in-place, shall be made at the applicable bid price for Class A concrete and reinforcing steel shown in the Bid Schedule. Measurements shall be made in accordance with the applicable provisions of these Specifications. No separate payment shall be made for excavation, backfill, or castings required to complete the work.
12. No separate payment will be allowed for manhole vacuum testing. Costs of performing this work shall be included in the unit price bid for manholes.

3.08 SECTION 02607, NEW AND REPLACEMENT PAVING AND SIDEWALKS

A. Measurement

1. Paving

- a. The quantities of the various types of paving for which payment will be made shall be expressed in linear feet of street occupied by the main sewer and shall be measured along the centerline of the street from the point of entry to the exit point or by the contract price per ton as shown in the bid schedule. When the paving is to be replaced for trench width only, separate payment will be made for replacing paving over service lines extending from the edge of the main sewer line paving to the edge of pavement. If the street is to be repaved full street width, the Contractor shall satisfy himself as to the average width of the street. Payment will be allowed only one way through street intersections when full width of street is paved. No separate payment will be made for raising manholes to finished grade of pavement using brick and/or precast concrete rings.
- b. In streets having Type 1 cement concrete paving, and Type 5, Double Bituminous surface treatment, the quantity of paving shall be expressed as linear feet of sewer line trench as measured along the centerline of the main sewer lines and service lateral lines.
- c. The quantity of paving replacement in asphalt drives and parking lots for which payment will be allowed shall be measured by the ton, accepted, and placed as indicated by the Engineer.

2. The quantity of sidewalks for which payment will be made shall be expressed in square feet and shall be obtained from surface measurements.
3. The quantity of asphaltic concrete curbs for which payment will be made shall be expressed in linear feet of asphaltic concrete curb.
4. The quantity of Portland cement concrete curbs for which payment will be made shall be expressed in cubic yards of Class A Concrete, as specified under Section 03310, "Cast-In-Place Concrete," of these Specifications.
5. The quantities of Portland cement concrete paving in driveways for which payment will be made shall be expressed in square feet and shall be determined from surface measurements.

B. Payment

1. Payment for each type of pavement, sidewalk, asphalt curb, and crushed stone backfill furnished and installed under these Specifications shall be made for the quantities determined in the manner specified above at the applicable contract unit prices stated in the Bid Schedule. This amount, so paid, shall be compensation in full for furnishing all labor, materials, tools, plant equipment, services and other work in connection with or incidental to the construction of the roadway pavement.
2. When full width paving is required, no separate payment shall be allowed for extending paving into existing paved driveways in order to provide a smooth transition from the full width paved street to the existing driveway grade. The work shall be completed to the satisfaction of the Engineer with no separate payment being allowed.
3. No separate payment will be allowed for replacing or repairing unpaved, crushed stone, gravel or chert street surfaces, driveways or parking areas as specified in this section.
4. Payment for concrete curbs installed under these Specifications shall be made at the applicable unit price per cubic yard of concrete under Section 03310 of these Specifications.
5. No separate payment will be made for street cleanup, maintenance, preparation for paving, or raising manholes to finished grade of final pavement. The cost of this work is to be included in the unit price bid for crushed rock backfill in the base bid.

3.09 SECTION 03240, CAST-IN-PLACE CONCRETE REINFORCEMENT

A. Measurement and Payment

1. Except for reinforcing steel specified to be included in structures or facilities paid for per lump sum or per structure as set forth in the Bid Schedule, payment for reinforcing steel placed in connection with the work shall be made at the unit price per pound of reinforcing steel placed in accordance with the Drawings or as directed by the Engineer as bid in the Bid Schedule.

2. Determination of quantities will be made by the Engineer and shall be expressed in pounds of calculated weights as determined from Standard Handbook Bar Listings. No allowance shall be made for weight of clips, ties, spacers, or other fastening devices.

3.10 SECTION 03310, CAST-IN-PLACE CONCRETE

A. Measurement

1. The volumes of each class of concrete for which payment will be allowed shall be expressed in cubic yards as computed from the dimensions of the neat lines shown on the Drawings. Where concrete masonry for which specific dimensions are not given on the Drawings has been placed under the direction of the Engineer, the volume shall be determined by the Engineer from field measurements.
2. The volumes allowed for payment shall include only the items of concrete placed in accordance with these Specifications and accepted by the Engineer. No deductions will be made for pipe or conduit runs three inches or under or for individual cavities or embedded pieces less than one cubic foot each or for reinforcement.

B. Payment

Except for sidewalks, paving, and concrete for manholes, railroad and highway crossings, etc., payment for which is provided elsewhere for these items of work, payment for Class A and Class B concrete shall be made for the quantities placed at the unit prices bid per cubic yard under Section 03310 in the Bid Schedule. These amounts, so paid, shall cover the cost of furnishing all labor, materials, equipment, tools, plant services, and other expenses in connection with or incidental to the concrete work.

3.11 SECTION 02752, TELEVISION INSPECTION OF SEWERS

A. Measurement

The quantities of Television Inspection of PVC pipe sewers for which payment will be made shall be expressed in linear feet of pipe of various sizes as shown in the bid schedule and shall be the horizontal length of pipe inspected by closed circuit television viewed by pulling a Radial View Television camera through the pipe and measured along the centerline of the sewer with no deductions made for manholes.

B. Payment

Payment for Television inspection of PVC pipe by pulling a closed circuit television camera through each section shall be made for the quantities determined in A above at the contract price per linear feet as listed in the Bid Schedule. Payment will be made for testing a pipe one time only. Cost for any repeat testing of the same pipe is to be included in the price submitted in the Bid Schedule.

3.12 SECTION 15062, DUCTILE IRON PIPING AND DUCTILE AND CAST IRON FITTINGS

A. Measurement

1. The quantities of ductile iron pipe sewers, except those installed in casing pipes for railroad or highway crossings, including unclassified excavation, for which payment will be made under this item shall be expressed in linear feet for each size and type of pipe and applicable depth as shown in the Bid Schedule and shall be the horizontal length of ductile iron sewer installed complete in place as measured along the centerline of the sewer with no deductions made for tee connections or manholes. The applicable vertical depth shall be measured from the original ground surface to the invert of the sewer and shall be as shown in the Bid Schedule.
2. The quantities of ductile iron pipe sewers installed in casing pipes for railroad or highway crossing for which payment will be made under this item shall be expressed in linear feet for each size and type of pipe as shown in the Bid Schedule and shall be the horizontal length of ductile iron sewer installed complete in place as measured along the centerline of the sewer with no deductions made for manholes.
3. The weight of cast iron or ductile iron fittings for which payment will be made under this section shall be the number of pounds of fittings furnished and placed, jointed and tested, in accordance with these Specifications. The total weight of all fittings shall be the catalog weights as published for each type furnished and placed. No payment will be allowed for weights of jointing compound, bolts, nuts, washers or gaskets which shall be considered an incidental part of the fitting and included in the unit price bid per pound for fittings.

B. Payment

1. No separate payment shall be made for connections to existing sewers and to manholes or inlets. The cost of this work shall be included in the unit price bid for other items of work done under Section 15062 of the Bid Schedule.
2. No separate payment shall be made for furnishing and installing cast iron plugs. The cost of this item shall be included in the unit prices bid for other items of work done under Item 15062 of the Bid Schedule.
3. No separate payment shall be made for any borrow excavation, clearing, or backfill. The cost of these items shall be included in the unit prices bid for pipe sewers under Item 15062 and as provided for in the Bid Schedule.
4. Payment for ductile iron pipe sewers constructed under these Specifications shall be made for the quantities determined in the manner specified above at the contract price per linear foot or otherwise, as applicable, for each of the applicable pipe sizes and types listed under Section 15062 in the Bid Schedule.

5. Payment so made shall constitute full compensation to the Contractor for the material, common excavation, rock excavation, Class C bedding, backfill, installation, including all labor, materials, tools, equipment, testing, and services necessary to complete the work as specified herein.

3.13 SECTION 15064-B, POLYVINYL CHLORIDE SEWER AND SERVICE PIPE

A. Measurement

1. The quantities of pipe sewers and service lines, including unclassified excavation, for which payment will be allowed shall be expressed in linear feet for each size and type of pipe and applicable depth as shown in the Bid Schedule and shall be the horizontal length of sewer installed complete in place as measured along the centerline of the sewer with no deductions made for tee connections or manholes. The applicable vertical depth shall be measured from the original ground surface to the invert of the sewer and shall be as shown in the Bid Schedule and plugged stubs and Fernco Couplings for which payment will be allowed shall be the actual number of each size and type furnished and installed by the Contractor.
2. Reinforcing steel, rock excavation, concrete, pipe protection and/or encasement, crushed rock, gravel, or other approved bedding materials, and Class C bedding, leakage testing, and other sections of work not specifically listed in the Bid Schedule shall not be separately measured and paid for but costs for same shall be included in the unit price or lump sum price bid for other sections of work.
3. The quantities of connecting risers for which payment will be allowed shall be expressed in linear feet of pipe and bends and shall be the vertical length of riser installed in place as measured along the centerline of the riser from the centerline elevation of the sewer line to the top of the riser connection as shown on the Drawings. No separate payment will be made for bends, concrete or plastic film markers used in this construction, payment therefor being included in the linear feet of riser pipe paid for in this category.
4. The quantities of deflection testing of PVC pipe sewers for which payment will be made shall be expressed in linear feet of pipe regardless of size for all PVC pipe 8 inches or greater in diameter as shown in the Bid Schedule and shall be the horizontal length of pipe deflection tested by pulling a mandrel through it as measured along the centerline of the sewer with no deductions made for manholes.

B. Payment

1. Payment for pipe sewers, service lines, tees, risers, plugged stubs, and connections to existing sewers constructed under these specifications shall be made for the quantities determined in the manner specified above at the contract price per linear foot or per each, as applicable, for each of the applicable pipe and special sizes and types listed in the contract pay items in the Bid Schedule.

2. Payment for concrete and bedding material furnished and placed under this Specification shall be made for the quantities determined in the manner specified above at the contract price per cubic yard and as listed under the applicable items of the Bid Schedule as specified.
3. No separate payment shall be made for furnishing and installing stoppers. The cost of this item shall be included in the unit prices bid for other items of work done in the Bid Schedule.
4. No separate payment shall be made for furnishing and installing adapters, bends, increasers and tees, plastic film markers, cleanouts, and other fittings and accessories in the building service lines. The cost of these shall be included in the unit prices bid for service lines in the Bid Schedule.
5. No separate payment shall be made for connections to existing sewers and to manholes, or inlets unless called for on the plans. The cost of this work shall be included in the unit price bid for other items of work.
6. No separate payment shall be made for any unclassified or borrow excavation, clearing, or backfill in connection with sewer line construction. The cost of these items shall be included in the unit price bid for pipe sewers.
7. No separate payment shall be allowed for pressure testing of PVC pipe. Costs for this shall be included in the unit price bid in the Bid Schedule for PVC pipe.
8. The quantities of tee connections and plugged stubs and Fernco Couplings for which payment will be allowed shall be the actual number of each size and type furnished and installed by the Contractor.
9. Reinforcing steel, rock excavation, concrete, pipe protection and/or encasement, crushed rock, gravel, or other approved bedding materials, and Class C bedding, leakage testing, and other sections of work not specifically listed in the Bid Schedule shall not be separately measured and paid for but costs for same shall be included in the unit price or lump sum price bid for other sections of work.
10. The quantities of connecting risers for which payment will be allowed shall be expressed in linear feet of pipe and bends and shall be the vertical length of riser installed in place as measured along the centerline of the riser from the centerline elevation of the sewer line to the top of the riser connection as shown on the Drawings. No separate payment will be made for bends, concrete or plastic film markers used in this construction, payment therefor being included in the linear feet of riser pipe paid for in this category.
11. The quantities of deflection testing of PVC pipe sewers for which payment will be made shall be expressed in linear feet of pipe regardless of size for all PVC pipe 8 inches or greater in diameter as shown in the Bid Schedule and shall be the horizontal length of pipe deflection tested by pulling a mandrel through it as measured along the centerline of the sewer with no deductions made for manholes.

END OF DOCUMENT

01150-10

SECTION 01200
PROJECT MEETINGS

PART 1 – GENERAL

1.1 SCOPE

- A. *This section specifies* administrative and procedural requirements for project meetings including but not limited to:
1. Pre-Construction Conference.
 2. Pre-Installation Conferences.
 3. Coordination Meetings.
 4. Progress Meetings
- B. *Construction schedules* are specified in another Division 1 section.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract and other Division 1 specification sections apply to this section.

1.3 PRE-CONSTRUCTION CONFERENCE

- A. *Attend and participate* in a pre-construction conference and organizational meeting at the project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. *Attendees.* The Owner, Engineer and their consultants, the contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. *Agenda.* Discuss items of significance that could affect progress including such topics as:
1. Tentative construction schedule.
 2. Critical work sequencing.
 3. Designation of responsible personnel.
 4. Procedures for processing field decisions and Change Orders.
 5. Procedures for processing Applications for Payment.
 6. Distribution of Contract Documents.
 7. Submittal of shop drawings, product data and samples.
 8. Preparation of record documents.
 9. Use of the premises.
 10. Office, work, and storage areas.
 11. Equipment deliveries and priorities.
 12. Safety procedures.
 13. First aid.

14. Security.
15. Housekeeping.
16. Working hours.

1.4 PRE-INSTALLATION CONFERENCES

- A. *Conduct* a pre-installation conference at the site before each construction activity that requires coordination with other construction. The installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Engineer of scheduled meeting dates.
 1. *Review the progress* of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Shop drawings, product data and quality control samples.
 - g. Possible conflicts.
 - h. Compatibility problems.
 - i. Time schedules.
 - j. Weather limitations.
 - k. Manufacturer's recommendations.
 - l. Compatibility of materials.
 - m. Acceptability of substrates.
 - n. Temporary facilities.
 - o. Space and access limitations.
 - p. Governing regulations.
 - q. Safety.
 - r. Inspection and testing requirements.
 - s. Required performance results.
 - t. Recording requirements.
 - u. Protection.
 2. *Record significant* discussions and agreements and disagreements at each conference, along with approved schedule. Distribute a record of the meeting to everyone concerned, promptly, including the Owner and Engineer.
 3. *Do not proceed* if the conference cannot be successfully conducted. Initiate whatever actions are necessary to resolve impediment performance of work and reconvene the conference at the next feasible date.

1.5 COORDINATION MEETINGS

- A. *Conduct project coordination meetings* at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings

held for other purposes, such as regular progress meetings and special pre-installation meetings.

- B. *Request representation* at each meeting party currently involved in coordination or planning for the construction activities involved.
- C. *Record meeting results* and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 PROGRESS MEETINGS

- A. *Conduct* progress meetings at the project site at regularly scheduled intervals but not less than monthly. Notify the Owner and Engineer of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
- B. *Attendees.* In addition to representative of the Owner and Engineer, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
- C. *Agenda.* Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the project.
 - 1. *Contractor's Construction Schedule:* Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the contract time.
 - 2. *Contractor's Submittal Schedule:* Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Submittal Schedule, whether on time or ahead or behind schedule. Determine how submittals behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the contract time.
 - 3. *Review* the present and future needs of each entity present, including such items as:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Deliveries
 - e. Off-site fabrication problems.
 - f. Access.
 - g. Site utilization.
 - h. Temporary facilities and services.
 - i. Hours of work.

- j. Hazards and risks.
- k. Housekeeping.
- l. Quality and work standards.
- m. Change Orders.
- n. Documentation of information for payment requests.

D. *Reporting.* No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

- 1. *Schedule Updating:* Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF DOCUMENT

SECTION 01220

PROGRESS MEETINGS

1.01 PROGRESS MEETINGS

- A. Hold regular and called meetings as progress of work dictates, but not less than monthly.
- B. Location of meetings shall be as indicated in the notice and satisfactory to the Engineer.
- C. Attendance
 - 1. Owner.
 - 2. Engineer.
 - 3. Other Contractors as pertinent to agenda.
 - 4. Subcontractors and/or suppliers as pertinent to agenda.
 - 5. Representatives of governmental or other regulatory agencies.
- D. Minimum Agenda
 - 1. Review work progress since last meeting.
 - 2. Note observations of work in progress, problems and decisions.
 - 3. Identify problems which impede planned progress.
 - 4. Review fabrication problems.
 - 5. Develop corrective measures and procedures to regain planned schedule.
 - 6. Revise construction schedule as indicated.
 - 7. Coordinate projected progress with other Contractors and Suppliers.
 - 8. Review submittal schedules and expedite as required to maintain schedule.
 - 9. Maintain quality and work standards.
 - 10. Complete other current business.
- E. The Contractor shall schedule and administer progress meetings and shall:
 - 1. Prepare agendas.

2. Distribute written notice and agendas of called meetings four days in advance of meeting date.
 3. Make physical arrangements for meetings.
 4. Preside at meetings.
 5. Record minutes, including significant proceedings and decisions.
 6. Furnish three copies of minutes to participants within four days after meetings.
 7. Distribute copies of minutes to participants within four days after meetings.
- F. The Engineer will attend meetings to ascertain that work is expedited consistent with construction schedule and with Contract Documents.
- G. The Contractor shall conduct progress meetings, as specified, during and until final acceptance of the work described under these Contract Documents.

END OF DOCUMENT

SECTION 01300

SUBMITTALS

1.01 EQUIPMENT DELIVERY AND CONSTRUCTION SCHEDULE

Not later than ten (10) consecutive calendar days after the issuance of the "Notice to Proceed," the Contractor shall submit to the ENGINEER for review a detailed schedule of major equipment delivery and installation and general construction operations, indicating the sequence of the work, the estimated dates of starting each task, and the estimated time of completion of each task. The schedule shall be broken down with respect to individual structures and facilities, indicating when existing structures or equipment would be taken out of service (if applicable). The form and content of the schedule shall be satisfactory to the ENGINEER.

1.02 SHOP DRAWINGS AND PRODUCT DATA

- A. The Contractor shall submit to the ENGINEER for review, for design concept, complete drawings and ENGINEERING data for all equipment, materials, and products to be incorporated into the work. Shop drawings and engineering data shall be provided and the ENGINEER'S review will be conducted in accordance with the requirements of the General Provisions. Shop drawings and/or engineering data, as appropriate, shall be submitted for the following items, including, but not limited to:
1. All piping, pipe fittings, pipe supports, hangers, couplings, and insulation including mill tests if requested by the ENGINEER.
 2. Miscellaneous iron castings and gratings, manhole frames and covers, curb inlets, manhole steps.
 3. All concrete and masonry accessories and steel reinforcement, including bending diagrams and bar schedules, ties, spreaders, chairs, inserts, form coatings, waterstops, curing and sealing compounds, and epoxy bonding agents.
 4. Premixed grouts and mortars.
 5. All paints and protective coatings.
 6. Grass seed, fertilizer, and commercial mulches.
 7. Precast concrete manholes, Sections, Frames and covers, steps, junction boxes, etc., inclusive of manhole boots and joint material, etc.
 8. Portland Cement Concrete design mix for Class A and Class B Concrete.
 9. Paving mix design inclusive of sieve analysis and bituminous content.

- B. Shop drawings and engineering data for equipment supplied as a pre-engineered or pre-assembled system shall include complete shop drawings and engineering data on each component of that system. In all cases, the information provided shall be sufficient to determine if the material or product conforms with the requirements of the specifications.
- C. Shop drawings and engineering data shall be prepared by the original equipment vendors or fabricators, as applicable. Purchased specifications by the Contractor or his Supplier shall not be acceptable as a substitute for actual vendor drawings and data.
- D. All shop drawings shall include a legend or other suitable means to identify all symbols and abbreviations used on the drawing. Where an accepted, industry-wide drafting symbol or standard has been established for a particular item, information depicted on the shop drawings shall conform to that standard.
- E. Shop drawings shall be dimensioned using the U.S. standard unit of measurement (feet and/or inches). Size of drawing shall not exceed 24 inches by 36 inches. All scaled drawings and details shall have the scale clearly noted on the drawing or detail. All information shall be clear and legible.
- F. Each shop drawing and each item of engineering data shall bear the Contractor's APPROVED stamp indicating that the Contractor has reviewed the drawing or data for conformance with the Contract Documents.
- G. All design calculations and drawings for foundation and footings, sheeting and shoring, and concrete formwork shall bear the signed and dated stamp of a licensed professional engineer.

1.03 MISCELLANEOUS SUBMITTALS

The Contractor shall submit to the ENGINEER miscellaneous information, procedures, test data, samples, etc., in the manner and at the time specified in these Specifications and Contract Documents. Miscellaneous submittals shall include, but not be limited to, the following:

1. Procedures for handling and disposing of sewage flows during construction.
2. Factory test data and results where specified for specific items of equipment.
3. Preliminary concrete mix design reports.
4. Satisfactory written evidence in the form of laboratory or mill test reports indicating that all cement, aggregate, masonry, structural steel, fencing, castings, steel reinforcement, conduit, pipe, grout, waterproof materials, grass seed and other items incorporated into the work are in compliance with the requirements of these Specifications.

5. Project record documents.
6. Copies of original invoices of all equipment delivered to the site.
7. When requested, analysis and design data on concrete formwork and sheeting and shoring.
8. Drawings and details of erosion and sediment control structures, if significantly different from Drawings approved by the Stormwater Division of the Department of Public Works.
9. Written evidence of equipment warranties.

1.04 SCHEDULE OF WORK

Contractor shall submit a SCHEDULE OF WORK in sequential order by dates in which he expects to perform the contract specifying the areas or locations in the order the work is anticipated beginning with work commencement date.

- A. "The Work" may include related sections or items (individually or grouped) such as, Clearing and Grubbing, Gradework (cut & fill), Storm Sewers, Relocation of Sanitary & Related Culvert Construction, Erosion Control, Base, Paving, etc., as examples.

1.05 SAMPLES

At the ENGINEER'S request, the Contractor shall furnish certified samples of materials utilized in the fabrications or production of equipment, materials and products supplied under these Contract Documents. Cost of all such samples shall be borne by the Contractor. The samples will be tested by a qualified, independent, testing laboratory selected by the OWNER to determine if the mechanical and chemical properties of the materials supplied are in accordance with the requirements of these Specifications and Contract Documents. The OWNER shall pay for the laboratory testing of material samples provided by the Contractor. The Contractor shall pay for all retests made necessary by the failure of materials to conform to the requirements of these Specifications and Contract Documents.

1.06 SCHEDULES, REPORTS AND RECORDS

- A. The Contractor shall submit to the Engineer such schedule of quantities and costs, progress schedules, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the Work to be performed.

- B. Prior to the first partial payment estimate, the Contractor shall submit construction schedules showing the order in which the Contractor proposes to carry on the Work, including dates, at which the various parts of the Work will be started, estimated date of completion of each part, and, as applicable:
1. The dates on which special detail drawings will be required. Submittal must allow sufficient time for review by the Engineer. Final approval must be obtained prior to commencement of construction of that portion of work to which they pertain.
 2. Respective dates for submission of shop drawings, the beginning of manufacture, the testing and the installation of materials, supplies, and equipment.
- C. The Contractor shall also submit a schedule of payments that the Contractor anticipates will be earned during the course of the Work.

END OF DOCUMENT

SECTION 01380
CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.1 SUMMARY

- A. *General.* This section specifies administrative and procedural requirements for construction photographs.
- B. *Costs.* Costs for photographs, album pages, and album shall be included in the lump sum bid price or unit prices contained for other items of work. No separate payment shall be allowed, with the exception of additional photographs, which is addressed elsewhere in this section.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplemental Conditions or General Provisions and other Division 1 specification sections, apply to this section.

1.3 SUBMITTALS

- A. Prints. Submit 2 prints of at least 4 views but not more than 8 views, directly to the Engineer with each monthly Application for Payment. The Engineer will distribute prints as follows:
 - 1. One print shall be retained in the project site field office of the Engineer's field representative and shall be available at all times for reference.
 - 2. One print to the Owner as the Owner's permanent record.
- B. *Extra Prints.* When requested by the Engineer, the photographer shall submit extra prints of photographs, with distribution directly to designated parties who will pay the costs for the extra prints directly to the photographer.
- C. *Negatives.* With each submittal, include photographic negatives, in protective envelopes, identified by date photographs were taken. The negatives shall be ready for transmittal to the Owner and for the Owner's unrestricted use. DO NOT CUT NEGATIVE from 3-4 negative grouping.
- D. *Photograph Albums.* Provide 2 loose leaf, notebook type photo albums with the first Application for Payment. Albums shall be provided as required, if more than one volume of photographs is required to contain the photographs over the length of the construction contract. The front cover of each photo album shall contain the following:
 - 1. Project Name
 - 2. Owner's Name and Contract Number
 - 3. Engineer's Name and Project Number

4. Volume Number
5. Contractor's Name

E. *Album Pages.* Album pages shall be punched for standard 3-ring binder. Allow 1-inch-wide margin on the left edge.

1.4 QUALITY ASSURANCE

- A. *Engage* a qualified, experienced photographer to take photographs during construction.
- B. *Associated Services.* Cooperate with the photographer's work. Provide reasonable auxiliary services as requires, including access to and use of temporary facilities including temporary lighting.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC COPIES

- A. Provide 4-by-6-inch smooth surface, glossy color prints on single-weight, commercial-grade stock, contained in photo album page. The photographs shall be taken with a 35 mm camera (or larger format) capable of being programmed to show the date the photo was taken on the front of the photograph.
- B. *Identification.* Provide date on front of photo per the previous paragraph. On the back of each print provide an applied label or rubber stamped impression with the following information:
 1. Name of the Project.
 2. Name and address of the photographer.
 3. Name of the Engineer.
 4. Name of the Contractor.
 5. Provide notation of vantage point marked for location and direction of shot on a key plan of the site.

PART 3 - EXECUTION

3.1 PHOTOGRAPHIC REQUIREMENTS

- A. Take at least 4 but no more than 8 color photographs in accordance with requirements indicated, to best show the status of construction and progress since taking the previous photographs.
 1. *Frequency:* Take photographs monthly, coinciding with the cutoff date associated with each Application for Payment.
 2. *Vantage Points:* The photographer shall select the vantage points for each shot each moth to best show the status of construction and progress since the last photographs were taken.

3. *Description:* A description of each photograph in album shall be noted below or to the side of the photograph.

B. *Additional Photographs.* From time to time the Engineer may issue requests for additional photographs, in addition to periodic photographs specified. Additional photographs will be paid for by the Owner or Engineer, and are not included in the contract sum or an allowance.

PART 4

Contractor may submit alternate proposal for utilizing Digital Camera to meet the above requirements for Engineer's approval.

END OF DOCUMENT

SECTION 01620
TRANSPORTATION AND HANDLING

1.01 GENERAL

The Contractor shall make provisions for transportation of all equipment, materials, and products furnished under these Contracts Documents to the site of the work. In addition, the Contractor shall provide preparation for shipment and storage, unloading, handling and re-handling, short-term storage, extended storage, storage facilities, maintenance and protection during storage, preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the work.

1.02 TRANSPORTATION

- A. All equipment shall be suitably boxed, crated, or otherwise protected during transportation.
- B. All equipment shall be shipped and delivered in the largest assembled sections practical or permitted by carrier regulations to minimized the number of field connections.
- C. The Contractor shall be responsible for ensuring that the equipment is assembled and transported in such a manner so as to clear buildings, power lines, bridges, and similar structures encountered during shipment or delivery to the site of the work.
- D. Where equipment will be installed using existing cranes or hoisting equipment, the Contractor shall ensure that the weights of the assemble sections do not exceed the capacity of the cranes or hoisting equipment.
- E. Small items and appurtenances such as gauges, valves, switches, instruments, and probes which could be damaged during shipment shall be removed from the equipment prior to shipment and packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.
- F. Temporary shipping braces and supports shall be painted orange or yellow for easy Identification.

1.03 HANDLING

- A. All equipment, materials, and products shall be carefully handled to prevent damage or excessive deflections during unloading or transportation. All equipment, materials and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the OWNER prior to being incorporated into the work.
- B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

- C. Under no circumstances shall equipment or products such as pipe structural steel, casting, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.
- D. Items such as nonmetallic pipe, nonmetallic conduit, flagpoles, and lighting poles shall be handled using nonmetallic slings or straps.
- E. Plastic pipe and fittings shall not be exposed to direct sunlight for an extended period of time (more than one (1) year, see Specifications) as specified by the manufacturer of these materials.

END OF DOCUMENT

SECTION 01630
STORAGE AND PROTECTION

1.01 GENERAL

Equipment and materials used in the project shall be received inspected, unloaded handled, stored, maintained, and protected by the Contractor in a suitable location on or off site, if necessary, until such time as installation is required.

1.02 STORAGE

- A. The Contractor shall be responsible for providing satisfactory storage facilities which are acceptable to the ENGINEER. In the event that satisfactory facilities cannot be provided on site, bonded warehouse, acceptable to the ENGINEER, will be provided by the Contractor for such time until the equipment, materials, and products can be accommodated at the site.
- B. Materials and Equipment that are properly and securely stored: (1) on the project site, or (2) in a bonded warehouse in Hamilton County, TN will be eligible to be included on an application for payment. Original unaltered invoices from manufacturers and suppliers must be presented with the pay request, with no erasures, white-outs or other alterations. Payment will be authorized for no more than the amounts of the invoices (material, freights and taxes). The subcontractor shall submit his requests for payment to the General Contractor. The General Contractor will review and, if acceptable, will include the request on the monthly Application for Payment from the General Contractor to the Owner submitted through the Engineer for review and approval. Each request for payment which includes amounts for materials or equipment stored off-site in a bonded warehouse must have an original Certificate of Insurance attached to the request for payment stating on the face of the original Certificate of Insurance a description of the insured stored material, the name and address of the bonded warehouse and naming the General contractor, the Owner, and the Owner's Agents each as Certificate Holders, each as Additional Insureds and each as Loss Payee for the said material at the said location.

"Materials" and "Equipment" are defined as items which have been manufactured or fabricated to the point they are ready for delivery to the Project Site and ready for installation, but the Contractor has chosen for his own purposes to delay their delivery and installation.

For example: Such Materials and Equipment would include assembled cabinets and casework, but would not include unassembled panels and other components to be used in fabricating cabinets and casework; such Materials and Equipment would also include the structural and miscellaneous steel which has been punched, drilled, fitted and otherwise uniquely fabricated for this project, but would not include steel shapes which have not been through the fabricator's shop; such Materials and Equipment would not include lumber and plywood for the purpose of constructing formwork, but would include lumber and plywood to be incorporated as part of the building construction as framing and decking.

- C. The Contractor shall be responsible for the maintenance and protection of all equipment, materials, and products placed in storage and shall bear all costs of storage, preparation for transportation, transportation, rehandling, and preparation for installation.
- D. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending between supports. Items such as pipe, structural steel, and sheet construction products shall be stored with one end elevated to facilitate drainage.
- E. Unless otherwise permitted in writing by the ENGINEER, building products and materials such as cement, grout, plaster, gypsumboard, particleboard, resilient flooring, acoustical tile, paneling, finish lumber, insulation, wiring, etc. shall be stored indoors in a dry location. Building products such as rough lumber, plywood, concrete block, and structural tile may be stored outdoors under a properly secured waterproof covering.
- F. Tarps and other covering shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent pounding of water.

1.03 EXTENDED STORAGE

In the event that certain items of major equipment such as air compressors, pumps, and mechanical aerators have to be stored for an extended period of time, the Contractor shall provide satisfactory long-term storage facilities which are acceptable to the ENGINEER. The Contractor shall provide all special packaging, protection coverings, protective coatings, power, nitrogen purge, desiccants, lubricants and exercising necessary or recommended by the manufacturer to properly maintain and protect the equipment during the period of extended storage.

END OF DOCUMENT

SECTION 01700

CLEANING

1.01 GENERAL

This section covers the general cleaning which the Contractor shall be required to perform during the construction process and a thorough cleaning before final acceptance of the project unless otherwise shown on the Drawings or specified elsewhere in these Specifications.

1.02 HAZARD CONTROL

- A. The Contractor shall store volatile wastes in covered metal containers and remove from premises daily.
- B. The Contractor shall prevent accumulation of wastes which create hazardous conditions.
- C. Burning or burying rubbish and waste materials on the site shall not be allowed.
- D. Disposal of volatile wastes into sanitary or storm sewers shall not be allowed.
- E. Contractors shall control dust on streets, and remove debris, dust and etc. from all properties during the construction process.

1.03 DISPOSAL OF SURPLUS MATERIALS

- A. Unless otherwise shown on the Drawings specified or directed, the Contractor shall dispose of all surplus excavated materials and materials and equipment from demolition, legally off the site, and shall provide his own suitable, off-site spoil area or on a site designated by the OWNER.
- B. The OWNER shall have the opportunity to inspect any equipment or materials removed prior to disposal by the Contractor. If said equipment and/or materials are determined to be salvageable by the OWNER, the Contractor shall transport said equipment and material to a building or area designated by the OWNER.

1.04 FINAL CLEANING

- A. Schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.
- B. Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as needed basis until building is ready for substantial completion or occupancy.
- C. Employ experienced workmen or professional cleaners for final cleaning.

- D. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and of concealed spaces.
- E. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.
- F. Repair, patch, and touch up marred surfaces to specified finish to match adjacent surfaces.
- G. Broom clean paved surfaces; rake clean other surfaces of ground.
- H. Remove snow and ice for access to building.
- I. Replace air conditioning filters if units were operated during construction.
- J. Clean ducts, blowers, and coils if air conditioning units were operated without filters during construction.
- K. Maintain cleaning until project or portion thereof is occupied by OWNER.

END OF DOCUMENT

**SECTION 01720
PROJECT RECORD DOCUMENTS**

1.1 GENERAL

- A. The Contractor shall maintain accurate record documents related to the furnishing and installation of equipment, materials, and products at the site of the project during the course of the work.
- B. Contractor shall prepare and submit cut sheets for the Engineer's approval prior to starting construction. No separate payment is allowed for this item.

1.2 MAINTENANCE OF DOCUMENTS

- A. The Contractor shall maintain at the project site one (1) record copy of each of the following:
 - 1. Contract Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Reviewed Shop Drawings
 - 5. Change Orders
 - 6. Other Modifications to Contract Documents
 - 7. Field Test Records

Project record documents shall be stored in suitable files and racks in a location satisfactory to the Engineer. The documents shall be maintained in a clean, dry, legible condition and shall not be used for construction purposes.

1.3 RECORDING

The Contractor shall label each document "Project Record" in one-inch high letters. Record Documents shall be kept current and work shall not be permanently concealed until the required information had been recorded.

- A. Contract Drawings: The Contractor shall legibly mark to record the actual construction on the project record set of prints of the Contract Drawings, including reviewed shop drawings, the following:
 - 1. Horizontal and vertical location of underground utilities and appurtenances referenced to mean sea level or permanent surface improvements.
 - 2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - 3. Field changes of dimension and detail, including elevations of foundations.
 - 4. Changes made by change order or field order.
 - 5. Details not on original Drawings.
- B. Specifications and Addenda: - The Contractor shall legibly mark up each section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
2. Changes made by change order or field order.
3. Other matters not originally specified.

C. Sanitary Sewer/Stormwater Structural Locations:

1. All sanitary sewer manholes, conveyances, pressurized mains and lift stations should be located by the center. English units and NAD 83 State Plane Coordinates shall be used. All applicable information required for each item on the "Sanitary Sewer Electronic Data Submittals - Explanation and Data Sheet" forms (pages 01720-3 - 01720-10) should be completed in Microsoft ® Excel format and submitted to the Technical Information Center (TIC) office. These forms will be provided by the TIC office on floppy disk.
2. All stormwater conveyances, structures and detentions should be located by the center. English units and NAD 83 State Plane Coordinates shall be used. All applicable information required for each item on the "Stormwater Electronic Data Submittals - Explanation and Data Sheet" forms (pages 01720-11 - 01720-16) should be completed in Microsoft ® Excel format and submitted to the Technical Information Center (TIC) office. These forms will be provided by the TIC office on floppy disk.

TIC office will utilize this information in updating the City of Chattanooga GIS System.

- D. Sewer Line Television - All new lines shall be videotaped following construction. Tee locations shall be marked. The Owner shall be given a copy of the videotape.

1.4 SUBMITTALS

- A. As-Built Drawings – Certified As-Built drawings shall be submitted at the end of the project. Minimum requirements include plan and profile, tee locations, scale, alignment angles, invert elevations, and easements. The final record drawing shall be submitted on disk, with certification of the engineer or surveyor, and digital CAD file in AutoCAD ® format.

At the completion of the work and prior to final acceptance by the Owner, the Contractor shall deliver the Project Record Documents to the Engineer. The Project Record Documents shall be acceptable to the Engineer before final payment is made.

With the submittal of the Project Record Documents, the Contractor shall submit a list of each document submitted and a certification that each document as submitted is complete and accurate.

SECTION 01720
PROJECT RECORD DOCUMENTS
Sanitary Sewer Electronic Data Submittals
Manhole Field Explanation

Item Name	Units	Description	Drop-down Menu Options
LegacyID		ID from previous Source	
RimElevation	Feet	Elevation at Rim of Manhole	
BarrelDiameter	Feet	Barrel (riser) diameter (ft) - default is 4 / change to "riser diameter" on data entry	
AccessDiameter	Inches	Lid Diameter	18,24 Default, 30
ConeHeight	Feet	Height of Cone above Ground	
VentHeight	Feet	Vent Height Above Manhole cover	
Depth	Feet	Depth of Manhole	
HighPipeDepth1	Feet	Depth of Manhole	
HighPipeDepth2	Feet	Depth of Manhole	
HighPipeDepth3	Feet	Depth of Manhole	
VentDiameter	Inches	Diameter of Vent Pipe	3, 4, 6, other
VentElevation	Feet	Elevation of top of vent	
Elevation	Feet	Invert elevation of manhole (if more than one # is shown , invert is always lowest # (rim elevation - depth)	
HighPipeElevation1	Feet	Elevation of High Pipe	
HighPipeElevation2	Feet	Elevation of High Pipe	
HighPipeElevation3	Feet	Elevation of High Pipe	
InstallContractor	mm/dd/yyyy	Construction Contractor	
WarrantyDate	mm/dd/yyyy	Warranty expiration date	
Manufacturer	mm/dd/yyyy	Manhole Manufacturer	
InstallDate	mm/dd/yyyy	Approx. date of substantial completion or date S/D was released	
Subtype		Type of Manhole - Can have multiple types	Vented, Odor Control, Flow Measurement, Air Release Valve, Junction Structure, Lamp Hole, Regulating Chamber, T-Base, Drop Manhole, Siphon Chamber, Other, Unknown
BarrelMaterial		Manhole barrel (riser) material	Brick, Concrete, Concrete with Brick, Lined, Plastic, Other, Unknown
VentMaterial		Vent Material	Steel, Ductile Iron, PVC, Other
NoPipeinflow	#	Number of pipes that flow into the structure	0, 1, 2, 3, 4, 5, 6, 7, 8
NoPipeoutflow	#	Number of pipes that flow out of the structure	0, 1, 2, 3, 4, 5, 6, 7, 8
AboveGrade		Is structure above grade?	True, False
Step		Are steps present	Yes, No, Unknown
PavingRing		Is a paving ring present?	Yes, No
AccessMaterial		Lid material	Metal, Concrete, Missing, Other, Unknown
LidType		Type of lid on Manhole	Solid Lid, Grated Lid, Bolted lid, Watertight Lid, Unknown
FrameMaterial		Frame material for lid	Concrete, Metal, Other, Unknown
BarrellMaterial		Manhole cone material	Brick, Concrete, Concrete with Brick, Lined, Plastic, Other
ConeType		Manhole cone type	Eccentric, Concentric, Flat Top, Chimney, Unknown
AccessType		Type of access	Lid, Hatch, Other
WaterType		Type of water structure is carrying	Combined Waste Water, Sanitary Sewer, Storm Runoff, Reclaimed, Unknown
GroundType		Predominant surface cover type	Asphalt, Concrete, Gravel, Soil, Grass, Brick Pavers, Building, Other, Unknown
Northing	#	Auto Calculation from Latitude	
Easting	#	Auto Calculation from Longitude	
DataSource			Aerial Photography, GPS Survey, Traditional Survey, Development Plans, Other

SECTION 01720

PROJECT RECORD DOCUMENTS

Sanitary Sewer Electronic Data Submittals
Manhole Data Sheet

Item Name	Manhole 1	Manhole 2	Manhole 3	Manhole 4	Manhole 5	Manhole 6	Manhole 7
LegacyID							
RimElevation							
BarrelDiameter							
AccessDiameter							
ConeHeight							
VentHeight							
Depth							
HighPipeDepth1							
HighPipeDepth2							
HighPipeDepth3							
VentDiameter							
VentElevation							
Elevation							
HighPipeElevation1							
HighPipeelevation2							
HighPipeElevation3							
InstallContractor							
WarrantyDate							
Manufacturer							
InstallDate							
Subtype							
BarrelMaterial							
VentMaterial							
NoPipeinflow							
NoPipeoutflow							
AboveGrade							
Step							
PavingRing							
AccessMaterial							
LidType							
FrameMaterial							
BarrellMaterial							
ConeType							
AccessType							
WaterType							
GroundType							
Northing							
Easting							
DataSource							

SECTION 01720
PROJECT RECORD DOCUMENTS
Sanitary Sewer Electronic Data Submittals
Conveyance Explanation

Item Name	Units	Description	Drop-down Menu Options
WaterType		Type of water structure is carrying	Sanitary Sewer, Combined, Storm Runoff, Reclaimed, Unknown
WarrantyDate	mm/dd/yyyy	Warranty expiration date	
US_ID	#	ID of link or node immediately upstream of this link	
UpstreamInvert	Inches	Invert elevation at upstream end of pipe	
DownstreamInvert	Inches	Invert elevation at downstream end of pipe	
Subtype		Main type	Bypass, Collector, Combined Sewer, Force Main, Interconnect, Interceptor, Outfall, Outfall for Combined Sewer, Relief Main, Siphon
Slope	Feet	Actual slope (FT/FT) calculated as $(us_elevation - ds_elevation) / actual_length$	
PipeWidth	Inches	Width of pipe if not round or width at maximum point if elliptical or egg shaped	
PipeLength	Feet	Measured length of the main (horizontal measure, in feet), system will automatically calculate the actual length of the line feature	
PipeHeight	Inches	Height of pipe if not round or Height at maximum point of pipe if elliptical or egg shaped	
PipeDiameter	Inches	Diameter of round pipe	6,8,10,12,15,16,18,21,24,30,36,42,48, 60,66,72,84,96, other
PipeCount		# of pipes coming into Manhole	
OtherDiameter	Inches	Diameter of pipe if other defined on PipeDiameter, Manual Entry	
Material		Construction material	Clay, Concrete, PVC, DIP, Brick, HDPE, Lined, Unknown, Cast Iron, Asbestos Concrete
Location		Users' description of feature's location - appears on plan - if not a subdivision, put down nearest major road	
LegacyID		Microfilm Number	
JointType1		Type of joint used to join mains together	Ball, Bell and Spigot, Flanged, Mechanical, Push on, Sleeved, Threaded
InstallDate	mm/dd/yyyy	Approx. date of substantial completion or date S/D was released	
InstallContractor	mm/dd/yyyy	Construction Contractor	
GroundType		Predominant surface cover type	Asphalt, Concrete, Gravel, Soil, Grass, Brick Pavers, Building, Other, Unknown
DS_ID	#	ID of link or node immediately downstream of this link	
DataSource			Aerial Photography, GPS Survey, Traditional Survey, Development Plans, Other
CrossSectionShape		Shape of the Main	Circular, Egg Shaped, Rectangular Channel, Elliptical, Other

SECTION 01720

PROJECT RECORD DOCUMENTS

Sanitary Sewer Electronic Data Submittals
Conveyance Data Sheet

Item Name	Pipe1	Pipe2	Pipe3	Pipe4	Pipe5	Pipe6	Pipe7
WaterType							
WarrantyDate							
US_ID							
UpstreamInvert							
Subtype							
Slope							
PipeWidth							
PipeLength							
PipeHeight							
PipeDiameter							
PipeCount							
OtherDiameter							
Material							
Location							
LegacyID							
JointType1							
InstallDate							
InstallContractor							
GroundType							
DS_ID							
DownstreamInvert							
DataSource							
CrossSectionShape							

SECTION 01720

PROJECT RECORD DOCUMENTS

Sanitary Sewer Electronic Data Submittals
Pressurized Main Explanation

Item Name	Units	Description	Drop-down Menu Options
Legacy_ID		Office Generation	
Originating PS		Originating Pump Station	
Discharge MH		Manhole that force main discharges to	
Recorded Length	Feet	Length of the Pressurized main	
Diameter	Feet	Diameter of main	
Depth	Feet	Depth of main	
Install Date	mm/dd/yyyy	Approx. date of substantial completion or date S/D was released	
Warranty Date	mm/dd/yyyy	Warranty expiration date	
Install Contractor	mm/dd/yyyy	Construction Contractor	
Water Type		Type of water structure is carrying	Sanitary, Combined, Storm Runoff
Force Main Material		Construction material	DIP, PVC, HDPE, RCPP, Steel, Other
Exterior Coating			Tar, Unknown, Other
JointType1		Type of joint used to join mains together	Ball, Bell and Spigot, Flanged, Mechanical, Push on, Sleeved, Threaded
Lining Type		Pipe Liner	Cement, PVC, HDPE, Teflon, Epoxy, Other
Location		Users' description of feature's location - appears on plan - if not a subdivision, put down nearest major road	
Ground Type		Predominant surface cover type	Asphalt, Concrete, Gravel, Soil, Sand, Grass, Brick Pavers, Building, Other
Design Flow			
Data Source			Aerial Photography, GPS Survey, Traditional Survey, Development Plans, Other
Surge ReliefValve		Is there a surge relief valve	Yes, No
Surge ReliefValve Size		Size of surge relief valve	
Air Release Valve			Yes, No
Vacume release valve			
Air release x Coord			
Air release y Coord			
Surge ReliefValve x Coord			
Surge ReliefValve y Coord			
Vacume release valve x coord			
Vacume release valve y coord			

SECTION 01720

PROJECT RECORD DOCUMENTS

Sanitary Sewer Electronic Data Submittals
Pressurized Main Data Sheet

Item Name	Main1	Main2	Main3	Main4	Main5	Main6	Main7
Legacy_ID							
Originating PS							
Discharge MH							
Recorded Length							
Diameter							
Depth							
Install Date							
Warranty Date							
Install Contractor							
Water Type							
Force Main Material							
Exterior Coating							
JointType1							
Lining Type							
Location							
Ground Type							
Design Flow							
Data Source							

SECTION 01720

PROJECT RECORD DOCUMENTS

Sanitary Sewer Electronic Data Submittals
Lift Station Explanation

Item Name	Units	Description	Drop-down Menu Options
LegacyID		Office Generation	
WetWellRimElevation	Feet	Elevation of rim on Wet Well	
WetWellDepth	Feet	Depth of wet well	
WetWellAccessDiameter	Feet	Diameter of Wet Well Access	
PumpCapacity		Capacity at given head	
ElevationAtBottom	Feet	Elevation at bottom of pump	
AverageFlow		Average flow through pump station	
PeakFlow		Peak flow through pump station	
WetWellCapacity	Gallons		
InstallDate	mm/dd/yyyy	Approx. date of construction or date S/D was released	
WarrantyDate	mm/dd/yyyy	Warranty date of the feature - Blank unless known	
InstallContractor	mm/dd/yyyy	Construction Contractor	
LiftStationName		Name of lift Station	
WasteWaterPumpSubtype		Type of pump in lift station	Standard Centrifugal, Submersible, Self-Priming Centrifugal, Dry Pit Vertical Centrifugal
OverflowAlarm		Verify if Alarm is present	True , False
LevelSensorType		Level Sensor type for pump station	Air Bubble, Enclosed Electrode, Electrode, Float, Micro Processor, Transducer, Ultrasonic, Unknown, Other
WetWellBarScreen		Bar Screen	True, False
WetWellMaterial		Material of wet well	Brick, Poured Concrete, Concrete and Brick, Fiberglass, Lined, Polyethylene, Precast concrete, Unknown, Other
WetWellStepMaterial		Material that steps are made of in wet well	PVC coated Cast Iron, Cast Iron, Other
WetWellAccessType		Type of access to wet well	Door, Grate, Hatch, Lid, Manhole Cover, Other, Unknown
NumberOfPumps		Numbers of Pumps	
PumpSize1		Hp at given head	
PumpSize2		Hp at given head	
PumpSize3		Hp at given head	
PumpSize4		Hp at given head	
PumpSize5		Hp at given head	
PumpSize6		Hp at given head	
PumpSize7		Hp at given head	
WetWellAccessMaterial		Material that Wet Well Access is made of	Cast Iron, Aluminum, Concrete, Unknown, Other
WetWellLiner		Lining material of Wet Well	Tar, PVC, Unknown, Other
WaterType		Type of water structure is carrying	Combined Waste Water, Reclaimed, Sanitary Sewer, Storm Runoff
WetWellRingMaterial		Material of wet well ring	Brick, concrete, Reinforced Concrete, Unknown, Other
WetWellFrameMaterial		Frame material of wet well	Metal, Concrete, Other, Unknown
OperationalDate	mm/dd/yyyy	Date in which lift station became operational	
SecondaryPower		Source of Secondary Power	Dedicated Generator, Portable Generator, Dual Power Feed, Battery, Others
DataSource			Aerial Photography, GPS Survey, Traditional Survey, Development Plans, Other
AutoLevelController			True, False
Agency		Indicator of who inventoried the pipe	City, CTI, AGM, Other,
SCADA		Type of SCADA connection	RTU, Telephone, Satellite, Wireless, Spread Spectrum, Other
Modem			True, False
PowerSupplier		Electrical Service Supplier	EPB, NWGA, Other

SECTION 01720

PROJECT RECORD DOCUMENTS

Sanitary Sewer Electronic Data Submittals
Lift Station Data Sheet

Item Name	LiftSatation1	LiftSatation2	LiftSatation3	LiftSatation4	LiftSatation5	LiftSatation6	LiftSatation7
LegacyID							
WetWellRimElevation							
WetWellDepth							
WetWellAccessDiameter							
PumpCapacity							
ElevationAtBottom							
AverageFlow							
PeakFlow							
WetWellCapacity							
InstallDate							
WarrantyDate							
InstallContractor							
LiftStationName							
WasteWaterPumpSubtype							
OverflowAlarm							
LevelSensorType							
WetWellBarScreen							
WetWellMaterial							
WetWellStepMaterial							
WetWellAccessType							
NumberofPumps							
PumpSize1							
PumpSize2							
PumpSize3							
PumpSize4							
PumpSize5							
PumpSize6							
PumpSize7							
WetWellAccessMaterial							
WetWellLiner							
WaterType							
WetWellRingMaterial							
WetWellFrameMaterial							
OperationalDate							
SecondaryPower							
DataSource							
AutoLevelController							
Agency							
SCADA							
Modem							
PowerSupplier							

SECTION 01720

PROJECT RECORD DOCUMENTS

Stormwater Electronic Data Submittals
Conveyance Explanation

Item Name	Units	Description	Drop-down Menu Options
UpStreamID	#	ID of link or node immediately upstream of this link	
DownstreamID	#	ID of link or node immediately downstream of this link	
LegacyID	#	ID from previous source/office generated	
PipeDiameter	inches	Height or diameter of pipe	8,10,12,15,18,24,30,36,42,48,60,72,84,96,108,120
Measurement1	inches	Width at bottom of pipe if not round or width at center of pipe if elliptical	
Measurement2	inches	Width at top of pipe if not round or elliptical	
HighPipeDepth	Feet	Distance from rim to bottom of High Pipe if pipe is >12" above invert of bottom pipe	
HighPipeDepth1	Feet	Distance from rim to bottom of High Pipe if pipe is >12" above invert of bottom pipe	
Depth	feet		Depth of storm water structure
UpstreamInvert	Inches	Invert elevation at upstream end of pipe	
DownstreamInvert	Inches	Invert elevation at downstream end of pipe	
Slope		Actual slope FT/FT up_strm-dwn-strm/act_len	
FillHeight	feet	Amount of earth between top of surface and top of pipe, including inside or under buildings, etc	
PipeLength	feet	System generated	
InstallDate	mm/dd/yyyy	Approx. date of construction or date S/D was released	
WarrantyDate	mm/dd/yyyy	Warranty date of structure if available, blank if unknown	
InstallContractor		Construction contractor	
SubType		Conveyance Link Type	Pipe, Ditch, Swale, Paved Channel, Improved Channel, Natural Channel, Spillway, Drain, LakeLine, Assumed Conveyance,Bridge
Pipe Shape		Shape of pipe	Round, Oblong, Rectangular,Box, Trapezoid, Arched, Elliptical, Other, Unknown
Barrel Count	#	Number of side-by-side barrels	1,2,3,4,5,6
Material		Link material	Reinforced Concrete, Poly Vinyl Chloride, AsbestosConcrete, Clay, Aluminized Steel, Plain, Coated, Bituminous Coated Corrugated Metal, Cast Iron, Ductile Iron, High Definition Poly-Ethylene, Rock and Mortar, Earthen, Corrugated Metal, Cast Aluminum, RipRap, Cut Stone, Geotextile, Other, Unknown DEFINITIONS AS=Aluminized Steel, RC=Reinforced Concrete, CMP=Corrugated Metal Pipe, BCCMP=Bituminous Coated Corrugated Metal Pipe, DIP= Ductile Iron Pipe, HDPE-High Density Poly-Ethylene, PVC=Poly-Vinyl Chloride, CIP=Cast Iron Pipe
Joint Type		Type of joint used to join mains together, Default unknown	Flange, Weld, Bond, Gasketed, Butt, None, Unknown
GroundType		Predominant surface cover type / Worst Case Cover (i.e. Building)	Asphalt, Concrete, Gravel, Soil, Grass, Building, Brick Pavers,Sand, Other, Unknown
Development Name		Name of subdivision, development, if known	
Location		Users description of features' location- subdivision, nearest major road	
Data Source			Aerial Photography, GPS, Development Plans,Tax Maps , Traditional Survey, As-Built, Other

SECTION 01720

PROJECT RECORD DOCUMENTS

**Stormwater Electronic Data Submittals
Conveyance Data Sheet**

Item Name	Conveyance1	Conveyance2	Conveyance3	Conveyance4	Conveyance5	Conveyance6	Conveyance7
UpStreamID							
DownstreamID							
LegacyID							
PipeDiameter							
Measurement1							
Measurement2							
HighPipeDepth							
HighPipeDepth1							
Depth							
UpstreamInvert							
DownstreamInvert							
Slope							
FillHeight							
PipeLength							
InstallDate							
WarrantyDate							
InstallContractor							
SubType							
Pipe Shape							
Barrel Count							
Material							
Joint Type							
GroundType							
Development Name							
Location							
Data Source							

SECTION 01720

PROJECT RECORD DOCUMENTS

Stormwater Electronic Data Submittals
Structure Explanation

Item Name	Units	Description	Drop-down Menu Options
LegacyID		ID from previous source	
TopStructureElevation	Ft, above MSL	Auto input from GPS Elevation of Top of Structure	
MeasureDown	feet	Difference between top of structure and bottom of structure	
Structure Diameter2	inch	2nd dimension of structure (if not round)	12,18,24,30,36,42, 54, 60, 66,72, 78, 84, 96, 108, 120, 144, Other, Unknown
Lid Diameter	feet	Lid diameter	
Structure Diameter1		Diameter of structure	12,18,24,30,36,42, 54, 60, 66,72, 78, 84, 96, 108, 120, 144, Other, Unknown
Invert Elevation	Ft above MSL	Invert elevation of the manhole	
Install Contractor		Construction contractor	
Warranty Date	mm/dd/yyyy		
Manufacturer		Structure Manufacturer	
CastingManufacturer		Casting Manufacturer	
CastingModel		Model Number of Casting	
Install Date	mm/dd/yyyy	Approx. date of construction or date S/D was released	
NodeFunctionType			Inlet, Outlet, Junction
StructureType		Structure Node Types	Catch Basin, Curb Inlet, Junction Box, Headwall, Weir, Manhole, Trench Drain, Plain Pipe End, Check Dam, Flared End Structure, Raised Top Inlet, Flat Top Catch Basin, Control Structure, Culvert, Ditch Intersection, Pipe Intersection, Lake Intersection, Assumed Structure, Inaccessible Structure, Unknown
StructureMaterial			Brick, Concrete, Concrete with Brick, Block, Cut Stone, Lined, Plastic, Other
Skimmer		Is a skimmer present	Yes, No, Unknown
NoLinkInflow	#	Number of links that flow into the structure	0, 1, 2, 3, 4, 5, 6, 7, 8
NoLinkOutflow	#	Number of links that flow out of the structure	0, 1, 2, 3, 4, 5, 6, 7, 8
NoDropConnections	#	Number of drop connections if present	0, 1, 2, 3, 4, 5, 6, 7, 8
AccessType		Type of access	Lid, Door, Grate, Hand, Manhole Cover, Hatch, Other, None
CleanLidMaterial		Lid material	Metal, Concrete, Plastic, Missing, Other, Unknown
GroundType		Predominant surface cover type	Asphalt, Concrete, Dirt, Gravel, Soil, Sand, Grass, Building, Brick Pavers, Other
Step		Steps present	Yes, No
Frame Material		Frame material	
Development Name		Name of subdivision, development, if known	
Basin		Name	List all 8 basins *****
Northing	#	Auto Calculation from Latitude	
Easting	#	Auto Calculation from Longitude	

SECTION 01720

PROJECT RECORD DOCUMENTS

Stormwater Electronic Data Submittals
Structure Data Sheet

Item Name	Structure1	Structure2	Structure3	Structure4	Structure5	Structure6	Structure7
LegacyID							
TopStructureElevation							
MeasureDown							
Structure Diameter2							
Lid Diameter							
Structure Diameter1							
Invert Elevation							
Install Contractor							
Warranty Date							
Manufacturer							
CastingManufacturer							
CastingModel							
Install Date							
NodeFunctionType							
StructureType							
StructureMaterial							
Skimmer							
NoLinkInflow							
NoLinkOutflow							
NoDropConnections							
AccessType							
CleanLidMaterial							
GroundType							
Step							
Frame Material							
Development Name							
Basin							
Nothing							
Easting							

SECTION 01720

PROJECT RECORD DOCUMENTS

Stormwater Electronic Data Submittals
Detention Explanation

Item Name	Units	Description	Drop-down Menu Options
LegacyID	#	ID from previous source/office generated	
DepthMaximum	Ft above MSL	Difference between top of ground and bottom of pond	Pond Depth
Width	feet		
Length	feet		
Area	sq. feet	Automatically calculated from GPS of perimeter	
InstallContractor		Construction Contractor	
InstallDate	mm/dd/yyyy	Approx. date of construction or date S/D was released	
WarrantyDate	mm/dd/yyyy		
Contractor		Name of Contractor	
PondType		Type of pond	Dry Detention, Wet Detention, Underground Detention, Constructed Wetlands, Rooftop, Swale
FencedPond		Does pond have fence	Yes, No
PondClass			Residential, Commercial, Industrial, Public
WeirType		Type of outlet structure	V-notch, Rectangular, Orifice, Riser pipe, Open pipe, Other, Unknown
PermitType		Does pond have Discharge permit?	Waste water, Stormwater, none
OutletPipeSize	inches	Size of main outlet pipe, not emergency spillway	<12,12,16,18,24,30,36,42,48,54,60, Other
GroundCover		Type of pond surface	Asphalt, Concrete, Dirt, Gravel, Soil, Sand, Grass, Building, Brick Pavers, Other
DevelopmentName		Name of subdivision, development, if known	
rghcoeff	#	Roughness coefficient of the conduit	
Northing			
Easting			

SECTION 01720

PROJECT RECORD DOCUMENTS

Stormwater Electronic Data Submittals
Detention Data Sheet

Item Name	Pond1	Pond2	Pond3	Pond4	Pond5	Pond6	Pond7
LegacyID							
DepthMaximum							
Width							
Length							
Area							
InstallContractor							
InstallDate							
WarrantyDate							
Contractor							
PondType							
FencedPond							
PondClass							
WeirType							
PermitType							
OutletPipeSize							
GroundCover							
DevelopmentName							
rghcoeff							
Northing							
Easting							

End of Document

SECTION 01730

GUARANTEES AND WARRANTIES

1.01 GENERAL WARRANTY

- A. The Contractor shall warrant all equipment, materials, products, and workmanship provided by the Contractor under these Contract Documents for a period of twelve (12) months after the date of final acceptance of the work by the OWNER.
- B. If, during the warranty period (a) any equipment, materials or products furnished and/or installed by the Contractor are found to be defective in service by reason of the Contractor's faulty process, structural and/or mechanical design or specification, or (b) any equipment, materials, or products furnished and/or installed by the Contractor are found to be defective by reason of defects in material or workmanship, the Contractor shall, as soon as possible after receipt of written notice from the OWNER, repair or cause to be repaired such defective equipment, materials or products, or replace such defective equipment, materials, or products.
- C. In the event of multiple equipment failures of major consequence prior to the expiration of the one-year warranty described above the affected equipment shall be disassembled, inspected, and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non-serviceable as a consequence of the equipment failure shall be replaced. A new twelve (12) month warranty against defective or deficient design, workmanship, and materials shall commence on the day that the item of equipment is reassembled and placed back into operation. As used herein, multiple equipment failures shall be interpreted to mean two (2) or more successive failures of the same kind in the same item of equipment or failures of the same kind in two (2) or more items of equipment. Major equipment failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts or structural members, broken or chipped gear teeth overheating, premature bearing failure, excessive wear, or excessive leakage around the seals. Equipment failures which are directly and clearly traceable to operator abuse, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over or under lubrication and using maintenance procedures not conforming with published maintenance instructions, shall be exempted from the scope of the one-year warranty. Should multiple equipment failures occur in a given item or type of equipment, all equipment of the same size and type shall be disassembled, inspected, modified or replaced, as necessary, and re-warranted for one year.
- D. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability with the law of the place of Construction.
- E. Submit guarantees for manufactured materials or units used in this project.

1.02 START-UP OF OPERABLE COMPONENTS

- A. Because of the need to maintain operation during construction, it will be necessary to accept and start-up operable components of the project at various times prior to the completion and final acceptance of the entire project.
- B. A component of the project, as used herein, shall mean a complete process subsystem and shall include all associated structures, equipment, piping, controls, etc.
- C. When a component of the project has been completed, checked out, field tested, and made ready for operation, the Contractor shall notify the ENGINEER in writing that the component is substantially complete and request an inspection for substantial completion. The ENGINEER will schedule the inspection within 10 days of the Contractor's request. If he concurs in the Contractor's statement, the ENGINEER will notify the Contractor in writing that the component is accepted as Substantially complete. At the same time, the ENGINEER will submit to the Contractor a list of items that must be completed or corrected before final acceptance can be given.
- D. If a component of the project is needed in order to maintain operation during construction and if it has been accepted as substantially complete, the Contractor shall start up the component when directed by the ENGINEER. Once the component has achieved stable and satisfactory operation (minimum 95 percent availability over a 7-day period), the Contractor shall request beneficial occupancy by the OWNER. The OWNER, if he concurs in the Contractor's statement that stable and satisfactory operation has been achieved, will notify the Contractor in writing within 10 days that he is assuming beneficial occupancy of the component.
- E. On the date that the OWNER assumes beneficial occupancy, the following shall occur, if it is not contrary to the General or Supplemental General Conditions:
 - 1. The one-year warranties for the component specified in Part 1.01 of the Section will begin; and
 - 2. The OWNER will assume responsibility for operating and maintaining the component.

END OF DOCUMENT

Detailed Specifications

ITEM 1

COMMON EXCAVATION

1.01 SCOPE

Common Excavation shall consist of the removal, replacement and disposition of all materials except rock excavation to lines and grades shown on the Plans, including all construction methods and devices required to accomplish this work.

1.02 PREPARATION OF WORKSITE

(a) Preparatory to beginning of construction operations, the Contractor shall remove from the site all vegetable growth, trees, brush, stumps, roots, debris and other objectionable matter, including fences, buildings, and other structures shown on the Plans in the construction area as otherwise designated for removal. Disposal of such refuse material shall be made by the Contractor in a manner acceptable to the Engineer.

(b) Trees, brush, and other vegetable growth shall be cleared from the area. Stumps and roots shall be grubbed and removed to a depth not less than two feet below grade. All holes or cavities which 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.

(c) The Contractor shall exercise special precautions for the protection and preservation of trees, mailboxes, shrubs, sod, fences, etc., situated within limits of the construction area but not directly within excavation limits. The Contractor shall be held liable for any damage his operations have inflicted on such property.

(d) Where sewers or structures are located in, near, or across stream-beds or drainage ditches, the Contractor shall be required to divert the stream or drainage and dewater the construction site as a part of this Item.

1.03 UNSUITABLE MATERIAL

(a) The determination of the suitability of material encountered below excavation limits shall be made by the Engineer after careful examination in the field.

(b) When such material has been identified as unsuitable, it shall be removed to the depth shown on Plans or as directed by Engineer and properly disposed of.

(c) Areas so excavated shall be backfilled in thin layers of crushed stone or other approved material, compacted by tamping to the density of the surrounding suitable material and to the lines and grades shown on Plans.

1.04 ROCKS AND BOULDERS

(a) Rocks and/or boulders not classified as rock excavation shall be removed to the limits of excavation and grades shown on the Plans. The spaces created outside the excavation limits by such removal shall be backfilled with suitable material and compacted to the proper lines and grades.

(b) The removal of such rocks and/or boulders shall be considered as earth excavation, although the Contractor may elect to remove same by drilling or blasting, in which case such operations shall comply with requirements set forth for drilling and blasting under Item 2, ROCK EXCAVATION.

1.05 DISPOSAL OF MATERIALS

(a) All materials removed by excavation which are suitable for the purpose shall be used for backfilling pipe trenches, foundations and footings and for making embankment fills or for such other purposes as may be shown on the Plans. All materials not used for such purposes shall be considered as waste materials, and the disposal thereof shall be made by the Contractor in a manner and at locations approved by the Engineer.

(b) Waste materials shall be spread in uniform layers and neatly leveled and shaped. Spoil banks shall be provided with sufficient and adequate openings to permit surface drainage of adjacent lands and left in a slightly condition.

1.06 SITE GRADING

Sites of all structures, roads and embankments shall be graded within the limits and to the elevations shown on the Plans. Grading operations shall be so conducted that materials shall not be removed or loosened beyond the required limits. The finished surfaces shall be left in smooth and uniform planes such as are normally obtainable from the use of hand tools. If the Contractor is able to obtain the required degree of evenness by means of mechanical equipment, he will not be required to use hand labor methods. Slopes and ditches shall be neatly trimmed and finished to slopes shown on the Plans unless otherwise approved by the Engineer.

1.07 STRUCTURAL EXCAVATION

Common excavation for structures shall not be greater in horizontal dimensions than those required between the outer surface of the structure and the walls of the adjacent excavation or of the sheeting used to protect it. The bottom of the excavation shall be true to the required shape and elevation shown on the Plans. No earth backfilling will be permitted under structures. If the Contractor excavates below elevation shown or specified, he shall fill the void made with Class B concrete at his/her own expense unless such excavation results from the provisions of paragraph 1.04.

1.08 TRENCH EXCAVATION

(a) Common excavation for pipe lines shall consist of the removal of materials necessary for the construction of water, sewer and other pipe lines and all appurtenant facilities including manholes, inlets, outlets, headwalls, collars, concrete saddles, piers, and pipe protection called for in the Plans.

Trench outline shall be scored through existing pavement for the width of pavement to be replaced before the trench excavation is started.

(b) Excavation for pipe lines shall be made to open cut, unless shown otherwise on the Plans. Trenches shall be cut true to lines and grades shown on the Plans or established by the Engineer on the ground. The banks of the trenches shall be cut in vertical, parallel planes equidistant from the pipe centerline. From an elevation twelve inches above top of the pipe to the bottom of the trench, the horizontal distance between vertical planes for different sizes of pipe shall not exceed those shown on the Plans. When sheeting is used, the width of the trench shall be considered as the distance between the inside faces of the sheeting. The bottom of the trench shall be cut carefully to required grade of the pipe except where bedding materials or cradles are shown, in which case the excavation shall extend to the bottom of the bedding or cradles as shown on the Plans. Minimum pipe cover shall be as shown on the Plans.

(c) The use of a motor-powered trenching machine will be permitted, but full responsibility for the preservation, replacement and/or repair of damage to any existing utility services and private property shall rest with the Contractor.

(d) Bell holes for bell and spigot pipe and/or mechanical joint pipe shall be excavated at proper intervals so the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper installation of all joints in the pipe. Bell holes shall not be excavated more than ten joints ahead of pipe laying.

(e) Excavation for manholes, outlets, collars, saddles, piers and other pipe line structure shall conform to the requirements of paragraph 1.07, STRUCTURAL EXCAVATION.

(f) Pipe trenches shall not be excavated more than 400 feet in advance of pipe laying, and all work shall be performed to cause the least possible of inconvenience to the public. Adequate temporary bridges or crossings shall be constructed and maintained where required to permit uninterrupted vehicular and pedestrian traffic.

(g) Wherever pipe trenches are excavated below the elevation shown on the Plans, the Contractor, at his/her own expense, shall fill the void thus made with compacted, 3/4 inch or smaller, crushed stone, sand or concrete bedding materials.

(h) In cases where materials are deposited along open trenches, they shall be placed so that no damage will result to the work and to adjacent property in case of rain or other surface wash.

1.09 BORROW EXCAVATION

- (a) Where the backfill of excavated areas or the placement of embankments or other fills require specified materials not available at the site or material in excess of suitable material available from the authorized excavations, such materials shall be obtained from other sources. This may require the opening of borrow pits at points not immediately accessible to the work. In such cases, the Contractor shall make suitable arrangements with the Property Owner and shall pay all costs incidental to the borrowed material, including royalties, if any, for the use of materials. Before a borrow pit is opened, the quality and suitability of the material to be obtained therefrom shall be approved by the Engineer.
- (b) Borrow pits shall not be opened until the original surface has been cross-sectioned by the Engineer.
- (c) Borrow pits shall be excavated so that the remaining surface and slopes will conform to the applicable requirements of paragraph 1.06.
- (d) Borrow pits shall be properly cleared and grubbed in accordance with the applicable provisions of paragraph 1.02.

1.10 SHEETING, SHORING AND BRACING

- (a) The sidewalls of all excavations shall be sufficiently sheeted, shored and braced whenever necessary to prevent slides, cave-ins, settlement, or movement of the banks and to maintain the excavation clear of all obstructions. Wood or steel sheeting of approved design and type shall be used in wet, saturated or flowing ground. All sheeting, shoring and bracing shall have sufficient strength and rigidity to withstand the pressure exerted.
- (b) Excavation adjacent to existing or proposed buildings and structures or in paved streets or alleys shall be sheeted, shored or braced adequately to prevent undermining beneath or subsequent settlement of such structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition. The Contractor shall be held liable for any damage resulting to such structures or pavements as a result of his/her operations.
- (c) Sheeting, shoring or bracing materials shall not be left-in-place unless otherwise shown on the Plans or ordered by the Engineer in writing. Such materials shall be removed in such manner that danger or damage will occur to new or existing structures or property. Trench sheeting shall be left-in-place until backfill has been brought to a level 12 inches above the top of the pipe. It shall then be cut off and the upper portion removed.
- (d) All holes and voids left in the work by the removal of sheeting, shoring or bracing shall be filled and thoroughly compacted.
- (e) All excavation shall be done in a manner to meet all State and Federal safety requirements.

1.11 BACKFILLING TRENCHES

- (a) The backfilling of sewer, water and other pipe line trenches shall be started immediately after the construction of same has been inspected and approved by the Engineer. Backfill material shall consist of fine, loose, earth containing optimum moisture content for thorough compaction. Material that is too dry for adequate compaction shall receive a prior admix of sufficient water to secure optimum moisture content. Material shall be free of large clods, stones, vegetable matter, debris and/or other objectionable material.
- (b) The pipe shall have a minimum of six inches of 3/8 inch crushed stone under it and be covered to a depth of at least twelve inches as shown on the drawings as a minimum for Class C bedding. Stone shall be tamped to provide a firm base and bedding for the pipe.
- (c) In traveled roadways and in sidewalk or driveway areas, backfill material shall be traffic bound stone as per Item 14, MINERAL AGGREGATE BASE, of these specifications. Fill material under haunches and around the structure shall be placed alternately in layers tamped to 6-inches on both sides of the pipe permitting thorough tamping. The fill is placed alternately to keep it at the same elevation on both sides of the structure at all times.
- (d) In all areas not affected by superimposed loads, trench backfill may be placed from the level 12 inches above the top of the pipe upward without compaction. At these places, backfill shall be neatly rounded over the trench to sufficient height to allow for settlement to grade after consolidation.
- (e) Trenches under concrete slabs and footing of structures shall be filled with dry sand or crushed stone and be tamped to 6-inch layers or filled with Class B concrete as shown on the Plans.
- (f) All backfilling shall be done in such a manner that the pipe or structure over or against which it is placed will not be disturbed or injured. Any pipe or structure injured, damaged or moved from its proper line or grade during backfilling operations shall be removed and replaced and/or repaired to the satisfaction of the Engineer and then re-backfilled.

Pavement scoring and trench backfill tamping may be done by equipment equal to Arrow Mobile Hydraulic Hammer. If the Contractor prefers to use this type equipment for trenches not over six feet in depth, the backfill may be compacted with this equipment as recommended by the manufacturer for the type of material being compacted in the backfill.

1.12 BACKFILLING AROUND STRUCTURES

Backfilling around structures shall be done by placing and tamping thinlayers of proper material for the full height to the finished grade.

1.13 FILL AND EMBANKMENTS

All fills and embankments constructed of earth material shall be consolidated to a degree of density equal to or greater than that of the material in its original state. The material shall conform to the requirements of paragraph 1.11 (a). It shall be placed in the fill or embankment in successive layers, each compacted to 6 inches are being approximately horizontal and extending to the full limit of the required cross-section, and shall be compacted or tamped as evenly and as densely as practicable by the use of suitable power tampers, rollers or hand tools over the entire surface. The process shall be repeated for each layer of material until the fill or embankment conforms to the plan lines, grades and cross-sections. The degree of compaction and moisture content required, the method of tamping and the equipment used shall be approved by the Engineer.

1.14 SLOPES

Open cut slopes shall be neatly trimmed and finished in accordance with all the requirements of paragraph 1.06.

1.15 TOPSOIL

(a) All areas to be sprigged or planted with trees, shrubs or grass as shown on the Plans shall be prepared by grading to a smooth, even surface to a level two inches (2") below the elevation of the finished grade shown on the Plans. It shall then be brought to neat and finished grade by the addition of two inches (2") of approved topsoil.

(b) Topsoil removed from the site of the work may be stockpiled and reused, or topsoil may be obtained from approved borrow areas. If obtained from borrow areas, the Contractor shall make suitable arrangements with the property owner and shall pay all costs incidental to the borrowed material including royalties.

1.16 MAINTENANCE

(a) All excavated and filled areas for structures, trenches, fills, topsoil areas, embankments and channels shall be maintained by the Contractor in good condition at all times until final acceptance by the Owner.

(b) The Contractor shall maintain trench backfill at the original ground surface by periodically adding specified backfill material as necessary or when directed by the Engineer. Such maintenance shall be continued until final acceptance of the project or until issuance of a written release by the Engineer.

(c) If trenches, embankments or backfills settle during the one-year guarantee period, Contractor shall add backfill material as required upon notification of the Owner.

(d) Trench backfill in streets and other areas where there is vehicular traffic shall be completed with six inches (6") of crushed stone as specified under Section 1.11, BACKFILLING TRENCHES. These trenches shall be maintained until approved for resurfacing.

1.17 DETERMINATION OF PAY QUANTITIES (IF APPLICABLE)

- (a) The volume of earth excavation for which payment will be allowed shall be expressed in cubic yards as computed from cut measurements.
- (b) Common excavation shall be computed by the average end-area method. All measurements shall be taken to the nearest 1/10 foot. Overcutting of slopes shall not be allowed for in the determination of pay quantities unless the excess materials thus produced were used as borrowed materials at the direction of the Engineer.
- (c) Common excavation for site grading, canal or channel changes, grading for access roads, and similar work where applicable and where shown on the Contract Plans, the allowable volume shall be based on cross-section measurements of the original surface and of the completed excavation.
- (d) For structural earth excavation, the allowable volume shall be based on the vertical centerline depth or on cross-section elevations from original ground level to the bottom levels of the structure elevations from horizontal dimensions but not to exceed one foot (1.0') in the clear outside the outer surface of the structure as shown on the drawings for the structural excavation payment limits. No allowance shall be made for overcutting nor for excavation below specified grade or below required elevations.
- (e) Except for trench excavation, where rock is encountered in any other type of excavation, and included in the total excavation computed, the allowable volume of rock excavation shall be deducted from the total volume of excavation allowed for payment in order to determine the net amount of earth excavation.
- (f) Trench excavation for sewers and other pipe lines and appurtenant facilities such as manholes, inlets, headwalls, collars, saddles, piers, and pipe protections or encasement shall be considered as incidental to the installation of any of the above facilities for which the trench excavation is made and shall not be included in the volume for common excavation.

1.18 PAYMENT (IF APPLICABLE)

The accepted quantities of items listed below will be paid for at the contract price per unit of measurement for each of the pay items that is listed on the Bid Schedule.

These amounts, so paid, shall cover the cost of furnishing all materials, labor, tools, plant equipment, services, and other expenses in connection with or incidental to common excavation, borrow excavation, structural excavation and sheeting left-in-place.

ITEM	DESCRIPTION	UNIT
1-1	Common Excavation	Cubic Yard
1-1a	Borrow Excavation	Cubic Yard
1-1b.1	Undercut Excavation	Cubic Yard
1-1b.2	Backfill for Undercut	Cubic Yard
1-1c	Structure Excavation	Cubic Yard
1-1d	Channel Excavation	Cubic Yard
1-1e	Sheeting Left-in-place	MBM
1-1f	Trench Cut	Cubic Yard
1-1g	Trench Backfill	Ton

END OF DOCUMENT

ITEM 2

ROCK EXCAVATION

2.01 SCOPE

The work covered by this item shall consist of the removal of all rock materials from their original beds as required for the purposes of construction shown on the Plans. It shall include the drilling and blasting incidental thereto and disposal of the excavated material.

2.02 DEFINITION OF ROCK EXCAVATION

(a) Sound, solid rock in its original position in ledges, bedded deposits or masses of such hardness and texture that, in the opinion of the Engineer, cannot be loosened or broken and removed by use of heavy construction equipment such as power shovels, bulldozers, heavy duty rooters, etc., without drilling and blasting, shall be classified as rock excavation.

(b) Boulders, stones or pieces of masonry that are one-half cubic yard or larger in volume that must be removed by blasting shall be considered rock excavation.

(c) Hard pan, small boulders less than one-half cubic yard in volume, chert, clay, soft shale, soft and disintegrated rock, and similar material shall not be considered as rock even though the Contractor elects to excavate same by drilling and blasting methods.

2.03 EXCAVATION METHODS

(a) Rock encountered in the process of excavation for structures shall be uncovered and stripped of all loose materials over the entire limits of excavation. Rock encountered for removal in a trench section shall be uncovered for a distance of not less than fifty feet (50'). In both cases, the Engineer shall be notified immediately so that the surface can be examined and the necessary measurements and elevations taken. Any material removed prior to inspection and measurement by the Engineer shall be considered as common excavation.

(b) Rock in trenches shall be excavated over the horizontal limits of excavation and to depths as follows:

Size of Pipe Line Inches	Depth of Excavation Below Bottom of Pipe, Inches	
	Sewer Pipe	Water Pipe
4 to 12 incl.	6	6
15 to 33 incl.	8	8
36 and over	12	12

The space below grade for pipe sewers shall then be backfilled with 3/8 inch crushed rock or gravel or other approved material and tamped to the proper grade. Where pipe sewers are constructed on concrete cradles rock shall be excavated to the bottom of the cradle as shown on the Plans.

(c) Rock under structures shall be excavated to lines and grades shown on the Drawings. Except as hereinafter provided otherwise where rock excavation has been carried below grade, the Contractor shall backfill to grade with Class B concrete at his/her own expense.

Where rock foundation is obtained at grade for over 50 percent of the area of any one structure, the portion of the foundation that is not rock shall be excavated below grade to reach a satisfactory foundation of rock. The portion below grade shall be backfilled with Class B concrete.

Where rock foundation is obtained at grade for over 50 percent of the area of any one structure, the portion of the foundation that is not rock shall be excavated below grade to reach a satisfactory foundation of rock. The portion below grade shall be backfilled with Class B concrete.

Where rock foundation is obtained at grade for less than 50 percent of any one structure and satisfactory rock cannot be found over the remaining area by reasonable additional excavation, the rock shall be removed for a depth of 12 inches below grade, and the space below grade shall be backfilled with crushed stone as specified above for pipe lines.

(d) Drilling and blasting operations shall be conducted with due regard for the safety of persons and property in the vicinity and in strict conformity with requirements of all ordinances, laws and regulations governing blasting and the use of explosives. Rock excavation near existing pipe lines or other structures shall be conducted with the utmost care to avoid damage. Injury or damage to other structures and properties shall be promptly repaired to the satisfaction of the Owner by the Contractor at his/her own expense.

(e) Rock excavation for all structures and adjacent trenches under this Contract and any other rock excavation directed by the Engineer shall be completed before construction of any structure is started in the vicinity.

(f) Rock excavation shall be subject to all the applicable provisions specified for Item 1, COMMON EXCAVATION, of these Specifications.

2.04 DETERMINATION OF PAY QUANTITIES

(a) The volume of rock excavation for which payment will be allowed shall be expressed in cubic yards as computed from cut measurements.

(b) The volumes for which payment will be made for crushed rock or gravel placed in trenches or elsewhere as shown on the Plans or as directed by the Engineer shall be expressed in cubic yards as computed from measurements made for this item-in-place, based on the maximum allowable width and depth of trench as shown on the Plans and specified herein.

(c) For pipe line excavation, the allowable volume of rock excavation shall be based on the maximum allowable width of trench as shown on the Plans and specified herein, and on the centerline depth of rock from the top of rock to the specified bottom of the trench, plus whatever depth is required by the Plans and Specifications for bedding if rock extends to such depth or to the bottom of the rock if above these depths. No allowance shall be made for excavation to extra widths for construction of manholes or other sewer or pipe line appurtenances, and costs of such additional rock excavation shall be included in the unit price bid for this item.

(d) For structure, the allowable volume of rock excavation shall be based on the actual horizontal dimensions of excavation made as shown on the plans but not to exceed one foot in the clear outside the outer surface of the structure and on the depth from the original top of rock to the bottom of the structure as installed, or to the bottom of the rock if above grade, measurements shall be taken from cross-sections made before rock excavation was started and after it is completed. No allowance shall be made for over cutting nor for excavation below specified grade or below the required elevation.

(e) Rock excavation shall be computed by the average-end-area method. All measurements shall be taken to the nearest 1/10 foot.

2.05 PAYMENT

(a) Payment for rock excavation performed under these Specifications shall be made for the quantities determined in the applicable manner specified above at the unit price per cubic yard of rock excavation under Item 2 of the Bid Schedule.

(b) Payment for crushed rock or gravel placed as required by the Plans or Specifications or as directed by the Engineer shall be made for the quantities determined in the manner specified above at the unit price bid per cubic yard of crushed rock bedding material under Item 2 of the Contract Bid Schedule, and shall include the cost of removing subgrade material,

except rock, to the required or specified bottom of the crushed stone bedding.

(c) These amounts, so paid, shall cover the cost of furnishing all labor, materials, tools, plant and other expense in connection with or incidental to rock excavation and crushed rock or gravel placement where specified.

(d) If State and Federal safety regulations require greater width of rock trench, the additional rock excavation shall be measured by the cubic yard and paid for at unit price bid for this item in the Bid Schedule.

ITEM 5

PIPE SEWERS AND SERVICE LINES

5.01 SCOPE

(a) The work covered by this item shall consist of furnishing and laying sewer pipe, risers, service lines, and fittings as called for on the drawings and specified herein, including trench excavation and backfill.

(b) Service lines are those sewer lines from the tees in sewer system mains to the property line for all existing buildings and proposed buildings to be served by the system.

5.02 PIPE MATERIALS

(a) CLAY PIPE

Clay pipe and special fittings shall be bell and spigot, conforming to the latest requirements ASTM "Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated", Serial Designation C 700.

(b) CONCRETE PIPE

1. All concrete pipe and fittings 12 inches in diameter and larger shall be Reinforced Concrete Culvert, Storm Drain and Sewer Pipe conforming to the latest requirements of ASTM "Specification for Reinforced Concrete, Culvert, Storm Drain, and Sewer Pipe", Serial Designation C 76, except the minimum cement content of the concrete used in the manufacture of pipe 24 inches and smaller in diameter shall be 10 bags per cubic yard of concrete.

2. All pipe 12 inches in diameter and larger shall be Class IV unless otherwise called for. Wall thickness shall be in accordance with Table 4, Wall B, for sizes through 72 inches and Wall C for 78-inch and 84-inch sizes. Sizes larger than 84 inches shall be in accordance with the special design requirements of ASTM C 76. The pipe shall have bell and spigot joints or tongue & groove suitable for the use of a rubber gasket to be provided as a part of this item. Pipe shall be free from blisters, honeycomb, protruding from marks on the inside of the pipe, and broken or chipped bells or spigots. On pre-bed or elliptical reinforced pipe, the pipe forms shall be constructed so that there will not be a form lap or joint in the bottom half of the pipe. On pipe with circular reinforcement, the pipe shall be laid so that any form marks on the inside of the pipe will be as close to the top of the pipe as possible.

3. Pipe shall have circumferential reinforcement as required for the particular class of pipe furnished. The bell of the joint shall contain circumferential and longitudinal

reinforcement. Reinforced concrete pipe shall be centrifugally cast or vibrated pre-bed, horizontally or vertically cast or made on a Packerhead machine and shall be furnished in lengths not more than sixteen feet (16') and not less than eight feet (8'), except where short lengths are required for construction conditions.

4. All concrete pipe less than twelve inches (12") in diameter shall be nonreinforced concrete pipe conforming to the latest ASTM "Specifications for Concrete Sewer, Storm Drain, and Culvert Pipe", Serial Designation C 14, except the minimum cement content of the concrete used in the manufacture of the pipe shall be 10 bags per cubic yard of concrete.

5. All pipe less than twelve inches (12") in diameter shall be Class 3 unless otherwise called for. The pipe shall have bell and spigot joints suitable for use with a rubber gasket to be provided as part of this item. The pipe shall be centrifugally cast or vibrated, horizontally or vertically cast or made on a Packerhead machine furnished in lengths of at least four feet (4'). Pipe shall be manufactured with machine bell pallets with a maximum slope in the bell of two degrees. The metal ring shall remain in the bell during the entire steam curing process of the pipe.

6. Each pipe shall be clearly marked as required by the standard specifications to show its class, date of manufacture, and the name or trademark of the manufacturer. Elliptical reinforced pipe shall be clearly marked top and bottom, and the minor axis clearly noted on the interior surface of the pipe.

(c) POLYVINYL CHLORIDE (PVC) PIPE

1. The pipe fittings shall be made from virgin Type I, Grade 1 Polyvinyl Chloride compounds with physical and chemical properties conforming to those defined and described in ASTM Serial Designation C 1784, "Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds."
2. The pipe shall be manufactured in accordance with the requirements of ASTM Serial Designation D 3033, "Specification Type PSP Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings" or ASTM Serial Designation D 3034, "Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings." The four-inch (4") diameter pipe for gravity sewers shall have an SDR (Standard Dimension Ratio) of 33.5. All other diameter pipe for gravity sewers shall have an SDR of 35.
3. The standard length of pipe provided under this specification shall be twenty feet (20'), with a minimum of ten feet (10'), except that all pipe used in service lines shall not exceed ten feet (10') unless otherwise approved by the Engineer.
4. Fittings shall be made in sizes and to the dimensions of standard pipe as shown above. If dimensions, structural design or materials from which they are manufactured vary from provisions of this specification, they must be approved by the Engineer.
5. Wyes, tees, bends and adapters and any other fittings required by the Engineer shall be provided. Plans for such fittings showing cross-sectional views with

dimensions shall be provided, and such plans and fittings shall be approved by the Engineer prior to their use. The materials used in the manufacture of fittings shall conform to the requirements for the pipe with which they will be used, and any variation of such requirements shall be subject to the approval of the Engineer.

6. Pipe shall be tested when requested by the Engineer, and all sizes of pipe so designated shall be tested in accordance with ASTM Serial Designation D 2412, "Test for External Loading Properties of Plastic Pipe by Parallel-Plate Loading."
7. Pipe shall be marked along the outside of the barrel in bold type and shall indicate the manufacturer's name, pipe size, PVC compound used, e.g., PVC Type 1, Grade 1, and the ASTM material specification for the PVC compound used, e.g., ASTM D 1734.
8. The type and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties.
9. The manufacturer shall provide multi-fin waterstops of a material conforming to ASTM Serial Designation C 443, "Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets," acceptable to the Engineer, which shall be applied to the outside of plastic pipe when the pipe is to be enclosed in any structure where concrete or mortar is used which will prevent leakage along the outer wall of the barrel of the pipe.
10. No single piece of pipe shall be laid on any project covered by this specification unless it is found to be generally straight. Such pipe shall have a maximum ordinate as measured from the concave side of the pipe not to exceed 1/16 inch per foot of length. If the deviation from straightness exceeds this requirement, then the particular piece of pipe shall be rejected for use until it can comply with this provision.
11. PVC pipe provided under this specification shall be installed to meet the following deflection requirements:
 - a. The pipe shall have a deflection of no more than five percent (5%). Such deflection shall be computed by dividing the amount of deflection (nominal diameter minus the minimum diameter when measured) by the nominal diameter of the pipe. Sections with more than 5% deflection will be removed and replaced at the Contractor's expense.
 - b. After an initial inspection and if, in the opinion of the Engineer, the deflection may be excessive, he may order the Contractor to arrange for and take accurate measurements of the pipe at whatever intervals and at whatever locations between such adjacent manholes the Engineer deems advisable. Such measurements may be taken or ordered taken by the Engineer at any time during the maintenance period and such measurements shall be performed in a manner and by methods approved by the Engineer. The Engineer may require a go-no go type mandrel test with nine vane mandrel for deflection check.

c. All costs involved in taking measurements ordered by the Engineer following the initial inspection shall be borne by the Contractor.

(d) CAST IRON SOIL PIPE

1. Where service lines are exposed or will be covered with less than one foot of earth material over the top of the pipe, or where directed by the Engineer, cast iron pipe conforming to the requirements of "Specification for Cast Iron Soil Pipe and Fittings," Serial Designation ASTM A 74, shall be installed. Pipe shall be coal tar coated.

2. Ductile iron pipe may be substituted for cast iron soil pipe at the discretion of the Contractor.

(e) QUALITY ASSURANCE

1. Pipe and special fittings shall be furnished in sizes, types and classes at the locations shown on the plans.

2. All pipe and specials shall be inspected by an approved commercial testing laboratory prior to delivery. Each joint of pipe and each special shall be stenciled or otherwise marked with the laboratory's mark of acceptance.

3. Any pipe or specials which have been broken, cracked or otherwise damaged before or after delivery or which have failed to meet the required tests, shall be removed from the site of the work and shall not be used therein.

5.03 JOINT MATERIALS

(a) Vitrified clay pipe shall have compression type positive friction joints in accordance with the latest requirements of ASTM "Specification for Compression Joints for Vitrified Clay Pipe and Fittings," Serial Designation C 425, for Type I, II or III joints with lubricant as recommended by the manufacturer. The joint material shall be bonded to the pipe at the factory.

(b) Concrete pipe for storm and sanitary sewers shall have rubber gasket and mastic type bituminous joints.

1. Rubber gasket type joints shall conform to the applicable provisions of ASTM "Specification for Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets," Serial Designation C 443, and AWWA Standard Specifications, Serial Designation C 302, latest revisions. A groove shall be provided in the spigot end to receive the rubber gasket, and it shall be so formed that when the joint is complete, the gasket will be deformed to a near rectangular shape and confined on all four sides. All inside surfaces of the bell and outside surfaces of the spigot, on which the rubber gasket may bear during closure of the joint and at any degree of partial closure, shall be

parallel within one degree and have an angle of not more than two degrees with the longitudinal axis of the pipe. The gasket shall be capable of sealing the joint from either internal or external hydrostatic pressure.

2. Mastic type bituminous jointing compound when required shall be made from asphalt, liquefiers, mineral fillers and fibers and shall be free from moisture. The filler shall be such that it shall have position adhesion to pipe surfaces and shall be water, acid and alkali resistant. It shall be plastic and workable with a trowel and of a composition which will not result in a plastic flow of the material at temperatures up to eighty (80) degrees Fahrenheit. The bituminous jointing compound will not be required on pipe which is manufactured in the following manner:

a. If smooth true metal rings are kept in the bell and on the spigot during the entire steam curing process of the pipe.

b. If the pipe barrel is of minimum specified thickness to the end of the spigot.

c. If the contact surfaces of the joint areas are smooth, free of all projections, air holes, irregularities and not patched or coated in any manner.

(c) PVC pipe joints shall be the bell and spigot type subject to the approval of the Engineer. Joints shall be sealed with a rubber O-ring gasket, and shall be of a composition and texture which is resistant to common ingredients of sewerage, industrial wastes including oils and groundwater, and which will endure permanently under the conditions likely to be imposed by this use. Installation of gasket shall be done in accordance with the pipe manufacturer's instructions using all the necessary materials, lubricants and equipment recommended by the manufacturer.

(d) Cast iron soil pipe shall have push-on joints with neoprene gaskets. Neoprene gaskets shall be in accordance with the requirements of ASTM Serial Designation C 564, "Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings."

(e) Lead joints will be permitted only where other "approved" type joints are not compatible (joining old pipe to new pipe, etc.). Lead shall be in accordance with the requirements of Federal Specification AA-L-156.

5.04 PIPE LAYING

(a) Excavation for the bottoms of the trenches and the backfill shall be prepared in three (3) classes of work, Class A, B, and C as shown on the contract drawings and to fit depths of trench, type of pipe, size of pipe, width of trench and bearing value of subgrade. The determination of the class shall be from actual width of trench, but payment therefor shall be made on class required for theoretical maximum allowable width. If Contractor increases width of trench for his convenience or due to collapse of trench walls so that a higher class of bedding is required, the increased cost of same shall be borne by the Contractor. If the bearing value of the subgrade requires special bedding methods, they

shall be as directed by the Engineer and paid for as made under his direction. Bedding shall be in accordance with the schedules and dimensions shown on the plans and shall be placed where shown on the plans or as directed by the Engineer.

(b) Before sewer pipe is placed in position in the trench, the bottom and sides of the trench shall be carefully prepared with bracing and sheeting installed where required. A Mason's line, supported at intervals not exceeding fifty feet (50'), shall be stretched tightly above ground level at a grade parallel to and directly above the axis line of the pipe. Each pipe shall be accurately placed to the exact line and grade called for on the plans by measuring suring down from this line to the invert of the pipe in place. The Contractor shall furnish all labor and materials necessary for erecting batter boards and establishing lines and grades therefor.

The Contractor may use the Laser Beam method of setting a line and grade for the sewer by using the Laser Beam coaxially through the center of the sewer being laid. The Laser Beam Projector is to be rigidly mounted to its support platforms, with a two-point suspension, or equivalent, assuring that all ground and equipment vibrations are kept to an absolute minimum. All equipment, including equipment necessary to control atmospheric conditions in the pipe to keep line and grade to acceptable standards of accuracy, shall be furnished by the Contractor. The Laser Beam system must be operated by competent experienced personnel who have been properly trained to operate the equipment used.

The Contractor shall stake check pegs at all manholes throughout the job. Check pegs midway between manholes and any other checkpoints deemed necessary to assure accuracy of the equipment shall be provided by the Contractor.

(c) Each piece of the pipe and special fitting shall be carefully inspected before it is placed, and no defective pipe shall be laid in the trench. Pipe laying shall proceed upgrade, starting at the lower end of the grade and with the bells uphill. No pipe shall be laid except in the presence of an inspector representing the Engineer. Trench bottoms found to be unsuitable for foundations after pipe laying operations have started shall be corrected and brought to exact line and grade with the approved compacted materials.

(d) Bell holes shall be of sufficient size to allow ample room for making the pipe joints properly. The bottom of the trench between bell holes shall be carefully graded so that the pipe barrel will rest on a solid foundation for its entire length as shown on the plans. Each joint shall be laid so that it will form a close concentric joint with adjoining pipe and in order to avoid sudden offsets or inequities in the flow lines.

(e) Water shall not be allowed to run or stand in the trench while pipe laying is in progress or before the joints are completely set or before the trench has been backfilled. The Contractor at no time shall open up more trench than his available pumping facilities are able to dewater. Where sewer pipelines are located in or across stream beds or drainage ditches, the Contractor shall divert the stream flow and dewater each section as the work progresses.

(f) No joints shall be made where pipe or joint materials have been soiled by earth in handling until such soiled surfaces are thoroughly cleaned by wire brushing and wiping until all traces of the earth are removed.

(g) As the work progresses, the interior of all pipe shall be kept thoroughly clean. After each line of pipe has been laid, it shall be carefully inspected, and all earth, trash, rags and other foreign matter shall be removed from the interior.

(h) Backfilling of trenches shall be started immediately after the pipe in place has been inspected and approved by the Engineer, and backfill shall be deposited and compacted as provided under Item 1, Common Excavation.

(i) Bedding for polyvinyl chloride (PVC) pipe sewers shall be in accordance with details shown on the contract drawings and to ASTM "Specification for Underground Installation of Flexible Thermoplastic Sewer Pipe," Serial Designation D 2321.

(j) Service Line Installation

1. Installation of service pipe shall conform to the appropriate requirements of main line sewers.

2. Connections to the main sewer shall be made with bends of the proper degree to make the service connection run perpendicular to the main sewer. Pipe shall be laid to a uniform line and grade. Minimum grade shall be one percent (1%).

3. The end of all service connections shall be plugged with a vitrified clay, concrete disc or PVC plug and sealed with plastic joint material. Other means of plugging shall be approved by the Engineer.

4. Crushed stone bedding and backfill material, concrete encasement and protection, etc., shall be provided as conditions required.

5. No service connections shall be covered until they have been inspected and located by the Engineer.

5.05 JOINT CONSTRUCTION

(a) Rubber Gasket Joint

1. Laying O-Ring Rubber Gasket Pipe shall be done in accordance with the pipe manufacturer's instructions, using all the necessary materials, lubricants and equipment recommended by the manufacturer.

2. Where wet conditions prevail, always use "Vreem" or a vegetable type shortening for lubrication. Never use "Flaxcap" in water.

(b) Rubber Gasket and Bituminous Joints

When required by Paragraph 5.03(b)2., joints between consecutive bell and spigot or tongue and groove pipe shall be made with a rubber gasket and compatible bituminous compound of a type recommended by the gasket manufacturer and shall be constructed as follows:

The gasket shall be fitted over the tongue or spigot of each pipe, the space behind the gasket filled with the bituminous compound on tongue and groove joints, and the pipe entered into the bell or groove and shoved home. The remainder of the joint space shall be filled with bituminous compound bevelled off with the outside of the pipe.

(c) Compression Type Joints

Compression type couplings on vitrified clay pipe shall be jointed in accordance with the pipe manufacturer's recommendations, using all the necessary materials, lubricants, adhesives and equipment as recommended by the manufacturer.

(d) Adapters approved by the Engineer shall be used wherever connections are made between pipes constructed of different sizes and types of materials.

(e) Defective joints discovered after laying shall be removed and replaced with new sections of pipe having undamaged joints. Defective pipes shall be removed and proper replacement made.

(f) All openings shall be closed with an approved type vitrified clay, concrete or PVC plug held securely in place. Dead ends of sewer lines shall be similarly stoppered.

5.06 TEES, WYES, RISERS AND PLUGGED STUBS

(a) Tee or wye branches shall be installed in the sewer lines at all places shown on the plans, specified herein or otherwise directed by the Engineer. Tee branches on pipe less than eighteen inches (18") in diameter shall be manufactured monolithically with the barrel.

(b) Riser connections, of the size and type shown on the plans, shall be installed at the locations shown on the plans or directed by the Engineer. A plastic film-marking tape five feet (5') long shall be placed twelve inches (12") over the top of each riser during backfilling to mark the location of the riser. The marking tape shall be heavy gauge polyethylene film (.004 inches thick). Tape shall be standard red color imprinted with the words "Warning - Buried Sewer Line Below." Tape shall be Allen Marking Tape No. AMT-1212 as manufactured by the Allen System, Inc., Glen Ellyn, Illinois. A second marking tape containing a metallic core which can be located with a metal detector shall be laid on top of the first marking tape. This tape shall be five feet (5') long and three inches (3") wide. Tape shall be Allen Detectotape Catalog No.ADT-1003 for buried sewer line as manufactured by the Allen System, Inc.

(c) Plugged pipe stubs for future connections to manholes and sewerage structures shall be installed where shown on the plans or directed by the Engineer. The pipe stubs shall be installed with the bell encased in the wall of the manhole and the bell of the opening flush with the outside wall of the manhole or structure.

(d) Plugged stubs and such branches of pipelines that are not to be used immediately shall be closed with clay, concrete or PVC stoppers held securely in place.

(e) Where specifically directed by the Engineer or shown on the drawings, connections to reinforced concrete pipe over eighteen inches (18") in diameter shall be made in accordance with details shown on the drawings.

5.07 CONNECTIONS

(a) If the work consists of the construction of sewer that is to replace an existing sewer, all of the existing service lines shall be kept in operation and connected to the new line.

(b) Connections shall be made to all existing sewer lines in the vicinity of the work by removing a section of the sewer from the existing line and inserting in the space a tee branch of the proper size, or by the construction of a manhole, regulator chamber or other structure as shown on the plans.

(c) Connections to existing manholes or inlets where no plugged stubs exist shall be made by cutting a hole in the wall of the existing structure, inserting a length of sewer into the hole, filling around same with concrete or mortar, and troweling the inside and outside surfaces of the joint to a neat finish. The bottom of the manhole shall be shaped to fit the invert of the sewer pipe as specified under "Manholes." PVC lines shall have water stops as shown on drawings.

(d) Connections to building services shall be made in a neat and work person-like manner. Clean out plugs shall be installed, whenever easible, by making the connection with a standard wye or tee.

5.08 EXISTING UTILITIES

(a) All existing sewers, water lines, gas lines, underground conduits, telephone lines, sidewalks, curbs, gutters, pavements, electric lines or other utilities or structures in the vicinity of the work shall be carefully protected by the Contractor from damage at all times. Here it is necessary for the proper accomplishment of the work to repair, remove and/or replace any such utility. The work shall be done under the provisions set forth in the "General Provisions." No separate payment shall be made for removing and replacing and/or repairing damaged existing sewers, water, gas, electric and telephone lines or conduits or other utilities, culverts, drains or conduits of similar existing services or structures. The removal, replacement and/or repair of these items shall be paid for in the unit price bid by the Contractor on other items or work. Similar repair and replacement of sidewalks, pavements, curbs, and gutters are provided elsewhere herein.

(b) Separation of Sewer or Water Lines and Culverts

1. Sewers shall be laid at least ten feet (10'), horizontally, from any existing or proposed water main. Should local conditions prevent a lateral separation of ten feet (10'), the sewer may be laid closer than ten feet (10') to a water main if it is laid in a separate trench, provided elevation of the top (crown) of the sewer is at least eighteen inches (18") below the bottom (invert) of the water main.

2. When sewers cross under water mains, the top of the sewer shall be at least eighteen inches (18") below the water main. If necessary, the water main shall be relocated to provide this separation or reconstructed with mechanical-joint cast iron or ductile iron pipe for a distance of ten feet (10') on each side of the sewer. One full length of water main shall be centered over the sewer so that both joints will be as far from the sewer as possible.

3. When it is possible to obtain proper horizontal and vertical separation as stipulated above, both water main and sewer main shall be constructed of mechanical-joint cast iron pipe and shall be pressure tested to assure water tightness.

4. When sewer lines cross under culverts where the sewer and the culvert are less than eighteen inches (18") apart, the sewer line shall be encased in concrete as shown on the standard drawings.

5.09 CLEANUP

After completing each section of the sewer line, the Contractor shall remove all debris and construction materials and equipment from the site of the work, grade and smooth over the surface on both sides of the line, and leave the entire right-of-way in a clean and neat condition. Unless otherwise called for on the drawings, the Contractor shall restore all disturbed areas to as close to its original condition as possible. Restoration shall include, but not be limited to, grassing, replacing shrubbery, trees, fences and other improvements which have been disturbed.

Cleanup and restoration shall be completed within sixty (60) calendar days after each section of sewer line is installed. Should the Contractor fail to do the cleanup within sixty (60) calendar days, payment made for pipe sewers and service lines for that section of the sewer not cleaned up shall be removed from the periodic estimate until the cleanup work is completed.

5.10 INSPECTION

(a) After completion of any section of sewer, the grades, joints and alignment shall be true to line and grade. Joint surfaces shall be smooth. There shall be no visual leakage, and the sewer shall be completely free from any cracks and from protruding joint materials, deposits of sand, mortar or other materials on the inside.

(b) For clay and concrete pipe, infiltration shall not exceed 300 gallons per 24 hours per mile. For PVC pipe, infiltration shall not exceed 25 gallons per 24 hours per inch of diameter per mile of sewer. For PVC force main, pipe shall be tested for leaks after laying in accordance with applicable requirements of Item 7 of the specifications for testing cast iron pipe. Contractor shall furnish all supplies, materials, labor, services, etc., needed to make infiltration or exfiltration tests including water. No separate payment will be made for equipment, supplies, material, water or services.

(c) Any leakage, including active seepage, shall be corrected by removal and replacement of pipe or joint where such leakage exists until the pipelines meet the requirements of the allowable leakage specifications.

(d) Infiltration tests shall be made when groundwater level is eighteen inches (18") or more above the top of the outside of the pipe.

(e) When normal groundwater does not stand at a level outside the pipe to enable infiltration tests to be made to the satisfaction of the Engineer, Contractor may make infiltration tests by filling the pipe or sections thereof with water to a head of not less than two feet (2') above the top of the inside of the pipe and observing the amount of water required to maintain this level.

(f) The sewers installed under the contract will be subject to television inspection by Owner and/or Engineer. It is the intent to televise sewers in which there are suspected defects. The City will furnish all equipment, materials, and labor for such inspection.

The Contractor shall provide access for the City crews and equipment for the television inspection and shall have his representative present during the inspection.

The television work shall be scheduled so as to take advantage of the time when the groundwater table is most likely to cause infiltration. Work shall be scheduled during or after rainy periods rather than after prolonged periods of dry weather. Logs and/or tapes of the inspections will be made available to the Contractor.

(g) When approved by the Engineer, "low pressure air test" shall be made in accordance with the procedures and standards listed below.

1. Clean pipe to be tested by propelling snug-fitting inflated rubber ball through the pipe with water.

2. Plug all pipe outlets with suitable test plugs. Brace each plug securely to prevent blowouts. As a safety precaution, pressurizing equipment shall include a regulator set at slightly above test pressure to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the manhole during testing.

3. If the pipe to be tested is submerged in groundwater, insert a pipe probe by boring or jetting into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to groundwater submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.

4. Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psi.

5. After an internal pressure of 4.0 psi is obtained, allow at least two minutes for air pressure to stabilize, adding only the amount of air required to maintain pressure.

6. When pressure decreases to 3.5 psi, start stopwatch. Determine the time in seconds that is required for the internal air pressure to reach 2.5 psi. Minimum permissible pressure holding times for runs of single pipe diameter and for systems of four inch (4"), six inch (6"), or eight inch (8") laterals in combination with trunk lines are indicated in the following tables in seconds.

NCPI AIR TEST TABLES

MINIMUM HOLDING TIME IN SECONDS REQUIRED

FOR PRESSURE TO DROP FROM 3 1/2 TO 2 1/2 PSI

PIPE DIAMETER														
4"	6"	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	39"	

25	4	10	18	28	40	62	89	121	158	200	248	299	356	418
50	9	20	35	55	79	124	178	243	317	401	495	599	713	837
75	13	30	53	83	119	186	267	364	475	601	743	898	1020	1105
100	18	40	70	110	158	248	356	485	634	765	851	935		

125	22	50	88	138	198	309	446	595	680					
150	26	59	106	165	238	371	510							
175	31	69	123	193	277	425								
200	35	79	141	220	317									

225	40	89	158	248	340									
250	44	99	176	275										
275	48	109	194	283										
300	53	119	211											

350	62	139	227											
400	70	158												
450	79	170												
500	88													
550	97													
600	106													
650	113	170	227	283	340	425	510	595	680	765	851	935	1020	1105

NOTE: To be used when testing one diameter only.

5.11 DETERMINATION OF PAY QUANTITIES (Unit Price Contracts Only)

(a) The quantities of pipe sewers and service lines, including common excavation, for which payment will be allowed shall be expressed in linear feet for each size and type of pipe and applicable depth as shown in the Bid Schedule and shall be the horizontal length of sewer, other than cast iron or ductile iron sewers, installed complete in place as measured along the centerline of the sewer, with no deductions made for bends, increasers, tee connections or manholes. The applicable vertical depth shall be measured from the original ground surface to the invert of the sewer and shall be as shown in the Bid Schedule.

(b) The quantities of tee connections and plugged stubs for which payment will be allowed shall be the actual number of each size and type furnished and installed by the Contractor.

(c) The quantities of connecting risers for which payment will be allowed shall be expressed in linear feet of pipe and bends and shall be the vertical length of riser installed in place as measured along the centerline of the riser from the centerline elevation of the sewer line to the top of the riser connection as shown on the plans. No separate payment will be made for bends, concrete or plastic film markers used in this construction, payment therefor being included in the linear feet of riser pipe paid for in this category.

(d) The quantities of each connection installed, as directed and shown on the drawings, in reinforced concrete pipe over eighteen inches (18") in diameter for which payment will be allowed shall be the actual number each connection so made by the Contractor. The connection will be included in addition to the linear feet of pipe sewer measured.

(e) Reinforcing steel, cast iron pipe and other classes of work entering into pipeline construction shall be measured and payment made therefore under the applicable provisions set forth in other items of these specifications and the Bid Schedule.

(f) Concrete for headwalls, collars, cradles, piers, pipe protection and/or encasement shall be measured in cubic yards of concrete furnished and placed in accordance with plan dimensions and these specifications and payment for this item of work shall be made at the applicable unit price per cubic yard of the class of concrete placed as set forth in the Bid Schedule.

(g) Crushed rock, gravel or other approved bedding materials shall be measured in cubic yards of such materials furnished and placed in accordance with plan dimensions and these specifications in excess of those amounts required for Class C or Standard Bedding. No separate payment shall be made for Class C or Standard Bedding, and the cost shall be included in other items of work done under Item 5 in the Bid Schedule.

(h) No separate payment shall be made for connections to existing sewers and to manholes or inlets. The cost of this work shall be included in the unit price bid for other items of work done under Item 5.

(i) No separate payment shall be made for furnishing and installing stoppers. The cost of this item shall be included in the unit prices bid for other items of work done under Item 5 in the Bid Schedule.

(j) No separate payment shall be made for furnishing and installing adapters, bends, increasers and tees, cleanouts and other fittings and accessories in the building service lines. The cost of these shall be included in the unit prices bid for service lines under Item 5 in the Bid Schedule.

(k) No separate payment shall be made for any common, rock or borrow excavation, clearing or backfill. The cost of these items shall be included in the unit prices bid for pipe sewers under Item 5 in the Bid Schedule.

(l) In the event that inspection of the sewers by television is performed by the Contractor, the quantities for which payment of this service will be allowed shall be the horizontal length of sewer inspected, measured along the centerline of the sewer for which this service is performed, with no deduction made for manholes. No additional measurements will be allowed for tees, risers, or other sewer appurtenances between manholes. Measurement for payment shall be made on the same piece of pipe one time only. If it is necessary to televise an area more than one time for any reason, no additional allowance will be made for the second or subsequent television inspection of the same piece of pipe.

A lump sum amount shall be allowed for supplying and setting up the television equipment on the job as provided for in the Bid Schedule. Payment for this item shall be allowed one time only through the work.

5.12 PAYMENT (Unit Price Contracts Only)

(a) Payment for pipe sewers, service lines, television inspection (when required), tees, risers, plugged stubs, and connections to concrete pipe constructed under these specifications shall be made for the quantities determined in the manner specified above at the contract price per linear foot or each, as applicable, for each of the applicable pipe and special sizes and types listed in the contract pay items in the Bid Schedule.

(b) Payment for concrete and bedding materials furnished and placed under this specification shall be made for the quantities determined in the manner specified above at the contract price per cubic yard and as listed under the applicable items of the Bid Schedule as specified above.

(c) These amounts shall cover the cost of furnishing all materials, tools, labor, plant, equipment, services, and other expense in connection with common trench excavation and furnishing and installing all items of work herein specified under Item 5 and when so paid, shall constitute full compensation to the Contractor.

Item 10

Full-Depth Reclamation

10.01 INTRODUCTION

Description. Full-depth reclamation (FDR) of a roadway shall consist of any combination of:

- Milling and removal of existing asphalt
- Pulverizing and mixing of asphalt, base, and/or subgrade.
- Addition and blending of Portland cement and water.
- Spreading and compaction of the mixed material to a specific grade.

This will result in a base course that meets or exceeds the stiffness specified in the plans and specifications.

10.02 MATERIALS

Portland Cement. Portland cement shall comply with the latest ASTM Specification for Portland Cement (ASTM C 150).

Water. Water shall be free from substances deleterious to the setting of the mix.

Bituminous Prime Coat shall conform to TDOT Specification Section 402.

10.03 CONSTRUCTION

Pulverizing. The contractor shall pulverize all pavement, base, and subgrade to a depth specified in the plans and specifications. The number of passes needed to meet the desired pulverization will be site specific based on the type of materials found in place.

Application of Cement. The quantity of cement specified in the plans and specifications shall be applied to the pulverized material in a manner that minimizes dust and facilitates uniform mixture.

Mixing. The pulverized material, cement, and water shall be mixed until the result is a uniform material and moisture content.

Compaction. The blended material shall be compacted by means of any roller equipment combination (i.e. - steel drum, pneumatic wheel, sheepsfoot, etc.) to a minimum stiffness of 18 CIV as tested by means of a Clegg hammer, by the City's Project Engineer. Finish grade will be set by the Project Engineer on a site specific basis.

Sealing. Once the finished grade is established, apply a prime coat of bituminous material. The bituminous material shall be uniformly applied to the surface at the rate and temperature specified by TDOT Section 402.

Traffic. Completed portions of FDR can be opened to traffic, when the prime coat has fully cured or if required, a sand blotter cover has been applied.

10.04 **MEASUREMENT AND PAYMENT.**

Measurement. This work shall be measured in square yards of roadway treated, completed and accepted.

Payment . The accepted quantities of Full Depth Reclamation will be paid for at the contract unit price per square yard for Full Depth Reclamation.

Payment for Full Depth Reclamation will be full compensation for all work necessary to complete the item.

TABLE FDR-1

Depth of Pulverization	Cement Content (by weight)	Moisture Content Range	Unit Weight (#/SY)
0" – 8"	6%	6-9%	46.8
8" – 12"	6%	6-9%	70.2
12" – 16"	6%	6-9%	93.6

END OF DOCUMENT

ITEM 14

MINERAL AGGREGATE BASE

14.01 SCOPE OF WORK

This work shall consist of furnishing and placing one or more courses of aggregate, plus additives if required, on a prepared subgrade in accordance with these specifications and in reasonably close conformity with the lines, grades, thicknesses and typical cross-sections shown on the Plans or established by the Engineer.

Mineral aggregate base shall be Type A or Type B, whichever is shown on the Plans and called for in the Bid Schedule.

14.02 MATERIALS

(a) Aggregate

The mineral aggregate shall meet the requirements of Item 73.05 for Class A or Class B aggregate, depending upon whether Type A or Type B base is required in the construction. Type A Base will require the use of Class A aggregate, Grading D. Either Class A or Class B aggregate may be used for Type B Base.

When the stationary plant method for mixing is used, the aggregate will be accepted immediately following mixing or immediately prior to mixing, based on periodic samples taken from the pugmill output, or from the belt feeding the pugmill.

When two or more materials are blended on the road by means of mechanical mixers, the aggregate will be accepted after mixing and before compaction, based on samples taken from each layer of base material. Aggregate that does not require blending will be accepted at the aggregate production plant, based on samples taken from stockpiles or plant production immediately prior to delivery to the road.

(b) Calcium Chloride

Calcium chloride shall meet the requirements of Item 74.02 for Type 1 or Type 2, except that the requirements for "total alkali chlorides" and "impurities" shall not apply.

(c) Sodium Chloride

Sodium chloride shall meet the requirements of Item 74.03.

14.03 EQUIPMENT

All equipment necessary for satisfactory performance of this construction shall be on the project and approved before work will be permitted to begin. Such equipment shall include a stationary mixing plant or mechanical road mixers, whichever is applicable to the type of work to be performed, as specified under Item 14.04(b).

(a) Stationary Mixing Plant

The mixing unit shall be an approved twin-shaft pugmill capable of producing a constant, uniform mixture. The mixer shall be equipped with a suitable truck-loading hopper with gate which will prevent segregation of the material when dumped into the truck. A spray bar capable of assuring an even wetting of the aggregate shall be mounted at the entrance of or above the pug-mill. The flow of water through the spray bar shall be controlled by a meter, valve or other approved type of regulating device to maintain a uniform moisture content in the mixture. The mixing plant shall be equipped with adjustable feeders for each size material capable of regulating a constant, uniform flow of material.

(b) Mechanical Mixer (for Road Mixing)

The mechanical mixer shall be of the pugmill or rotary type capable of producing a uniform blend of all materials to the full depth of the course being placed. The mixer shall be either a self-propelled or trailer type.

14.04 CONSTRUCTION REQUIREMENTS

(a) General

1. Mineral aggregate base, Type A or Type B, shall be constructed in layers, the compacted thickness of which shall be as shown on the Plans.
2. The subgrade shall be checked and approved by the Engineer not more than five hundred feet (500') in advance of spreading any mineral aggregate. This distance may be shortened by the Engineer to as little as two hundred feet (200') between November first and April first or during periods of prolonged wet weather.
3. Mineral aggregate shall not be spread on a subgrade that is frozen or contains frost.
4. Hauling over material already placed will not be permitted until it has been spread, mixed, shaped and compacted.

(b) Mixing

1. Unless otherwise specified, Contractor shall mix the base course material, including an additive if required, on the Plans, by one of the following methods:

- a. For mineral aggregate base, Type A, the stationary plant method will be required.
- b. For mineral aggregate base, Type B, requiring the blending of two or more materials, either the stationary plant method or the road mix method (mechanical mixer) shall be used.
- c. For mineral aggregate base, Type B, requiring additive, stationary plant mixing or mechanical road mixing shall be used.
- d. For mineral aggregate base, Type B, requiring neither blending of materials nor additives, either stationary plant mixing, mechanical road mixing or mixing by motor grader on the road may be used.

2. Detailed requirements for the three types of mixing operation are as follows:

a. Stationary Plant Method

The base course material and water shall be mixed in an approved stationary mixing plant as described in Item 14.03(a). Water shall be added during the mixing operation in the amount necessary to provide a moisture content satisfactory for compacting. If combining materials is required to meet the grading requirements, the blending shall be performed as provided for in Item 73.05, prior to mixing.

b. Road Mix Method (Mechanical Mixer)

After the material for each layer of base course has been placed through an aggregate spreader or windrow-sizing device, the material shall be mixed by means of approved mechanical mixing machines as described in Item 14.03(b).

c. Road Mix Method (Motor Grader)

After material for each layer of base course has been deposited and spread uniformly, it shall be sprinkled with water in sufficient quantity to moisten all particles, but not in such quantity that segregation of sizes or softening of subgrade will occur. Immediately following the application of water, the material shall be thoroughly mixed by windrowing and spreading with motor graders until the mixture is uniform throughout.

(c) Spreading

1. Stationary Plant Mixing

After mixing, material for each layer of base shall be transported to the job site while it contains the proper moisture content, and shall be spread to the required thickness and cross-section by means of an approved mechanical spreader.

2. Road Mixing (Mechanical Mixer)

Material to be mixed by mixing method b shall be spread prior to mixing with an approved mechanical spreader. If the blending of two or more materials is to be performed on the road, each material shall be spread separately with an approved mechanical spreader capable of being adjusted to spread the materials in the proper proportions.

3. Road Mixing (Motor Grader)

a. After the aggregate and water have been thoroughly mixed, the base material shall be spread while at optimum moisture content in layers of specified thickness and cross-section by means of approved motor graders.

b. If the required compacted depth of base course exceeds six inches (6"), the base shall be constructed in two or more layers of approximate equal thickness. The maximum compacted thickness of any one layer shall not exceed six inches except when vibrating or other approved types of special compacting equipment are used, the compacted depth of a single layer of base course may be increased to eight inches upon approval of the Engineer.

c. In some cases, the plans show the base as extending for the full width of the roadbed. In other cases, the edges of the base are shown as coinciding with the inside edges of the shoulders. In the latter case, shoulder material shall be placed to a minimum width of three feet (3') prior to the spreading of each layer of base material in order to confine the base material and to permit proper compaction.

d. Any base material used for constructing detours, for maintenance of traffic, for backfilling rock cuts and capping rock fills may be spread and mixed using this method.

(d) Shaping and Compaction

1. Except where mechanical aggregate spreading equipment is used to place the base material, final shaping of each layer prior to compaction shall be accomplished by motor grader. In the event that mechanical spreading equipment fails to shape the base material properly, final shaping shall be done by motor grader or other approved means.

2. Immediately following spreading and final shaping, each successive layer shall be compacted with pneumatic-tire rollers described under Subsection 205.02 of Tennessee Department of Transportation Standard Specifications and any other types of compacting equipment, provided the required density and the required degree of uniformity and smoothness are attained. If the density requirement does not apply as provided for below, the base may be compacted with pneumatic-tire rollers meeting the requirements of Subsection 205.03 of Tennessee Department of Transportation Standard Specifications as directed by the Engineer. Compaction shall progress gradually from the edges of the base to the center, parallel with the center-line of the road, and shall continue until the base layer has been compacted to its full width. Where lifts of shoulder materials are placed to confine the base material, the initial pass of the compacting equipment shall overlap the shoulder to a width of not less than twelve inches (12").

3. Compaction of each layer shall continue until a density of not less than eighty-three percent (83%) of the solid volume has been achieved. The density determination will be based on the bulk specific gravity, AASHTO Designation T 84, "Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate," and T 85, "Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate," and the dry weight of the aggregate. Unless otherwise specified, density requirements will not apply to base construction on projects that do not include the construction of a surface upon the base. The compaction of each layer shall be approved before material for the next successive layer is placed. Placing and compacting areas shall be kept separate.

4. The surface of each layer shall be so constructed that the aggregates become firmly keyed and a uniform texture produced and shall be maintained in that condition until covered by the following stage of construction or until final acceptance of the project. Any irregularities that develop shall be corrected by loosening the material at those places and adding or removing material as required.

5. Approved distributors shall be used to apply water uniformly over the base materials during compaction in sufficient quantity for proper compaction. Softening of the underlying subgrade resulting from the use of excess water is especially to be avoided.

(e) Maintenance

After construction of the base has been completed satisfactorily, it shall be maintained, under traffic if required, smooth and uniform until covered by the following stage of construction or until the project has been completed and accepted.

(f) Thickness Requirements

The thickness of the completed base shall be in reasonably close conformity to the thickness shown on the Plans. The thickness shall be measured at such frequency as established by the Engineer by means of test holes or other approved methods.

(g) Surface Requirements

The surface of the finished base shall be in reasonably close conformity to the lines, grades and cross-sections shown on the Plans or established by the Engineer and shall have a satisfactorily smooth riding quality.

14.05 COMPENSATION (IF APPLICABLE)

(a) Method of Measurement

Mineral aggregate base, unless otherwise stipulated, shall refer to Type A, Grading D mineral aggregate meeting the requirements of Item 73.05. Mineral aggregate base shall be measured by the ~~ton of 2000 pounds~~ unit(s) specified in the bid schedule.

(b) Basis of Payment

The accepted quantities of mineral aggregate base of the type specified will be paid for at the contract unit price ~~per ton for mineral aggregates~~ specified in the bid schedule.

END OF DOCUMENT

ITEM 15

CONCRETE PAVEMENT REMOVAL

15.01 SCOPE OF WORK

(a) All pavement, base course, sidewalks, driveways, curbs, gutters, etc., which are constructed of Portland Cement Concrete, designated for removal, shall be disposed of as directed.

(b) Concrete pavement, parking strip, base with or without bituminous overlay, concrete curb and gutter, sidewalks, driveways, etc., which exist within the limits of construction and are not more than one-half foot (.5') below subgrade elevation shall be removed and disposed of.

15.02 METHOD OF MEASUREMENT

Pavement areas of any kind whatsoever, as named above, shall be considered uniform in depth and shall be measured in units of square feet.

15.03 BASIS OF PAYMENT

The accepted quantities of Pavement Removal will be paid for at the contract unit price bid. Said price shall be full compensation for removing and disposing of the designated materials in accordance with the contract.

END OF DOCUMENT

ITEM 19

TREE AND/OR STUMP REMOVAL

19.01 SCOPE OF WORK

The work covered under this item shall consist of removing trees, stumps, shrubs, etc., from the street right-of-way. The Contractor shall use special care to protect public and private property. The Contractor shall take special care so as not to damage any utility lines in the process of cutting and removing the trees. The Contractor shall maintain proper barricades and watchpersons to detour traffic during the cutting and removal of trees.

19.02 EQUIPMENT

All equipment necessary or required in connection with this type of work must be on hand, proven to be in first class working condition, and approved by the Engineer before this work will be permitted to begin.

19.03 CUTTING TREES

Before any tree is cut down, the tree shall be completely "topped" in an accepted manner approved by the Engineer so as to protect all utilities, public and private properties. The Contractor shall be responsible for removing branches, foliage, etc., from the construction site as soon as the tree has been cut. If any curb, sidewalk, wall, street, etc., is damaged during the removal of a tree, the Contractor shall replace the damaged portions at his/her own expense as directed by the Engineer.

19.04 STUMP REMOVAL

Stumps shall be removed to a minimum depth of six inches (6") below finished grade. The stumps shall be removed by a "stump router" or any other manner as approved by the Engineer. If the portion of curb and sidewalk is in good condition at the stump and the Contractor removed the stump by other means than a "stump router" and damages the curb and sidewalk, the Contractor shall replace same at his/her own expense. If the Engineer determines that the stump cannot be removed without damaging the curb and/or sidewalk, the City will bear the cost of replacing the curb and sidewalk.

19.05 METHOD OF MEASUREMENT AND PAYMENT

(a) No separate payment shall be made for clearing and grubbing, removal of all debris from the construction site, or the installation of topsoil to finished grade.

(b) Payment will be made for the removal of trees and/or stumps for each diameter as shown in the Bid Schedule.

(c) No separate payment will be made for the removal of bushes, shrubs, or trees less than six inches (6") in diameter, nor the installation of topsoil, where their stumps were removed.

(d) Payment will be made for the removal of an existing stump as shown in the Bid Schedule at the unit price bid for each diameter. The unit price, so paid, shall cover the cost of furnishing all labor, materials, tools, services and other expense in connection with the removal of trees and/or stumps.

ITEM 23

REMOVAL OF STRUCTURES AND OBSTRUCTIONS

23.01 DESCRIPTION

This work shall consist of the removal, wholly or in part, and satisfactory disposal of all buildings, fences, structures, old pavements, abandoned pipe lines, and any other obstructions which are not designated or permitted to remain, except for the obstructions to be removed and disposed of under other items in the Contract. It shall also include the salvaging of designated materials and backfilling the resulting trenches, holes, and pits. When the Proposal does not include pay items for Removal of Structures and Obstructions as set out in this Section, such work shall be performed, and the costs thereof shall be included in the prices bid for other items of construction.

EQUIPMENT

23.02 EQUIPMENT

All equipment necessary for the satisfactory performance of this work shall be on the project and approved before the work will be permitted to begin.

CONSTRUCTION REQUIREMENTS

23.03 GENERAL

The Contractor shall raze, remove, and dispose of all buildings and foundations, structures, fences and other obstruction, any portions of which are on the rights-of-way, except utilities, and those for which other provisions have been made for removal. All material from such work designated to become the property of the Department shall be removed without unnecessary damage, in sections or pieces which may be readily transported, and shall be stored and protected by the Contractor at specified places within the project limits, and all material not so designated will become the property of the Contractor and shall be disposed of outside the limits view from the project. If the material is disposed of on private property, the Contractor shall secure written permission from the property owner. A copy of each agreement with property owners is to be furnished by the Engineer.

The City of Chattanooga reserves the right to dispose of buildings on any tract prior to their being torn down or removed by the contractor.

Buildings and other structures, which are indicated on the Plans to be removed or disposed of by other agencies, will not be held as a charge or responsibility of the Contractor except that the Contractor waives any and all claims for interference, delay or damage due to their removal or non-removal.

Foundations of buildings and structures shall be removed to a depth of not less than one foot below natural ground, except that within construction limits, removal shall be to a depth of not less than two feet below subgrade elevation. Basement floors shall be broken up to prevent holding of water. Basements or cavities left by structure removal shall be filled to the level of the surrounding ground and within the prism of construction and below subgrade elevation shall be compacted in accordance with the provisions of Item 1, Earthwork.

23.04 REMOVAL OF BRIDGES, CULVERTS, AND OTHER DRAINAGE STRUCTURES

Bridges, culverts and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic.

Unless otherwise specifically designated or directed, the substructure of bridges shall be razed to the adjacent ground level or natural stream bottom for such portions located in a stream, except that such portions of the substructure of a bridge located in a navigable stream shall be subject to the laws of the U. S. Government and requirements set out in the standard permit form of the applicable government agency approving the location and plans and authorizing the construction of the structure. Where such portions of existing structures lie wholly or in part within the limits for a new structure, they shall be removed as necessary to accommodate the construction of the proposed structure.

Steel bridges and wood bridges designated to become the property of the City of Chattanooga shall be carefully dismantled without unnecessary damage. All such material shall be stored in a manner as to prevent damage.

Blasting or other operations necessary for the removal of an existing structure or obstruction, which may damage new construction, shall be completed prior to placing the new work, or adequate precautions shall be taken to prevent such damage.

23.05 REMOVAL OF PIPE

Pipe designated to become the property of the City of Chattanooga shall be carefully removed and every precaution taken to avoid breaking or damaging the pipe. Pipes shall be removed, and stored when necessary, so that there will be no loss or damage. The Contractor will be required to replace sections damaged by negligence or by use of improper methods.

23.05 REMOVAL OF PAVEMENT, SIDEWALKS, CURBS, ETC., CONSTRUCTED OF PORTLAND CEMENT CONCRETE

All pavement, base course, sidewalks, curbs, and gutters, etc., constructed of portland cement concrete designated for removal shall be disposed of as directed.

Concrete pavement, parking strip, and base, all with or without bituminous overlay, concrete curb and gutter, sidewalk, driveways, etc., shall be removed and disposed of as follows:

If the items are below subgrade elevation, but by not more than two feet, they shall be removed, disposed of, and the work paid for in accordance with this Section.

If the items are more than two feet below subgrade elevation, they shall be broken into size not to exceed two feet in maximum dimension and remain in place, unless it interferes with succeeding items of construction. The cost of this work shall be included in the unit price bid for other items of construction and shall not be paid for directly.

If the items are above subgrade elevation, the removal and disposal of same shall be paid for as provided in Item 1, Earthwork.

When specified, ballast, gravel, bituminous pavement or other pavement materials shall be removed and stockpiled as in an appropriate manner. Otherwise, such materials shall be disposed of as directed.

COMPENSATION

23.07 METHOD OF MEASUREMENT (IF APPLICABLE)

When the Contract stipulates that payment will be made for removal of structures and obstructions on a lump sum basis, the pay item, Removal of Structures and Obstructions, will include all structures and obstructions encountered within the rights-of-way in accordance with the provisions of this Section. Where the Contract stipulates that payment will be made for the removal of specific items on a unit basis, measurement will be made by the unit stipulated in the Contract.

Removal of Rigid Pavements, Sidewalks, etc., to be paid for under Item 23, will be measured for payment by the square foot unless the contract stipulates that payment for removal of rigid pavements, sidewalks, etc., will be on a lump sum basis.

Where the removal of pipe is designated as a specific item, it will be measured in linear feet or lump sum basis.

23.08 BASIS OF PAYMENT (IF APPLICABLE)

The accepted quantities of Removal of Structure and Obstructions will be paid for at the contract lump sum price bid, which price shall be full compensation for removing and disposing of the obstructions in accordance with the Contract.

Specific obstruction items, including pipe removal, stipulated for removal and disposal under unit price pay items and Removal of Rigid Pavements, Sidewalks, etc., will be paid for at the contract unit price bid per unit specified in the proposal, which price shall be full compensation for removal and disposal of such items, excavation and subsequent backfill incidental to their removal. The price shall also include salvage of materials removed, their custody, preservation, storage on the rights-of-way, or disposal as provided herein.

Payment will be made only when payment for all or any part thereof is provided for in a "Pay Item."

END OF DOCUMENT

ITEM 35

SODDING AND/OR SEEDING

35.01 SCOPE OF WORK

(a) Sodding

1. Sodding shall consist of planting an entire area with sod.
2. Strip sodding shall consist of planting narrow strips in continuous lines.
3. Spot sodding shall be planted as indicated on the Plans.
4. Sod, strip sod, or spot sod shall be planted on areas indicated on the Plans or as directed by the Engineer and in accordance with these Specifications.

(b) Seeding

Seeding shall consist of preparing the ground area and sowing grass seed of the group specified at such locations as may be indicated on the Plans or as directed by the Engineer in conformity with the provisions and requirements set out in these Specifications, stipulated in Special Provisions, or as directed by the Engineer. Seeding shall also consist of the maintenance and final clearing up in conformity with the provisions and requirements set out in these Specifications, stipulated in Special Provisions or as directed by the Engineer. In general, all newly graded earthen areas that are not to be paved, stabilized or sodded shall be seeded, unless otherwise indicated on the Plans or as directed by the Engineer.

35.02 MATERIALS

(a) Sodding

1. Sod shall consist of a live, dense, well-rooted growth of permanent grasses, free from Johnson grass, nut grass and other obnoxious grasses, of suitable character for the purpose intended and for the soil in which it is planted. It shall be uninjured at the time of planting.
2. Sod, strip sod, or spot sod must be free of weeds, bind weeds or other matter which has a tendency to kill grass.
3. All sod for sodding shall be at least eight inches (8") wide, not less than twelve inches (12") long and have at least two and one-half inches (2 1/2"), in thickness, of dirt on its roots.

4. All sod for strip sodding shall be at least three inches (3") wide, not less than twelve inches (12") long and have at least two and one-half inches (2 1/2"), in thickness, of dirt on its roots.

5. All sod for spot sodding shall be at least three inches (3") square and have at least two and one-half inches (2 1/2"), in thickness, of dirt on its roots.

6. Ammonium nitrate shall be a standard commercial product, shall conform to the requirements for other commercial fertilizers as specified in Item 74.16 of these

Specifications and shall have a minimum of thirty-three and one-half percent (33 1/2%) nitrogen.

(b) Seeding

1. Seed shall meet all requirements of Item 74.14 of these Specifications. All grass seed shall be of the previous year's crop. All seeds shall be free of illegal weed seeds; grass seeds will be rejected when they contain weed seeds in excess of one percent (1%).

2. Mulch shall meet all requirements of Item 74.18 of these Specifications. Mulch binder shall be either cut-back asphalt Grade RC-70 or RC-250 conforming to the requirements of Item 904.03 of the Tennessee Department of Transportation Specifications.

3. Topsoil shall meet all requirements of Item 36 of these Specifications.

(c) Fertilizer

Fertilizer (15-15-15) shall contain fifteen percent (15%) nitrogen, fifteen percent (15%) phosphoric acid and fifteen percent (15%) potash, and shall be a good grade commercial fertilizer. The fertilizer shall be furnished in standard containers with the name, weight and guaranteed analysis of the contents clearly marked. The containers shall insure proper protection in handling and transporting the fertilizer. All commercial fertilizer shall comply with local, state and federal fertilizer laws and with Item 74.15 of these Specifications.

(d) Agricultural Limestone

Agricultural limestone shall contain not less than eighty-five percent (85%) of calcium carbonate and magnesium carbonate combined, and shall be crushed so that at least eighty-five percent (85%) will pass the No. 10 mesh sieve.

35.03 EQUIPMENT

(a) All equipment necessary for the proper preparation of the areas and for the sowing and maintenance must be available when required, in first class working condition, and shall have been approved by the Engineer before construction is permitted to begin.

(b) The Contractor's attention is especially called to the fact that he shall provide satisfactory equipment for watering and sprinkling.

35.04 WEATHER LIMITATIONS

(a) Sodding

Sod, strip sod or spot sod shall be planted only when the soil is moist and favorable to growth. No planting shall be done between October 1st and April 1st unless weather and soil conditions are considered favorable and permission is granted by the Engineer.

(b) Seeding

1. The Contractor shall notify the Engineer at least forty-eight (48) hours in advance of the time he intends to begin sowing seed and shall not proceed with such work until permission to do so has been granted by the Engineer. Before starting seeding operations on any area, final dressing shall have been completed in accordance with the requirements of Item 36.

2. The seed group mixture shall be as specified under Item 74.14. Group A seed shall be used for seeding from February 1 to August 1, and Group B seed shall be used from August 1 to December 1, except that either Group A or B may be used during the month of August.

3. Seeding shall be performed only when the soil is in a tillable and workable condition, and no seeding shall be performed between December 1 and February 1 unless otherwise permitted.

35.05 PREPARATION AND PLANTING

(a) Sodding

1. The area to be sodded shall be constructed to the lines and grades indicated on the Plans or as directed by the Engineer, and the surface loosened to a depth of not less than three inches with a rake or other device. If necessary, it shall be sprinkled until saturated at least one inch in depth and kept moist until the sod is placed thereon. Immediately before placing the sod, the fertilizer shall be uniformly applied at the rate of eight pounds of Grade 15-15-15, or equivalent per 1,000 square feet. Agricultural limestone shall be applied at the rate of 75 pounds per 1,000 square feet.

2. The entire area shall be thoroughly covered with sod.

3. The sod shall be placed on the prepared surface with the edges in close contact and, as far as possible, in a position to break joints. Each sod laid shall be fitted in the space placed and shall be pounded into place with wooden tamps, 10 inch by 10 inch, or other satisfactory implement.

The sod shall be maintained moist from time of removal until reset but shall be placed as soon as practicable after removal from place where growing. Immediately after placing, it shall be rolled with a roller between four feet and six feet in length and weighing approximately 1,000 pounds, or hand tamped to the satisfaction of the Engineer.

4. On steep slopes, or where necessary, pinning or pegging will be required to the sod in place.

(b) Strip Sodding

Strip sod shall be laid in a continuous line, not more than 12 inches apart. Before placing these sodding strips, the furrows shall be thoroughly watered and the fertilizer applied uniformly in the furrows at the rate of 8 pounds of Grade 15-15-15, or equivalent, per 1,000 square feet. Agricultural limestone shall be applied at the rate of 75 pounds per 1,000 square feet. The sodding strips shall be reset as soon as practicable after removal from the location where growing, lightly covered with earth and thoroughly rolled with a roller between four feet and six feet in length and weighing approximately 1,000 pounds, or hand tamped. It shall then be carefully raked to the satisfaction of the Engineer in order to break up the crust of earth formed by rolling or tamping.

(c) Spot Sodding

1. The area to be spot sodded shall be constructed to the lines and grades indicated on the Plans or as directed by the Engineer. Holes shall be dug not less than four inches square and three inches deep and not more than 12 inches apart.

2. Fertilizer and lime shall be used at the rate as specified in Paragraph 35.02 (c) and 35.02 (d) above, one-half of which must be evenly distributed and placed in the holes dug for the spot sodding.

3. Before spot sodding and fertilizer have been placed, the entire area shall be thoroughly wetted until the holes hold water to 1/3 their depth.

4. After the spot sod has been placed, any openings around the sod shall be filled and the entire area thoroughly rolled and raked as set out in paragraph 35.05 (b).

(d) Seeding

The seedbed shall be prepared in the following manner and sequence:

1. Each area to be seeded shall be scarified, disced, harrowed, raked or otherwise worked until it has been loosened and pulverized to a depth of one inch and brought to the lines and grades indicated on the Plans or directed by the Engineer.

2. This operation shall be performed only when the soil is in a tillable and workable condition. Fertilizer, at the rate of not less than 10 pounds of grade 15-15-15, or equivalent, per 1,000 square feet, and agricultural limestone at a rate of not less than 75 pounds per 1,000 square feet, shall be distributed evenly over the seedbed, unless other rates are specified in the proposal or on the Plans. The limestone and fertilizer shall be lightly harrowed, raked or otherwise incorporated into the soil for a depth of approximately 1/2 inch. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment.

3. Seed of the specified group shall be sown as soon as preparation of the seedbed has been completed. It shall be sown uniformly by means of a rotary seeder, wheelbarrow seeders, hydraulic equipment or other satisfactory means and unless otherwise specified on the Plans or in the Special Provisions, at the rate of 1-1/2 pounds per unit (1,000 square feet).

4. No seeding shall be done during windy weather or when the ground surface is frozen, wet or otherwise non-tillable.

(e) Mulching

1. Immediately following the seeding operations as described above, the mulch material shall be spread evenly over the seeded areas at an approximate rate of 100 pounds per 1,000 square feet immediately following the seeding operations. This rate may be varied by the Engineer depending on the texture and condition of the mulch material and the characteristics of the area seeded. All portions of the seeded areas shall be covered with a uniform layer of mulch so that approximately 25 percent of the ground is visible.

2. The mulch shall be held in place by the use of an approved mulch binder. Cut-back asphalt or emulsified asphalt shall be applied at the approximate rate of four gallons per unit (1,000 square feet) as required to hold the mulch in-place. Mulch in medians and other areas affected by traffic shall be held in-place by applying asphalt binder at the approximate rate of 11 gallons per unit. The Contractor shall cover bridges, guardrails, signs and appurtenances if the mulch binder is applied in such a way that it would come in contact with or discolor the structures.

35.06 MAINTENANCE

(a) Sodding

1. The sod shall be watered as directed by the Engineer for a period of two weeks, after which ammonium nitrate shall be applied at the rate of 3.5 pounds per 1,000 square feet and the sod given a final watering.

2. The Contractor shall not allow any equipment or material to be placed on any planted area and shall erect suitable barricades and guards to prevent his equipment, labor or the public from traveling on or over any area planted with sod, strip sod or spot sod.

3. It shall be the obligation of the Contractor to secure a satisfactory growth of grass before final acceptance of the project.

(b) Seeding

1. All seeded areas shall be cared for properly to the Engineer's satisfaction until acceptance of the work. Such care shall include mowing the seeded areas when required by the Engineer. When mowing is required, mower blades shall be set at sufficient height to protect the vitality of the growth. Surfaces gullied or otherwise damaged following seeding shall be repaired by re-grading and re-seeding as directed.

2. All grassing which does not show satisfactory growth or a uniform stand shall be re-seeded as follows:

Reseeding shall be performed at any time when required by the Engineer during the life of the contract.

After the grass seed has started growing, any parts or areas which fail to show a uniform stand of grass for any reason whatsoever, shall be re-seeded at the Contractor's own expense, with the same combination of seed as originally used thereon, and such reseeding shall be repeated until all required areas are covered with grass.

35.07 FINAL CLEARING UP

(a) Final clearing up shall consist of completely cleaning the area of all equipment, rubbish, excess materials and unused materials caused by sodding and seeding and any other matter of materials which will mar the appearance or condition of the project and satisfactorily disposing of same.

(b) In addition, final clearing up shall be performed in accordance with the provisions and requirements set out in the General Specifications of the Contract.

(c) All pavements and structures shall be swept clean of all dirt or rubbish which may have become deposited upon them during construction.

35.08 MEASUREMENT (IF APPLICABLE)

All areas shall be obtained from surface measurements.

(a) Sodding

The area of sodding to be measured for payment shall be the number of square yards sodded in accordance with these Specifications and accepted by the Engineer.

(b) Seeding

The area of seeding to be measured for payment shall be the number of acres seeded in accordance with these Specifications and accepted by the Engineer.

35.09 PAYMENT (IF APPLICABLE)

(a) Sodding

1. No direct allowance will be made for the excavation and disposal of any material necessary for the preparation of areas to be sodded.
2. Sodding, strip sodding and spot sodding will be paid for at the contract unit price per square yard, complete-in-place, which price shall be full compensation for preparation of the area; for furnishing the required sod; for placing sod; for furnishing and placing the fertilizer, lime and ammonium nitrate; for watering or sprinkling; for disposal of excess material; for all maintenance; for re-sodding, if required; for final clearing up; for completing all incidentals thereto; and for furnishing all materials, labor, equipment, tools and incidentals required to complete the item.

(b) Seeding

1. No direct allowance will be made for the excavation and disposal of any material necessary for the preparation of areas in which seeding is to be performed.
2. Seeding, (with mulch) will be paid for at the contract unit price per acre, complete-in-place, which price shall be full compensation for preparation of the area; for furnishing the required combination of seed; for furnishing and placing the fertilizer, agriculture limestone and mulching; for watering or sprinkling; for disposal of excess material; for all maintenance; for re-sowing, if required; for final clearing up; for completing all incidentals thereto; and for furnishing all materials, equipment, tools, labor and incidentals necessary to complete the item, except topsoil which will be paid for under Item 36.

(c) Payment will be made under one or more of the following pay items as set forth in the Bid Schedule:

Item No. 35-1a	Sodding-per square yard
Item No. 35-1b	Strip Sodding-per square yard
Item No. 35-1c	Spot Sodding-per square yard
Item No. 35-2	Seeding, (with mulch)-per square yard

END OF DOCUMENT

ITEM 36

TOPSOIL

36.01 DESCRIPTION

Topsoil for planting shall consist of a rich friable soil conforming to the requirements and provisions set out in these Specifications, stipulated in special provisions, or as approved by the Engineer, and obtained from locations indicated on the Plans, stipulated in Special Provisions, or as approved by the Engineer. Topsoil shall be placed at the locations indicated on the Plans set out in the Specifications or as directed by the Engineer, and in conformity with the provisions and requirements set out in the Specifications or as required by the Engineer.

36.02 MATERIAL

Topsoil for planting shall be a rich friable loam containing a large amount of humus and shall be original surface sandy loam, topsoil of good, rich, uniform quality, free from any material such as hard clods, stiff clay, hardpan, partially disintegrated stone, pebbles larger than 1/2 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 wood seeds, and shall not contain objectional plant material, toxic amounts of either acid or alkaline elements or vegetable debris undesirable or harmful to plant life. Bermuda grass roots in topsoil will not be accepted, unless otherwise approved by the Engineer.

Topsoil shall be natural topsoil without admixture of subsoil material and shall be classifiable as a loam, silt loam, clay loam, or a combination thereof. Topsoil shall contain not less than five percent nor more than 20 percent, by weight, of organic matter as determined by loss on ignition of oven-dried samples. The ignition test shall be performed on samples which have been thoroughly oven-dried to constant weight at a temperature of 221 degrees F.

Topsoil shall be secured from areas from which topsoil has not been previously removed, either by erosion or mechanical methods. Topsoil shall not be removed to a depth in excess of the depth approved by the Engineer.

The area or areas from which topsoil is secured shall possess such uniformity of soil depth, color, texture, drainage and other characteristics as to offer assurance that, when removed in commercial quantities, the product will be homogeneous in nature and will conform to the requirements of these Specifications, or as required by the Engineer.

Topsoil may be secured, if approved by the Engineer, from areas which are, or have been, in cultivation within the past five years, and which are producing or have produced fair or good yield of staple farm or truck crops without usual fertilization, or topsoil may be secured from areas supplied with good normal drainage which is arable or suitable for cultivation.

36.03 EQUIPMENT

All equipment necessary for the proper removal, transportation, protection, and maintenance of topsoil must be available when required in first class working condition and shall have been approved by the Engineer before construction will be permitted to begin.

36.04 REQUIREMENTS

Topsoil, except that reserved within excavation areas on the project, shall not be stored for use but shall be excavated and placed directly into its final position.

All areas from which topsoil is to be secured, shall be cleaned of all sticks, boards, stones, lime, cement, ashes, cinders, slag, concrete, bitumen, or its residue and any other refuse which will hinder or prevent growth.

In securing topsoil from a designated pit, or elsewhere, should strata or seams of material occur which do not come under the requirements for topsoil, such materials shall be removed from the topsoil, or, if required by the Engineer, the pit shall be abandoned.

Before placing or depositing topsoil upon any areas, all improvement within the area shall be completed, unless otherwise approved by the Engineer.

The areas or pits into which topsoil is to be placed or incorporated shall be prepared before securing topsoil for use.

The depth to which topsoil is excavated in any pit, shall be subject to the direction of and be approved by the Engineer, and if during the excavation of the pit the Engineer decides to make changes in the depth in order to secure a more satisfactory material, the Contractor shall follow such instructions as may be issued by the Engineer.

Topsoil shall be transported in vehicles which will not lose or scatter the topsoil during transportation.

Topsoil shall be placed upon or incorporated into prepared areas or pits in accordance with the provisions and requirements set out in the sections of these Specifications covering the particular type or kind of planting or seeding with which topsoil is required.

36.05 MAINTENANCE

The Contractor shall maintain topsoil, at his own expense, in connection with any seeding or planting, or otherwise, until final completion of the project. Maintenance shall consist of preserving, protecting, replacing, and such other work as may be necessary to keep the project in a satisfactory condition.

36.06 FINAL CLEARING UP

Final clearing up shall consist of completely cleaning the area of all equipment, rubbish, excess material, and unused materials which will mar the appearance of the project, and disposing of same satisfactorily.

All pavements and structures shall be swept clean of all dirt or rubbish which may have become deposited upon them during construction.

In addition, final clearing up shall be performed in accordance with the provisions and requirements set out in Item 1.15 (b) of these Specifications.

36.07 MEASUREMENT AND PAYMENT (IF APPLICABLE)

The volume of topsoil for which payment will be allowed shall be expressed in cubic yards as computed from the topsoil in-place in the finished work.

Payment for topsoil in-place as required by the Plans or Specifications or as directed by the Engineer shall be made for the quantities determined in the manner specified above at the unit price bid per cubic yard of topsoil under Item 36 of the Contract Bid Schedule.

END OF DOCUMENT

ITEM 40

FENCE RELOCATION

40.01 DESCRIPTION

This item shall consist of the relocation of all types of fence complete-in-place. The contractor shall use existing materials in the relocation. All fence shall be relocated to as close to the original state as is possible. Any new material required shall be furnished by the contractor and shall meet the specifications as set out in this item.

40.02 MATERIALS

The fabric, line post, corner post, etc., shall be of the same quality and meet the same requirements as set out in the A.S.T.M. specifications for the original material.

40.03 CONSTRUCTION

All fence shall be erected to the lines and grades as indicated on the plans or as directed by the Engineer.

(a) Chain Link Fence

(1) All posts in the line of fence shall be spaced not further apart than 10' center to center. All posts shall be set in concrete bases, and the posts shall extend in the concrete not less than 26". The concrete bases shall be at least 8" in diameter and extend 30" or more below the surface of the ground. The concrete bases shall be crowned at the top to shed water and shall be finished to the satisfaction of the Engineer.

(2) The fabric shall be fastened to the top rail at intervals not exceeding 24" and to posts at intervals not exceeding 14".

(3) The top rail shall be connected with expansion sleeves to form a continuous rail.

40.04 METHOD OF MEASUREMENT

Fence will be measured by the linear foot of fence complete and accepted in place measured in the line of the fence.

40.05 BASIS OF PAYMENT

(a) All fence relocation shall be paid for at the contract unit price for fence relocation, which price shall be full compensation for the construction of the item as indicated above, including all materials, equipment, tools, labor, and incidentals required to complete the item.

(b) Payment will be made under Item No. 40, fence relocation per linear foot.

END OF DOCUMENT

ITEM 73

AGGREGATES

73.01 FINE AGGREGATE FOR CONCRETE

Fine aggregate for Portland Cement Concrete shall conform to the requirements of AASHTO, "Standard Specification for Fine Aggregate for Portland Cement Concrete," Serial Designation M 6, with the following exceptions and added stipulations:

- (a) The option regarding alternate freeze-thaw tests for soundness will not be exercised.
- (b) The fine aggregate shall be washed in the processing operations.
- (c) Fine aggregate manufactured from limestone or dolomite shall be processed from material which has been scalped to remove quarry fines. The material from which the fine aggregate is processed shall have a percentage of wear, Los Angeles Test, of not more than forty.
- (d) The amount of deleterious substances shall not exceed the following limits:

**Maximum Permissible
Limits, By Weight**

1. Clay Lumps	0.5%
2. Coal and Lignite	0.5%
3. Material Passing the No. 200 Sieve	3.0%
4. Other Deleterious Substances (such as Shale, Alkali, Mica, Coated Grains, Soft and Flaky Particles)	3.0%

- (e) Fine aggregate shall be well graded from coarse to fine and, when tested by means of laboratory sieves, shall conform to the following requirements:

Sieve Size	Total Percent Passing, By Weight
3/8 inch	100
No. 4	95-100
No. 16	60-90
No. 100	10-30
No. 200	0-3

73.02 FINE AGGREGATE FOR MORTAR

Mortar sand shall conform to the requirements of AASHTO, "Standard Specification for Aggregate for Masonry Mortar," Serial Designation M 45. Sand for mortar shall be uniformly graded from coarse to fine within the following limits:

Sieve Size	Total Percent Passing, By Weight
No. 8	100
No. 50	15-40
No. 100	0-10
No. 200	0-5

73.03 COARSE AGGREGATE FOR CONCRETE

Coarse aggregate for any type or class of Portland Cement shall consist of crushed stone or crushed or uncrushed gravel, unless otherwise specified.

Coarse aggregate for Portland Cement Concrete base and pavement shall be furnished in two sizes: Size No. 4 and Size No. 67, as shown in Item 73.19. The two sizes shall be manufactured, within the specified limits, so as to produce Size No. 467, Item 73.19, when combined in the proper proportions at the batching plant.

Coarse aggregate for structural concrete shall be Size No. 57, Item 73.19.

Coarse aggregate for pre-stressed and precast concrete shall be Size No. 57 or Size No. 67, Item 73.19, as may be specified or directed.

Coarse aggregate for concrete curbing placed by machine-extrusion methods shall be Size No. 7 or 78, Item 73.19.

The coarse aggregates shall otherwise conform to the requirements of AASHTO, "Interim Specification for Coarse Aggregate for Portland Cement Concrete," Serial Designation M 80, with the following exceptions and added stipulations:

(a) Deleterious Substances

The amount of deleterious substances shall not exceed the following limits:

**Maximum Percent,
By Weight**

1.	Soft or non-durable fragments (fragments which are structurally weak such as shale, soft sandstone, limonite concretions, gypsum, weathered schist or cemented gravel)	3.0
2.	Coal and lignite	1.0
3.	Clay lumps	0.25
4.	Material passing the No. 200 sieve	0.75
5.	Thin or elongated pieces (length greater than 5 times average thickness)	10.0
6.	Other local deleterious substances	1.0

The sum of the percentages of Items No. 1, 2, 3, 4, and 6 shall not exceed 5.0.

- (b) When the coarse aggregate is subjected to five alternations of the sodium sulfate soundness test, the weighted percentage of loss shall be not more than nine percent. Coarse aggregate failing to meet the requirement for soundness may be accepted, provided it can be shown by evidence satisfactory to the Engineer that concrete of comparable proportions made from the same source has been exposed to weathering under conditions similar to those occurring at the site of the structure for a period of at least ten years without appreciable disintegration.

The sum of the percentage of Items No. 1, 2, 3, 4, and 6 for soundness will not apply to (b) above.

73.04 AGGREGATE FOR PENETRATION MACADAM BASE

Aggregate for penetration macadam base shall be crushed stone or crushed slag meeting the quality requirements of AASHTO, "Standard Specification for Crushed Stone and Crushed Slag for Bituminous Concrete Surface Coarse," Serial Designation M 79, except that the sodium sulfate soundness loss shall not exceed nine percent and the percentage of wear, Los Angeles Test, shall not exceed fifty.

The gradation of the aggregate shall meet the requirements for the following sizes in Item 73.19:

Coarse	Size No. 24
Key or Choker	Size No. 6

73.05 AGGREGATE FOR MINERAL AGGREGATE BASE AND SURFACE COURSES

Aggregate for Mineral Aggregate Base and Surface Course shall be crushed stone, crushed slag, crushed or uncrushed gravel, or crushed or uncrushed chert, together with such material as manufactured sand or other fine materials naturally contained, or added thereto as needed to conform with these Specifications.

The aggregate shall be of two classes: Class A and Class B.

- (a) Class A aggregate for mineral aggregate base and surface courses shall consist of hard durable particles or fragments of stone, slag, gravel, or chert, and other finely divided mineral matter. Individual materials shall meet the requirements specified below:
 1. Crushed stone shall be free from silt and clay. The coarse aggregate portion of the stone shall have a percentage of wear of not more than fifty, and when subjected to five alternations of the sodium sulfate soundness test, the weighted percentage of loss shall not exceed fifteen.
 2. Crushed slag shall be free of silt and clay and shall meet the quality requirements of crushed stone. It shall be reasonably uniform in density and shall have a dry-rodded weight of at least seventy pounds per cubic foot.
 3. Crushed gravel and crushed chert shall be screened, and all oversize material shall be crushed and fed uniformly back over the screen. The coarse aggregate portion (retained on the No. 4 sieve) shall have a percentage of wear of not more than thirty. The portion of the material passing the No. 40 sieve shall be non-plastic or shall have a liquid limit of not more than twenty-five and a plasticity index of not more than six.

If a fine aggregate, coarse aggregate or binder, in addition to that present in the base material, is necessary in order to meet the gradation requirements, or for satisfactory bonding of the material, it shall be uniformly blended with the base coarse material at the mixing plant by a mechanical feeder to maintain a uniform flow on the belt to the mixer. Blending of materials on the stockpiles or in the pits by bulldozer, clamshell, dragline or similar equipment will not be permitted.

The composite gradation of Class A aggregate shall be the grading specified.

- (b) Class B aggregate for mineral aggregate base shall consist of crushed or uncrushed gravel, crushed or uncrushed chert, crushed stone or crushed slag, and other finely divided particles. The quality of Class B aggregate shall be the same as the quality requirements for Class A aggregate with the following exceptions:

Gravel or chert Class B aggregate shall be screened, and oversize materials may be wasted or crushed and returned over the screen and uniformly blended with the other material. The coarse aggregate portion (retained on the No. 2 sieve) shall have a percentage of wear of not more than forty. Material having a clay content greater than twelve percent, as determined by hydrometer analysis, will not be permitted. Material having a clay content not exceeding twelve percent will be acceptable, provided a plasticity index-fines product does not exceed 3 when calculated by the following formula:

$$\text{Per Cent Passing No. 40 Sieve} \times \text{P.I. of Minus 40 Material} = 100$$

If an excess of binder occurs, crushed stone, crushed slag, gravel, chert, and sand, or other approved granular materials shall be uniformly incorporated in such proportions, not to exceed twenty percent of the total mix, as the Engineer directs.

If the quantity of binder is insufficient to bond the base or surface course properly, additional binder of approved quality, in an amount not to exceed fifteen percent of the total mix, shall be uniformly incorporated as directed by the Engineer.

The use of material requiring the addition of coarse aggregate or binder in excess of the above limits will not be permitted unless otherwise specified on the Plans or in the Contract.

Blending of additional material, if required, may be performed either at the screening or mixing plant or on the road. If blending is done at the plant, mechanical feeders which will maintain a uniform flow of the materials on the conveyor belt to the mixer or screening plant shall be employed. If blending is done on the road, the two or more materials shall be spread in uniform layers and blended by means of a mechanical mixer. Blending of materials on the stockpile or in the pit by means of a bulldozer, clamshell, or similar equipment will not be permitted.

When combinations of materials for Class B aggregate for mineral aggregate base and surface courses, such as creek gravel and chert, bank gravel and chert, crushed stone and chert, or crushed slag and chert, are permitted, they will be designated on the Plans or in the Contract and the pertinent requirements of this Specification for quality, blending of materials, and gradings shall apply.

The composite gradation of Class B aggregate shall be the grading specified on the Plans or in the Contract.

**GRADING TABLE FOR CLASS A AND CLASS B AGGREGATE
FOR MINERAL AGGREGATE BASE AND SURFACE COURSES**

Sieve Size	Class A	Class B	Class C1	Class C2	Class D and E	Class F
2"	100					
1 1/2"	75-100	100				
1"			100			
3/4"	45-70	65-90	85-100	100		
1/2"					100	
3/8"	30-55		55-80	60-90	85-100	100
No. 4	20-40	30-55	35-60	40-65	55-82	85-100
No. 8	10-30	20-45			38-62	75-95
No. 30	5-20	8-25	7-22	7-25	18-42	35-70
No. 50						5-20
No. 100		1-12	1-12	1-12	3-12	5-20
No. 200	0-8	0-7			0-8	2-10

73.06 AGGREGATE FOR PLANT MIX BASE AND LEVELING COURSES (HOT MIX)

Aggregate for plant mix base and leveling courses shall consist of coarse aggregate, fine aggregate, and mineral filler when required.

Prior to the approval of the job-mix formula and at least ten working days prior to the beginning of this construction, a sample of each material to be used in the mix shall be submitted to the Engineer for laboratory tests and evaluation. If at any time the sources of materials are changed, samples of the new materials shall be submitted for laboratory tests.

(a) Coarse Aggregate

Coarse aggregate (aggregate retained on the No. 4 sieve) shall be crushed stone, crushed slag, or crushed gravel, or combinations of these materials, except as hereinafter specified. It shall conform to the quality requirements of AASHTO, "Standard Specification for Crushed Stone, Crushed Slag, and Crushed Gravel for Open-Graded Bituminous Road Mix Surface Course," Serial Designation M 63. At least fifty percent of the gravel retained on the No. 4 sieve shall have at least one fractured face. Crushed slag coarse aggregate shall contain no more than twenty percent, by weight, of glass particles.

(b) Fine Aggregate

Fine aggregate shall consist of natural sand; sand manufactured from stone, gravel, or slag; or combination thereof. It shall consist of hard, tough grains free from injurious amounts of deleterious substances, and when subjected to five cycles of the sodium sulfate soundness test, it shall have a weighted loss of not more than fifteen percent. In natural sand, the percentage of material finer than 200 mesh shall not exceed five percent.

Fine aggregate in Gradings A, B, C1 and C2 shall consist of crushed stone or crushed slag only and shall be stored separately from the coarse aggregate.

(c) The Combined Grading

The gradations of the coarse and fine fractions of aggregate shall be such that when combined in proper proportions, the resultant mixture will meet one of the following gradings, as specified.

In addition, the combination of materials for Grading B and C shall be such that when combined with the required amount of bitumen, the resultant mixture shall have a stability of not less than 1,000 pounds when tested in accordance with ASTM, "Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus," Serial Designation D 1559. The compactive effort shall be 75 blows of the hammer on each end of the specimen.

**HOT PLANT MIX BASE AND LEVELING COURSE
MIXTURE DESIGNATION
MASTER RANGE OF GRADATIONS**

Sieve Size	Total Percent Passing, By Weight			
	Grading A (Base)	Grading B (Base)	Grading C-1 (Leveling)	Grading C-2 (Leveling)
2"	100			
1 1/2"	75-100	100		
1"			100	
3/4"	45-70	65-90	85-100	100
3/8"	30-55		55-80	60-90
No. 4	20-40	30-55	35-60	40-65
No. 8	10-30	20-45		
No. 30	5-20	8-25	7-22	7-25
No. 100		1-12	1-12	1-12
No. 200	0-8	0-7		

73.07 AGGREGATE FOR ASPHALTIC CONCRETE SURFACE COURSES (HOT MIX)

Aggregate for asphaltic concrete surface courses shall consist of a combination of coarse and fine aggregate, and mineral filler when required or specified. Prior to the approval of the job-mix formula and at least ten working days prior to the beginning of this construction, a sample of each material to be used in the mix shall be submitted to the Engineer for laboratory design and determination of the optimum asphalt content. If at any time the sources of materials are changed, samples of the new materials shall be submitted for laboratory tests.

(a) Coarse Aggregate

The coarse aggregate (aggregate retained on the No. 4 sieve) shall consist of crushed stone, crushed slag, or crushed gravel. Only one kind shall be used on any project except by permission of the Engineer. The coarse aggregate shall meet the quality requirements of AASHTO, "Standard Specification for Crushed Stone, Crushed Slag and Crushed Gravel for Dense Graded Bituminous Road and Plant-Mix Surface Course," Serial Designation M 62, with the following exceptions and additions:

The sodium sulfate soundness loss shall not exceed twelve percent.

Crushed gravel shall consist of siliceous particles, processed from washed material, of which a minimum of eighty-five percent, by count, of the material retained on the No. 4 sieve shall have one or more fractured faces, fractured for the approximate average diameter or thickness of the particles. The addition of pea gravel or uncrushed particles will not be permitted.

Crushed slag coarse aggregate shall contain not more than twenty percent, by weight, of glassy particles.

(b) Fine Aggregate

The fine aggregate (passing the No. 4 sieve) shall consist of natural sand, or of sand prepared from stone, slag or combinations thereof. It shall consist of hard, tough grains free from injurious amounts of clay, loam, or other deleterious substances. The fine aggregate, when subjected to five cycles of the Sodium Sulfate Soundness Test, shall have a weighted loss of not more than 15 percent.

In addition to the above, the following requirements shall also apply.

Natural sand shall be washed, except that an unwashed filler sand may be used in an amount not to exceed fifteen percent by weight of the total fine aggregate (-4 Material).

If a filler sand is used, it shall be free of clay lumps and other deleterious substances. The natural sand shall be so graded that no more than five percent will be retained on the No. 4 sieve.

Fine aggregate consisting of natural sand, including filler sand or sand manufactured from crushed gravel, or any combination of these materials will be tested in accordance with AASHTO, "Standard Method of Test for Amount of Material Finer than 0.075 mm Sieve in Aggregate," Serial Designation T 11, and the loss on the 200 mesh sieve shall not exceed four percent by weight.

Agricultural limestone, when used as a portion of the fine aggregate, shall be manufactured from sound, durable stone and shall be crushed so that at least eighty-five percent will pass the No. 8 mesh sieve and at least fifty percent will pass the No. 30 mesh sieve.

(c) The Combined Grading

The several aggregate fractions shall be sized, graded, and combined in such proportions that the resulting composite blend will meet one of the following grading requirements, as specified, together with the stipulations pertaining to the constituents of the blend hereinafter specified.

**ASPHALTIC CONCRETE SURFACE COURSE
MIXTURE DESIGNATION
MASTER RANGE OF GRADATIONS**

<u>Grading Sieve Size</u>	<u>Total Percent Passing, By Weight</u>		
	<u>D</u>	<u>E</u>	<u>F</u>
3/4"	100		
5/8		100	
1/2"	95-100	95-100	
3/8"	80-98	80-98	100
No. 4	53-80	53-80	85-100
No. 8	36-60	36-60	75-95
No. 30	16-40	16-40	35-70
No. 50			20-50
No. 100	3-12	3-14	5-20
No. 200	2-8	3-10	2-10

Grading D

The mineral aggregate shall be composed of crushed gravel, crushed granite, crushed slag, natural sand, granite screenings, slag screenings, or a combination of the proper sizes of these materials. The use of carbonate rocks such as limestone and dolomite or other aggregates tending to polish under traffic will not be permitted in the coarse aggregate and will be permitted only to the extent specified herein in the fine aggregate.

When the combined mineral aggregate includes crushed gravel or natural sand, agricultural limestone in an amount of not less than ten percent nor more than twenty percent by weight of the mineral aggregate shall be used. The addition of agricultural limestone, within the range specified above, will also be required in crushed slag and crushed granite aggregate when needed to meet the specified design criteria or when directed by the Engineer.

In addition to the other requirements of these Specifications, the composition of the mineral aggregate shall be such that when combined with the required amount of bitumen, the resultant mixture will comply with the following design criteria as determined by the Marshall Method of Test Criteria.

Stability, min.	1,000 lbs.
Void Content	4-9 percent
Flow	8-16

If these values cannot be obtained with the aggregate submitted for laboratory design or if, in the opinion of the City, the quality of the mix can be improved, the addition of limestone screenings* in an amount not to exceed twenty-five (25) percent by weight of the mineral aggregate and/or the addition of mineral filler, meeting the requirements of Item 73.13, in an amount not to exceed five percent of the mineral aggregate, will be required. If the mixture still does not meet the design criteria, another source of aggregate will be necessary.

* The gradation of the limestone screenings for use in Grading "D" shall have at least 95 percent passing the No. 4 screen and not less than ten percent passing the 100 mesh sieve.

Grading E

When Grading "E" is to be used as a surface for traffic lanes, the mineral aggregate shall be composed of not less than 50 percent nor more than 55 percent crushed limestone and not more than 50 percent nor less than 45 percent natural sand, slag sand, sand manufactured from gravel, or any combination of these materials, except as herein specified.

The requested sand percentage on the job mix formula shall be in the range of 45 to 50 percent. However, if needed to meet or improve the specified design criteria, the limestone and sand percentage may be altered by the numerical value of +5 percent from the percentages shown by the Contractor on the original job mix formula request. In the event the limestone and sand percentages are altered from those shown on the original job mix formula, the Contractor shall request a new job mix formula using the aggregate percentages shown on the design.

When Grading "E" is used for surfacing of shoulders or other non-traffic lane construction, the mineral aggregate may be composed entirely or in part of limestone, but in no case shall the mineral aggregate for this construction consist of less than 50 percent.

Limestone: When this mix is used for asphalt curb construction, it shall conform to the combined gradation specified under (c) except that the requirements for material passing the 200 mesh sieve shall be 5 to 10 percent.

In addition to other requirements, the composition of the mineral aggregate shall be such that when combined with the required amount of bitumen, the mixture will comply with the Marshal Method of Test Criteria results as follows:

Stability, min.	1,000 lbs.
Void Content	4-9 percent
Flow	8-16

In the event that the above design criteria may be improved with the addition of mineral filler to the aggregate submitted to the laboratory for design, the addition of mineral filler meeting the requirements of Item 73.13 in an amount not to exceed 5 percent by weight of the mineral aggregate will be required. If mineral filler is added to a mixture, it will be considered as a part of the limestone percentage.

If the design criteria above cannot be obtained with the aggregate submitted to the laboratory for design, another source of aggregate will be necessary.

Grading F

The mineral aggregate shall be composed of not less than seventy-five percent nor more than eighty-five percent of either natural sand, slag sand, sand manufactured from siliceous material or any combination of these materials, and not less than fifteen percent more than twenty-five percent of stone screenings meeting the gradation requirements of Size No. 10, Item 73.19.

In addition to the other requirements of these Specifications, the composition of the mineral aggregate shall be such that when combined with the required amount of bitumen, the resultant mixture shall have a minimum stability of 800 pounds when tested in accordance with the Hubbard-Field Method of mix design. The method of test shall conform to AASHTO, "Standard Method of Sampling Bituminous Paving Mixtures," Serial Designation T 168, except for the following modifications:

- (1) The specimen shall be consolidated by applying a pressure of 5096 psi, which corresponds to a total load of 16,000 pounds for a specimen two inches in diameter. This pressure shall be maintained for five minutes and then released.
- (2) The test specimens, testing mold, and plunger shall be brought to the desired temperature of test by storing in a water bath for one hour with the temperature of the water maintained by (140+ 2°F.) or (60+ 1°C.) during the entire storage period.

If the minimum stability cannot be obtained, the addition of mineral filler meeting the requirements of Item 73.13 in an amount not to exceed five percent of the mineral aggregate will be permitted in order to obtain the minimum stability. If the mixture still lacks stability, another source of aggregate will be necessary. When mineral filler is added, it will be considered as part of the stone screening percentage.

73.08 AGGREGATE FOR HOT BITUMINOUS SEAL COAT (SPLIT APPLICATION)

Aggregate for hot bituminous seal coat (split application) shall consist of crushed stone, crushed slag or crushed gravel meeting the quality requirements of AASHTO, "Standard Specification for Crushed Stone, Crushed Slag and Crushed Gravel for Open-Graded Bituminous Road-Mix Surface Course Serial Designation M 63, except that the sodium sulfate soundness loss shall not exceed nine percent. Crushed slag aggregate retained on the No. 4 sieve shall contain not more than twenty percent, by weight, of glassy particles.

The amount of material finer than 200 mesh shall not exceed 1.0 percent. If all material finer than the 200 mesh sieve consists of the dust of fracture, essentially free from clay or shale, the percentage may be increased to 1.5.

At the option of the Engineer, the aggregate may be tested for bituminous film retention. When tested in accordance with AASHTO, "Standard Method of Test for Coating and Stripping of Bitumen-Aggregate Mixtures," Serial Designation T 182, the aggregate shall have a bituminous film retention in excess of ninety-five percent.

Aggregates which are tested and do not meet the film retention requirement may be approved provided a satisfactory chemical additive is used.

Aggregate used in the mat shall be Size No. 6. Aggregate used in the seal shall be Size No. 7, Item 73.19.

73.09 AGGREGATE FOR HOT BITUMINOUS SEAL COAT

Aggregate for hot bituminous seal coat shall be crushed stone, crushed gravel, or crushed slag meeting the requirements specified in Item 73.08. The gradation requirement shall be those shown for size No. 7, Item 73.19.

73.10 AGGREGATE FOR DOUBLE BITUMINOUS SURFACE TREATMENT

Aggregate for double bituminous surface treatment shall conform to the requirements of Item 73.08. Aggregate used in the mat shall be Size No. 6. Aggregate used in the seal shall be Size No. 7, Item 73.19.

73.11 AGGREGATE FOR AGGREGATE-CEMENT BASE COURSE

Aggregate for aggregate-cement base course shall consist of coarse aggregate composed of sound, tough, durable fragments of crushed stone, crushed slag, crushed or uncrushed gravel, or crushed or uncrushed chert; fine aggregate composed of natural or manufactured sand; and silt-clay or other finely divided mineral matter.

The aggregate shall be of such gradation that all will pass a 1 1/2 inch sieve, not more than seventy-five percent will pass the No. 4 sieve, and not less than five nor more than fifteen percent will pass the No. 200 sieve. The fraction passing the No. 40 sieve shall have a liquid limit not greater than thirty-five, and a plasticity index not greater than ten.

The combined total of shale, organic material, or other unwanted substances shall not exceed five percent by weight.

73.12 AGGREGATE FOR SUBGRADE INSULATION COURSE

Aggregate for Subgrade Insulation Course shall consist of sand-gravel, crushed stone, crushed or granulated slag, or combinations of these materials.

That portion of the mineral passing the No. 40 sieve shall have a liquid limit not greater than twenty-five, and a plasticity index not greater than six.

The materials shall meet the following gradation requirements:

Sieve Size	Total Percent Passing By Weight
1 1/2"	100
3/4 "	95-100
No. 8	30-100
No. 200	0-100

73.13 MINERAL FILLER

Mineral filler shall meet the requirements of AASHTO "Mineral Filler for Bituminous Paving Mixture," Serial Designation M 17.

73.14 AGGREGATE FOR UNDERDRAINS

- (a) Aggregate for under-drains shall be crushed stone, crushed slag, or washed gravel meeting the quality requirements of AASHTO, "Standard Specification for Crushed Stone, Crushed Slag, and Crushed Gravel for Open Graded Bituminous Road-Mix Surface Course," Serial Designation M 63, and the grading requirements for size 6, 7, or 8, Item 73.19.

- (b) Natural sand shall be washed and shall meet the quality requirements of AASHTO, "Standard Specification for Fine Aggregate for Bituminous Paving Mixture," Serial Designation M 29. It shall have a gradation meeting the requirements for Size 9, Item 72.19, or the gradation specified in Item 73.01 (e) except that the percent passing the No. 50 sieve shall be 0-30.

73.15 AGGREGATE FOR SAND-ASPHALT SURFACE COURSE

Aggregate for sand-asphalt surface course shall consist of natural sand and/or crushed siliceous material meeting the quality requirements of ASTM, "Standard Specification for Fine Aggregate for Bituminous Paving Mixtures," Serial Designation D 1073.

In the natural sand, the percentage of material finer than the 200 mesh shall not exceed five. The natural sand or combination of these materials shall meet the following requirements for gradation:

Sieve Size	Total Percent Passing By Weight
No. 4	100
No. 8	95-100
No. 30	50-80
No. 50	30-60
No. 100	8-65
No. 200	2-10

In addition to the above requirements, the sand-asphalt mixture shall have a minimum stability of 400 pounds when tested in accordance with AASHTO, "Standard Method of Sampling Bituminous Paving Mixtures," Serial Designation T 168. If this value cannot be obtained, the addition of mineral filler, meeting the requirements of Item 73.13 in an amount not to exceed five percent of the mineral aggregate, will be permitted in order to obtain this minimum stability. If the mixture still lacks stability, another source of aggregate will be necessary.

73.16 LIGHTWEIGHT AGGREGATES FOR STRUCTURAL CONCRETE

Lightweight aggregate for structural concrete shall conform to the requirements of ASTM, "Standard Specification for Lightweight Aggregates for Structural Concrete," Serial Designation C 330, sizes as specified.

73.17 STOCKPILING AGGREGATES

Sites for aggregate stockpiles shall be grubbed and cleaned prior to storing aggregates, and the ground shall be firm and smooth and well drained. A cover of at least three inches of aggregate shall be maintained in order to avoid the inclusion of soil or foreign material. The stockpiles shall be built in layers not exceeding four feet in height, and each layer shall be completely in place before the layer is started so as to prevent segregation. The material shall be deposited in such manner as to prevent coning, except in the case of aggregate composed essentially of material finer than the No. 4 sieve and base material.

Dumping, casting or pushing over sides of stockpiles will be prohibited, except in the case of aggregate for base material and fine aggregate materials.

Stockpiles of different types or sizes of aggregates shall be spaced far enough apart, or separated by suitable walls or partitions, to prevent the mixing of the aggregates.

When it is necessary to operate trucks or other equipment on a stockpile in the process in building the stockpiles, it shall be done in a manner approved by the Engineer. Any method of stockpiling aggregate which allows the stockpile to become contaminated with foreign matter or causes excessive degradation of the aggregate will not be permitted. Excessive degradation will be determined by sieve tests of samples taken from any portion of the stockpile over which equipment has operated, and failure of such samples to meet all grading requirements for the aggregate shall be considered cause for discontinuance of such stockpiling procedure.

73.18 TEST METHODS

In stating requirements for most materials Item 73, reference has been made to AASHTO and ASTM Standard Specification for material. Those Specifications, in turn, include reference to the respective AASHTO and ASTM methods of sampling and testing. In a few instances, however, properties of materials in Item 73 have been specified without reference to corresponding AASHTO and ASTM Standard Specifications. In such instances the following methods of sampling and testing will govern:

TEST	TEST METHOD
AASHTO T 11	Amount of Material Finer than 0.075 mm Sieve in Aggregate
AASHTO T 19	Unit Weight of Aggregate
AASHTO T 27	Sieve Analysis of Fine and Course Aggregates
AASHTO T 88	Particle Size Analysis of Soils
AASHTO T 89	Determining the Liquid Limit of Soils
AASHTO T 90	Determining the Plastic Limit and Plasticity Index of Soils
AASHTO T 96	Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
AASHTO T 104	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
AASHTO T 182	Coating and Stripping of Bitumen Aggregate Mixtures
See Below	Heat-Stable Additives used in Hot Bituminous Mixtures

Test Method for Heat-Stable Additives.

- (a) Place fifty grams of treated asphalt cement heated to 325° F (treated at manufacturer's recommended percent of heat-stable asphalt additive) in a clean container.
- (b) Seal the container securely and place in an oven heated to 325° F and hold at this temperature for twenty-four hours.
- (c) Remove sample from oven and after thorough stirring, use the asphalt cement for mixing with the mineral aggregate as specified in the stripping test.
- (d) The aggregate-asphalt mixture shall then be subjected to the stripping test.
- (e) This test shall be conducted as often as deemed necessary by the Engineer.

Stripping Test

Fifty grams of the mineral aggregate passing the 1/2 inch and retained on the No. 4 sieve are washed and surface dried. The selected aggregate is coated with the blend by thorough stirring of the mixture heated to 250° F. Either of the following stripping tests may be employed. (Method (b) is intended primarily for field test.)

- (a) The coated aggregate is immersed in previously boiled distilled water at 104° F. The covered beaker containing the mix is placed overnight in an oven maintained at 140° F. At the end of the heating period (approximately eighteen hours), there shall be no evidence of stripping of the asphalt as determined by visual inspection.
- (b) The coated aggregates shall be placed in boiling water and boiling continued for one minute. The water shall then be poured off the mixture and the mixture removed and placed on a paper towel. The coated aggregate shall show no signs of strippings as determined by visual inspection.

END OF DOCUMENT

ITEM 74

MISCELLANEOUS MATERIALS

74.01 WATER

Water used in mixing concrete shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable matter, or other substances injurious to the finished product. Water will be tested in accordance with AASHTO, "Standard Method of Test for Quality of Water to be Used in Concrete," Serial Designation T 26. Water known to be of potable quality may be used without test. Where the source of water is relatively shallow, the intake shall be so enclosed as to exclude silt, mud, grass, or other foreign materials.

74.02 CALCIUM CHLORIDE

Calcium chloride shall conform to the requirements of AASHTO, "Standard Specification for Calcium Chloride," Serial Designation M 144, for the type specified.

74.03 SODIUM CHLORIDE

Sodium chloride shall conform to the requirements of ASTM, "Standard Specification for Sodium Chloride," Serial Designation D 632, for the type specified.

74.04 HYDRATED LIME

Hydrated lime shall conform to ASTM, "Standard Specification for Hydrated Lime for Masonry Purposes," Serial Designation C 207, Type N, except that Section 3 (b), 4, and 5 will not be applicable.

74.05 METAL CENTER STRIP

Metal center strip shall be of an approved type, shall not be lighter than sixteen gauge, and shall be painted or galvanized.

74.06 ASPHALT PLANT

Asphalt plant shall meet the requirements of AASHTO, "Standard Specification for Asphalt Plank," Serial Designation M 46, for the type specified.

74.07 PRECAST MANHOLE RISERS AND TOPS

These items shall conform to ASTM, "Standard Specification for Precast Reinforced Concrete Manhole Sections," Serial Designation C 478.

74.08 PRECAST REINFORCED CONCRETE CATTLE PASS UNITS

If these units are designed by the producer, completely detailed drawings and design computations shall be submitted to the Engineer for approval in advance of the start of manufacture. If the units are designed by the City, the applicable standard drawing sheet shall govern. Details of manufacture shall conform in all other respects to the applicable provisions of ASTM, "Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe," Serial Designation C 76. No strength tests will be required on the completed units, but the City reserves the right to conduct continuous inspection at the site of production, and to sample and test all component materials, including the concrete, for conformity of these Specifications.

74.09 CHEMICAL ADDITIVES

- (a) For Portland Cement Concrete Mixtures

These additives shall conform to the requirements of AASHTO, "Standard Specification for Chemical Admixtures for Concrete," Serial Designation M 194, covering the following five types:

- Type A Water-Reducing Admixtures
- Type B Retarding Admixtures
- Type C Accelerating Admixtures
- Type D Water-Reducing and Retarding Admixtures
- Type E Water-Reducing and Accelerating Admixtures

Before any admixture is approved for use in Portland Cement concrete mixtures under these Specifications, the manufacturer of the admixture or the Contractor shall furnish the City documentary evidence that the material proposed for use has been tested in accordance with the methods of test specified in AASHTO, "Standard Specification for Chemical Admixtures for Concrete," Serial Designation M 194, and meets the requirements of that Specification. Documentary evidence shall be the results of tests conducted by a testing laboratory inspected at regular intervals by the Cement and Concrete Reference Laboratory of the National Bureau of Standards and approved by the City. The City may from time to time require a notarized certification from the manufacturer stating that the material is identical with that originally approved and has in no way been changed or altered.

(b) Asphalt To Be Used In Hot Bituminous Mixtures

Heat-stable asphalt anti-stripping additive shall contain no ingredient harmful to the bituminous material or to the operator and shall not appreciably alter the specified characteristics of the bituminous material when added in the recommended proportions.

The manufacturer shall recommend the percentage of his compound to be used, not to exceed 1.0 percent, but in no case shall the percentage of active agent added be less than 0.5 percent by weight of the asphalt cement.

The manufacturer shall furnish the City an affidavit stating the percentage by weight of active agent in the anti-stripping additive proposed for use.

The treated asphalt cement shall show no evidence of stripping when tested in accordance with Item 73.18.

74.10 MASONRY STONE

Masonry stone shall be sound, dense and durable, free from cracks, pyrite intrusions and other structural defects. Stone which will be used with mortar shall be free from dirt, oil, or other material that might prevent good adhesion with the mortar.

When tested by the Los Angeles Test Method, the percent of wear shall not exceed sixty.

When the crushed aggregate is subjected to five alternations of the sodium sulfate soundness test, the weighted percentage of loss shall be not more than fifteen.

74.11 WATERSTOPS

Waterstops shall be of the type, shape and dimensions shown on the Plans.

(a) Metallic

Metallic waterstops shall be sheet copper conforming to the requirements of Item 908.15 of the Tennessee Department of Transportation Specifications.

(b) Nonmetallic

Nonmetallic waterstops shall be manufactured from either natural rubber, synthetic rubber, or polyvinyl-chloride (PVC) at the option of the Contractor. Waterstops shall be produced by such a process that, as supplied for use, they will be dense, homogeneous, and free from holes and other imperfections. The cross-section of the water stop shall be uniform along its length and transversely symmetrical so that the thickness at any given distance from either edge of the waterstop will be uniform.

(1) Rubber Waterstop

The waterstop shall be fabricated from a high grade thread-type compound. The basic polymer shall be natural rubber or a co-polymer of butadiene and styrene, or a blend of both. The compound shall contain not less than seventy percent by volume of the basic polymer, and the remainder shall consist of reinforcing carbon black, zinc oxide, accelerators, anti-oxidants, vulcanizing agents, and plasticizers, but shall contain no Factice.

Samples taken from the finished waterstop shall meet the following requirements when tested in accordance with the current specified ASTM method of test.

Title	<u>ASTM Method</u> Requirement of Test	
Tensile Strength (Die "C")	2500 psi, min.	D 412
Ultimate Elongation (Die "C")	450 percent min.	D 412
Shore Durometer Hardness	60-70	D 2240
Specific Gravity	1.5 +/- 0.03 (Sec. 17)	D 297
Water Absorption (% by Wt.)	5 percent	D 570
Tensile Strength after accelerated aging, oxygen-pressure method	80 percent min.	D 572

(2) Polyvinyl Chloride Waterstop

This waterstop shall be extruded from an elastomeric plastic material. The material shall be a plastic compound, the basic resin of which shall be polyvinyl chloride. The compound shall contain any additional resins, plasticizers, stabilizers, or other materials needed to insure that when the material is compounded it will meet the performance requirements of this Specification. No reclaimed polyvinyl chloride shall be used.

(3) Finished Waterstop

Samples taken from the finished waterstop shall meet the following requirements when tested in accordance with the current specified ASTM method of test.

Title	ASTM Method Requirement of Test	
Tensile Strength (Die "C")	2500 psi, min.	D 412
Ultimate Elongation (Die "C")	280 percent min.	D 412

(4) Sheet Material

Samples taken from the sheet material shall meet the following requirements when tested in accordance with the current specified ASTM method of test or the specified Civil Works Guide Specification CE 1402, "Metals, Miscellaneous Materials and Standard Articles."

Title	Method Requirement of Test	
Tensile Strength (Die "C")	1750 psi min.	ASTM D 412
Ultimate Elongation (Die "C")	350 percent min.	ASTM D 412
Stiffness in Flexure (1/4" span)	400 psi min.	ASTM D 747
Cracking or Chipping @ -35 F	Nil	ASTM D 746
Tensile Strength (Die "C")	1500 psi min.	Accelerated
	Extraction	
	Test CE 1402	
Ultimate Elongation (Die "C")	300 percent min.	Accelerated
	Extraction	
	Test CE 1402	
Change in Weight after 7 Days	0.00 to +0.25	Effect of percent Alkalies
	Test CE 1402	
Change in Weight After 30 Days	0.00 to +0.40	Effect of percent Alkalies
	Test CE 1402	
Change in Shore Durometer Hardness	+/- 5	Effect of Alkalies
	Test CE 1402	
Change in Thickness After 30 Days	+/- 1 percent	Effect of Alkalies
	Test CE 1402	

For polyvinyl chloride waterstops, the supplier shall submit a certificate stating that all of the performance requirements specified for the sheet material under polyvinyl chloride waterstops have been complied with. In addition, the supplier shall submit an affidavit to the effect that the sheet sample is of the same material in all respects as that to be used in the manufacture of the finished waterstop. The supplier shall also specify the value of the specific gravity of the finished waterstop material to within plus or minus 0.02.

Waterstops shall be manufactured with an integral cross section which shall be uniform within plus or minus 1/8" in width, and the web thickness or bulb diameter within plus 1/16" and minus 1/32".

The Contractor shall furnish the City of Chattanooga at no cost to the City a certified test report from an approved laboratory covering each lot or unit of finished waterstops. These test reports shall contain the numerical laboratory test data of the required tests.

74.12 EPOXY RESIN SYSTEMS

Two-component epoxy resin systems for application to Portland Cement Concrete, bituminous concrete, and metals shall conform to the requirements of AASHTO, "Standard Specification and Recommended Practice for Epoxy Protective Coatings," Serial Designation M 200. These systems shall be supplied in one of the following types as designated;

Type A-A Polysulfide-modified system blended with mineral filler.

Type B-A Clear or light-colored amine or polyimide-cured system.

Type C-A Coal-tar modified system.

74.13 SELECT MATERIAL FOR SOIL-CEMENT BASE

Select material for soil-cement base shall be of such general character as to be classified as Group A-1 or A-2, AASHTO, "Recommended Practice for the Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes," Serial Designation M 145. The material shall be of such size that all will pass the standard 1-1/2" sieve. Samples of the select material shall be tested in the laboratory before work is started for determination of cement content and optimum moisture content.

74.14 GRASS SEED

The seed shall meet the requirements of the Tennessee Department of Agriculture and no "Below Standard" seed will be accepted.

Grass seed furnished under these Specifications shall be packed in new bags or bags that are sound and not mended.

The vendor shall notify the City before shipments are made so that arrangements can be made for inspection and testing or stock.

The vendor shall furnish the City a certified laboratory report from an accredited commercial seed laboratory or from a State seed laboratory showing the analysis of the seed to be furnished. The commercial fertilizers as specified in Item 74.15 shall have a minimum of 3-1/2% nitrogen. The report from an accredited commercial seed laboratory shall be signed by a Senior Member of the Society of Commercial Seed Technologists. At the discretion of the City, samples of seed may be taken for check against the certified laboratory report. Sampling and testing will be in accordance with the requirements of the Tennessee Department of Agriculture.

When a seed group is used, the percentages forming the group shall be as follows, unless otherwise specified:

Name	Quantity Percent by Weight
Group "A"	
Lespedeza (Common or Korean)	20%
Sericea Lespedeza	15%
Ky. 31 Fescue	40%
English Rye	15%
White Dutch Clover	5%
Weeping Love Grass	5%
Group "B"	
Ky. 31 Fescue	55%
Redtop	15%
English Rye	20%
White Dutch Clover	5%
Weeping Love Grass	5%
Group "C"	
Sericea Lespedeza	50%
Ky. 31 Fescue	30%
English Rye	15%
White Dutch Clover	5%

In mixing or forming "Groups" of seed, they shall be uniformly mixed. "Group" seed shall not be mixed until after each type seed that is used to form the "Group" has been tested and inspected separately and approved for purity and germination by the City. Seed mixed before tests and inspection are made will not be accepted.

74.15 COMMERCIAL FERTILIZER

Manufactured fertilizer shall be a standard commercial fertilizer containing the specified percentages by weight of nitrogen (N), phosphoric acid (P O) and potash (K O).

The fertilizer shall be furnished in standard containers with the name, weight and guaranteed analysis of the contents clearly marked. The containers shall insure proper protection in handling and transporting the fertilizer.

All commercial fertilizer shall comply with local, state and federal fertilizer laws.

74.16 AMMONIUM NITRATE

Ammonium nitrate shall be a standard commercial product, shall conform to the requirements for other commercial fertilizers as specified in Item 74.15 and shall have a minimum of 33-1/2 percent nitrogen.

74.17 AGRICULTURAL LIMESTONE

Agricultural limestone shall contain not less than eighty-five percent of calcium carbonate and magnesium carbonate combined, and shall be crushed so that at least eighty-five percent will pass the No. 10 mesh sieve.

74.18 MULCH MATERIAL

All mulch materials shall be air dried and reasonably free of noxious weeds and weed seed, or other materials detrimental to plant growth.

Hay shall be stalks of approved grasses, sedges or legumes seasoned before baling or loading.

Straw shall be stalks of rye, oats, wheat or other approved grain crops.

Both hay and straw shall be suitable for spreading with standard mulch blower equipment.

74.19 JUTE MESH

Jute mesh shall be of a uniform, open, plain weave of single jute yarn. The yarn shall be of loosely twisted construction and shall not vary in thickness by more than one-half of its normal diameter. Jute mesh shall be furnished in rolled strips and shall meet the following requirements.

Jute mesh shall be nontoxic to the growth of plants and germination of seeds, and shall be identified by tag. It shall have 58 wrap ends per yard, 41 weft ends per yard, and have an average weight of 0.9 pounds per square yard, with an allowable deficiency of not more than five percent.

All materials shall be new and unused, and the length shall be marked on each roll. Staples shall be machine made of No. 11 gauge new steel wire formed into a "U" shape.

74.20 LINSEED OIL PRESERVATIVE

Linseed oil preservative shall consist of fifty percent boiled linseed oil, and fifty percent petroleum spirits (mineral spirits), meeting the requirements of Item 604.28 of the Tennessee Department of Transportation Standard Specifications. The linseed oil and petroleum spirits shall be agitated and thoroughly mixed prior to application.

74.21 GROUT

Grout shall be mixed in small quantities as needed, and shall not be re-tempered or used after it has begun to set. Unless otherwise specified or directed, the grout shall consist of one part Portland Cement and three parts sand mixed with sufficient water to form a grout of proper consistency. When non-shrinking fast-setting grout is specified, it shall be formulated by the incorporation of an admixture, or a premixed grout may be used. The formulation and the admixture or the premixed grout used will be subject to the approval of the Engineer, and shall be mixed and used in accordance with the recommendations of the manufacturer. These special grouts will be classified as follows:

Type I - Non-shrinking grout

Type II - Non-shrinking, fast-setting grout

Portland Cement for grout shall conform to the requirements of Item 73.01. Sand for grout shall conform to the requirements of Item 73.02. Water for grout shall be approved by the Engineer.

74.22 MANHOLE STEPS

Steps used in manholes or catch basins shall be cast iron, aluminum or wrought iron, unless otherwise specified. The design of the steps shall be as shown on the Plans.

- (a) Cast iron steps shall conform to the requirements of Item 908.07 of the Tennessee Department of Transportation Standard Specifications.
- (b) Aluminum steps shall be fabricated from aluminum alloy 6060, T 60 with a minimum tensile strength of 3800 psi, a minimum yield strength of 3500 psi, and an elongation in two inches of not less than 10 percent.

74.23 RED IRON OXIDE

Red iron oxide for coloring concrete shall be a mineral product containing no organic coloring matter and shall conform to the following requirements:

Loss on ignition	4 percent, maximum
Iron Oxide, as F	80 percent, minimum
Passing 325 mesh sieve	97 percent, minimum

74.24 INOCULANTS FOR LEGUMES

Inoculants for treating legume seed shall be standard cultures of nitrogen-fixing bacteria that are adapted to the particular kind of seed to be treated. The inoculant shall be supplied in convenient containers of a size sufficient to treat the amount of seed to be planted. The label on the container shall indicate the specified legume seed to be inoculated and the date period to be used.

END OF DOCUMENT

ITEM 75 - COLD PLANING OF BITUMINOUS PLANT MIX PAVEMENTS

75.01-Description.

This work shall consist of cold planing an existing bituminous plant mix pavement in accordance with the requirements of these Specifications and in reasonably close conformity with the lines and grades shown on the Plans or established by the Engineer.

75.02-Equipment.

All equipment necessary for the satisfactory performance of this work shall be on hand and approved before work will be permitted to begin. The required equipment shall include a power broom, a water truck, and a planing machine. Equipment shall be furnished to remove the material planed from the pavement. The planing machine shall be a power operated, self-propelled milling machine or grinder capable of removing bituminous concrete to the required width, depth, profile, cross-slope and surface texture. The machine shall be capable of accurately establishing profile by referencing from either the existing pavement or from an independent grade control and shall have positive means for controlling cross-slope. The machine shall have a floating moldboard with sufficient down pressure to plane the milled surface. The machine shall have an effective means of removing cuttings from the pavement and for preventing dust from escaping into the air. When milling the Interstate or controlled access freeways, the planing machine shall be equipped with a cutter drum at least 12 feet wide and be capable of restoring pavement profile with either a contact or noncontact leveling system. A contact leveling system shall be a minimum of 40 feet in length and the non-contact leveling system shall have a minimum of 3 sensors dispersed the length of the machine.

The maximum spacing between teeth on the cutter drum shall not exceed 5/8 inch. Supplemental equipment shall be provided as necessary to remove material in areas that cannot be reached by the planing machine.

75.03-General Requirements.

The operations shall be so arranged that no vertical longitudinal faces exceed 1-1/4 inch in height in areas to be used by public traffic. Transverse faces shall be tapered in a manner approved by the Engineer to avoid creating a hazard for traffic. The Contractor shall be required to cold plane in the direction of traffic. The planing machine shall operate at a consistent forward speed to provide an acceptable surface texture. The maximum allowable forward speed shall be 60 ft/min when the teeth spacing is between 1/2 inch and 5/8 inch, and the maximum allowable forward speed shall be 80 feet/min when the teeth spacing is less than 1/2 inch.

After planing, the finished surface shall provide a smooth riding surface free from scallops, scabs, gouges, ridges, oil film, and other imperfections of workmanship, having a uniform texture, and true to the required grade and cross section. The elevation of the longitudinal edges of adjacent cuts shall not differ more than 1/8 inch.

Milling shall not commence unless the subsequent layer of pavement can be placed within limitation specified in **ITEM 12.09**.

The planed pavement shall be thoroughly swept immediately behind the machine and all materials swept up shall be loaded and hauled away. A water truck shall be furnished and used to control dust from the work, when deemed necessary by the Engineer.

Where sound pavement has been gouged, torn, or otherwise damaged during the milling operations, or damage is done to any other property of any kind including utility frames, grates, and covers, repairs shall be made by the Contractor at no cost to the Department. The Contractor shall take appropriate measures so that the cold planing operation does not trap water.

75.04-Surface Requirements.

Where the planed pavement is not to be resurfaced, the texture shall be uniform throughout the project and shall provide a satisfactory riding surface. The average texture depth shall be no less than 0.20 inch.

The finished surface shall be of uniform profile throughout, without any scabbing, scallops, gouges, ridges, or other imperfections resulting from worn cutter teeth, improper operating speeds, poor equipment maintenance, or other instances of poor workmanship. The cross-slope shall be as specified on the plans in the tangent, transition, and super-elevated curve sections. The finished surface after the final cut shall not show a deviation greater than 1/8 inch from a 10 ft. straightedge, and the crossslope shall not deviate more than 3/8 inch in 10 ft. All irregularities exceeding these limits shall be corrected. Approaches and tapers shall be acceptably textured when required by the Engineer. Length, width, and depth of cut on approaches and tapers will be as determined by the Engineer. The approaches and tapers shall match the finished cut on the main line and shall be transitioned to the existing surface to within $\pm 1/8$ inch.

When deemed necessary by the Engineer, private entrances shall be transitioned to provide a smooth approach to the roadway.

Unless otherwise specified on the plans, the cuttings shall become the property of the Contractor and be removed from the project.

75.05-Method of Measurement.

Cold Planing of Bituminous Pavement will be measured by the square yard of planed pavement. The method of measurement will depend upon the pay item designated in the proposal.

Unless otherwise specified, water used to control dust will not be measured for separate payment but will be considered incidental to the planing operation.

75.06-Basis of Payment.

The accepted quantity of Cold Planed Bituminous Pavement will be paid for at the contract unit price, which payment shall be full compensation for all labor, materials, equipment, hauling, and incidentals necessary to plane the pavement, control dust, and dispose of the cuttings.

END OF DOCUMENT

ITEM 98

SLOPE PROTECTION AND EROSION CONTROL

98.01 SCOPE

(a) This Section shall consist of temporary control measures as shown in the plans or directed by the Engineer during the life of the Contract to control erosion and water pollution, through the use of berms, dikes, dams, sediment basins, fiber mats, netting, mulches, grasses, slope drains, temporary silt fences, and other control devices.

(b) The temporary pollution control provisions contained herein shall be coordinated with the permanent erosion control features, to assure economical, effective, and continuous erosion control throughout the construction and post-construction period.

98.02 TEMPORARY BERMS

(a) A temporary berm is constructed of compacted soil, with or without a shallow ditch, at the top of fill slopes or transverse to centerline on fills.

These berms are used temporarily at the top of newly constructed slopes to prevent excessive erosion until permanent controls are installed or slopes stabilized.

98.03 TEMPORARY SLOPE DRAINS

A temporary slope drain is a facility consisting of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, sod or other material acceptable to the Engineer that may be used to carry water down slopes to reduce erosion.

98.04 SEDIMENT STRUCTURES

Sediment basins, ponds, and traps, are prepared storage areas constructed to trap and store sediment from erodible areas in order to protect properties and stream channels below the construction areas from excessive siltation.

98.05 CHECK DAMS

(a) Check dams are barriers composed of logs and poles, large stones or other materials placed across a natural or constructed drainway.

(b) Stone check dams shall not be utilized where the drainage area exceeds fifty (50) acres. Log and pole structures shall not be used where the drainage area exceeds five (5) acres.

98.06 TEMPORARY SEEDING AND MULCHING

Temporary seeding and mulching are measures consisting of seeding, mulching, fertilizing, and matting utilized to reduce erosion. All cut and fill slopes including waste sites and borrow pits shall be seeded when and where necessary to eliminate erosion.

98.07 BRUSH BARRIERS

(a) Brush barriers shall consist of brush, tree trimmings, shrubs, plants, and other approved refuse from the clearing and grubbing operation.

(b) Brush barriers are placed on natural ground at the bottom of fill slopes, where the most likely erodible areas are located to restrain sedimentation particles.

98.08 BALED HAY OR STRAW CHECKS

(a) Baled hay or straw erosion checks are temporary measures to control erosion and prevent siltation. Bales shall be either hay or straw containing five (5) cubic feet or more of material.

(a) Baled hay or straw checks shall be used where the existing ground slopes toward or away from the embankment along the toe of slopes, in ditches, or other areas where siltation erosion or water run-off is a problem.

98.09 TEMPORARY SILT FENCES

Silt fences are temporary measures utilizing woven wire or other approved material attached to posts with filter cloth composed of burlap, plastic filter fabric, etc., attached to the upstream side of the fence to retain the suspended silt particles in the run-off water.

98.10 EROSION CONTROL FABRIC

Mulch on slopes exceeding 3 to 1 ratio shall be held in place by the use of an approved erosion control fabric, such as Curlex 1 as manufactured by American Excelsior Company, or an approved equal.

98.11 DITCH LINING FABRIC

(a) Mat

The mat shall be of three-dimensional structures of entangled nylon filaments (0.40 mm minimum diameter) bonded at their intersections. The filaments shall be coated with polyurethane binder to increase tensile strength between the filaments and to increase abrasion resistance. The mat shall be resistant to chemical and environmental degradation. The mat shall be 10 mm in thickness and promote and maintain the integrity of the grass root system. Enkamat Type 7020 soil reinforcement matting as manufactured by the American Enka Company or an approved equal shall be used.

(b) Ground Fasteners

Ground fasteners shall be one or a combination of the following:

1. T-Staple (wire)
2. Broad wire U-staple
3. Narrow wire U-staple
4. Wood Survey stake

All staples shall be 8- to 11-gauge wire with a minimum penetration of 8 inches. The wood survey stakes will be used when high velocity and/or large volumes of water are expected to occur.

98.12 PROJECT REVIEW

Prior to the preconstruction conference, the Contractor shall meet with the Engineer and go over in detail the expected problem areas in regard to the erosion control work. Different solutions should be discussed so that the best method might be determined. It is the basic responsibility of the Contractor to develop an erosion control plan acceptable to the Engineer.

98.13 PRECONSTRUCTION CONFERENCE

At the preconstruction conference the Contractor shall submit for acceptance his schedule for accomplishment of temporary and permanent erosion control work, as are applicable for clearing and grubbing, grading, bridges and other structures at watercourse, construction, and paving. He shall also submit for acceptance his proposed method of erosion control on haul roads and borrow pits and his plan for disposal of waste materials. No work shall be started until the erosion control schedules and methods of operations have been accepted by the engineer.

98.14 CONSTRUCTION REQUIREMENTS

(a) The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, the surface of erodible earth material exposed by excavation, borrow and fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds, or other water impoundment. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats, seeding or other control devices or methods as necessary to control erosion. Cut and fill slopes shall be seeded and mulched as the excavation proceeds to the extent directed by the Engineer.

(b) The Contractor shall be required to incorporate all permanent erosion control features into project at the earliest practicable time as outlined in his accepted schedule. Temporary pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent pollution control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

(c) Where erosion is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, erosion control measures may be required between successive construction stages. Under no conditions shall the surface area of erodible earth material exposed at one time by clearing and grubbing, exceed 750,000 square feet without approval by the Engineer.

(d) The Engineer will limit the area of excavation, borrow, and embankment operations in progress commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

(e) Under no conditions shall the amount of surface area or erodible earth material exposed at one time by excavation or fill within the project area exceed 750,000 square feet without prior approval by the Engineer.

(f) The Engineer may increase or decrease the amount of surface area of erodible earth material to be exposed at one time by clearing and grubbing, excavation, borrow and fill operations as determined by his analysis of project conditions.

(g) In the event of conflict between these requirements and pollution control laws, rules, or regulations or other Federal or State or local agencies, the more restrictive laws, rules, or regulations shall apply.

98.15 CONSTRUCTION OF STRUCTURES

(a) Temporary Berms

A temporary berm shall be constructed of compacted soil, with a minimum width of 24 inches at the top and a minimum height of 12 inches with or without a shallow ditch, constructed at the top of fill slopes or transverse to centerline on fills.

Temporary berms shall be graded so as to drain to a compacted outlet at a slope drain. The area adjacent to the temporary berm in the vicinity of the slope drain must be properly graded to enable this inlet to function efficiently and with minimum ponding in this area. All transverse berms required on the downstream side of a slope drain shall extend across the grade to the highest point at approximately a 10-degree angle with a perpendicular to centerline. The top width of these berms may be wider and the side slope flatter on transverse berms to allow equipment to pass over these berms with minimal disruptions. When practical and until final roadway elevations are approached, embankments should be constructed with a gradual slope to one side of the embankment to permit the placement of temporary berms and slope drains on only one side of the embankment.

(b) Temporary Slope Drains

Temporary slope drains shall consist of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, flexible rubber, or other materials which can be used as temporary measures to carry water accumulating in the cuts and on the fills down the slopes prior to installation of permanent facilities or growth of adequate ground cover on the slopes.

1. Fiber matting and plastic sheeting shall not be used on slopes steeper than 4:1 except for short distances of 20 feet or less.
2. All temporary slope drains shall be adequately anchored to the slope to prevent disruption by the force of the water flowing in the drains. The base for temporary slope drains shall be compacted and concavely formed to channel the water or hold the slope drain in place. The inlet end shall be properly constructed to channel water into the temporary slope drain. Energy dissipaters, sediment basins, or other approved devices shall be constructed at the outlet end of the slope drains to reduce erosion downstream. An ideal dissipater would be dumped rock or a small sediment basin which would slow the water and collect sediment. All temporary slope drains shall be removed when they are no longer necessary and the site restored to match the surroundings.

(c) Sediment Structures

1. Sediment structures shall be utilized to control sediment at the foot of embankments at slope drain outlets, at the bottom and in the ditchlines atop waste sites, and in the ditchlines and/or borrow bits. Sediment structures may be used in most drainage situations to prevent excessive siltation of pipe structures. All sediment structures shall be at least twice as long as they are wide.

2. When use of temporary sediment structures is to be discontinued, all sediment accumulation shall be removed, and all excavation backfilled and properly compacted. The existing ground shall be restored to its natural or intended condition.

(d) Check Dams

1. Check dams shall be utilized to retard stream flow and catch small sediment loads. Materials utilized to construct check dams are varied and should be clearly illustrated or explained in the Contractor's erosion control plan.

2. All check dams shall be keyed into the sides and bottom of the channel a minimum depth of 2 feet. A design is not needed for check dams, but some typical designs are shown in the standard plans.

3. Stone check dams should generally not be utilized where the drainage area exceeds fifty (50) acres. Long and pole structures should generally not be used where the drainage area exceeds five (5) acres.

(e) Temporary Seeding and Mulching

Seeding and mulching shall be performed in accordance with Item 35, entitled "Sodding and/or Seeding."

(f) Brush Barriers

Brush barriers shall consist of brush, tree trimmings, shrubs, plants and other approved refuse from the clearing and grubbing operation. The brush barriers shall be constructed approximately parallel to original ground contour. The brush barrier shall be compressed to an approximate height of 3 to 5 feet and approximate width of 5 to 10 feet. The embankment shall not be supported by the construction of brush barriers.

(g) Baled Hay or Straw Erosion Checks

Hay or straw erosion checks shall be embedded in the ground 4 to 6 inches to prevent water flowing under them. The bales shall also be anchored securely to the ground by wooden stakes driven through the bales into the ground. Bales can remain in place until they rot, or be removed after they have served their purpose, as determined by the Engineer. The Contractor shall keep the checks in good condition by replacing broken or damaged bales immediately after damage occurs. Normal debris clean-out will be considered routine maintenance.

(h) Temporary Silt Fences

1. Temporary silt fences shall be placed on the natural ground, at the bottom of fill slopes, in ditches, or other areas where siltation is a problem. Silt fences are constructed of wire mesh fence with a covering of burlap or some other suitable material on the upper grade side of the fence and anchored into the soil.

2. The Contractor shall be required to maintain the silt fence in a satisfactory condition for the duration of the project or until its removal is requested by the Engineer. The silt accumulation at the fence may be left in place and seeded, removed, etc., as directed by the Engineer. The silt fence becomes the property of the Contractor whenever the fence is removed.

(i) Erosion Control Fabric

1. Fabric shall be installed immediately after seeding operations have been completed in work areas. Mulch shall not be used under the fabric.
2. Installation instructions shall be supplied by the manufacturer, and fabric shall be applied in accordance with the manufacturer's recommendation as directed by the specifier.
3. Fabric shall be unrolled and draped loosely, without stretching, so that continuous ground contact is maintained. In ditches, fabric shall be unrolled and applied parallel to the flow direction. On slopes, fabric shall be applied parallel to the slope direction unless the engineer approves an alternate application method.
4. In ditches and on slopes, each upslope and each downslope end of each piece of fabric shall be placed in a 4-inch trench, stapled on 9-inch centers, backfilled and tamped. Where one roll ends and a second roll starts, the upslope piece shall be brought over the end of the downslope roll so that there is a 12-inch overlap, placed in a 4-inch trench stapled on 9-inch centers, backfilled and tamped.
5. On slopes where two or more widths of fabric are applied, the two edges shall be overlapped according to manufacturer's installation instructions and stapled at 18 to 24-inch intervals along the exposed edge of the lap joint. The body of the fabric shall be stapled in a grid pattern with staples 3 feet maximum on center each way.
6. Where heavy concentrations of water or extremely erodible soil conditions exist, erosion checks shall be installed at intervals up to 50 feet as directed by the engineer. Erosion checks shall be a 4-inch deep trench perpendicular to the flow line across the width of the fabric. The fabric shall be stapled at 9-inch intervals along the bottom of the trench across the entire width of the fabric, backfilled and stamped.

(j) Ditch Lining Fabric

1. The ditch shall be shaped and dressed in accordance with the Specifications and Drawings at the location and grade shown on the plans or designated by the Engineer. Transverse check slots shall then be cut at the ends of the liner at 25-foot intervals along the ditch to a depth of 6 to 12 inches. Matting widths shall be as specified in the plans. Longitudinal shelves shall be cut 4 inches along the full length of the ditch for the mat edges to rest on.

2. Before the matting is placed, seeding operations shall be completed along the ditch line. Seeding operations shall conform to the requirements of Item 35, entitled, "Sodding and/or Seeding."

3. After seeding, the center strip of matting shall be rolled out starting at the upper end of the ditch. Then the side strips shall be rolled out, also starting at the upper end of the ditch, and overlapping the middle strip about 3 inches. The mat shall then be pinned down thoroughly and snugly in the transverse check slots and longitudinal shelves and at maximum intervals of 5 feet along the ditch. Where necessary, additional pins shall be used to hold the mat firmly in place, the transverse check slots and longitudinal shelves shall be covered with soil and tamped. Additional grass seed shall be applied to any disturbed areas after dressing is complete.

98.16 MAINTENANCE

(a) The temporary erosion control features should be installed by the Contractor until no longer needed or permanent erosion control methods are installed. Any materials removed shall become the property of the Contractor.

(b) In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of work as scheduled, and are ordered by the Engineer, such work shall be performed by the Contractor at his own expense.

(c) Where the work to be performed is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls and falls within the specifications for a work item that has a contract price, the units of work shall be paid for at the proper contract prices.

98.17 EROSION CONTROL OUTSIDE PROJECT AREA

Temporary pollution control shall include construction work outside the project area where such work is necessary as a result of construction such as borrow pit operations, haul roads and equipment storage sites. Bid price in such cases shall include all necessary clearing and grubbing, construction incidentals, maintenance, and site restoration when no longer needed.

END OF DOCUMENT

ITEM 717

MOBILIZATION OF FORCES, SUPPLIES, AND EQUIPMENT

717.01 Description

This work shall consist of the mobilization and demobilization of the prime Contractor's and all Subcontractors' work forces, supplies, equipment, and incidentals at the project site. It shall include all Contractor and Subcontractor costs associated with obtaining performance bonds, insurance required by railroads, and other preconstruction costs incurred after award of the contract which are necessary costs to the project and are of a general nature rather than directly attributable to other pay items. All necessary preconstruction costs not attributable to a specific pay item shall be included in the contract lump sum price for Mobilization and not in any other pay item.

717.02 Method of Measurement

Mobilization will be measured by the unit for the completion of the work as described above, and payment will be made on a lump sum basis.

717.03 Basis of Payment

Partial payment for mobilization will be determined as indicated below. Upon completion of all work on the project, payment will be made of any amount bid for mobilization in excess of the total limit for partial payment.

Partial Payment Schedule

Percent of Total Contract Amount of Progress Estimate Exclusive of Mobilization	Percent of Mobilization Allowed
Not Less Than	
2%	30%*
5%	50%*
10%	80%*
25%	100%*

* % of lump sum bid price for mobilization or of the total limit for partial payment whichever is less.

Payment for mobilization will be made in accordance with the provisions set out above, which price shall be full compensation for organizing and moving all forces, supplies, equipment, and incidentals to the project site, regardless of the number of times such moves are made and also for all preconstruction costs incurred after award of the contract.

END OF DOCUMENT

717-1

Division 13
Asbestos
Specifications

SECTION 1310 ASBESTOS ABATEMENT

- 1.1 DESCRIPTION OF WORK
 - 1.1.2 Protection of Existing Areas to Remain
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 - 1.4.1 Qualifications and Organization Report
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Asbestos

**ASBESTOS ABATEMENT
THE AVONDALE YOUTH and FAMILY DEVELOPMENT CENTER**

1.1 DESCRIPTION OF WORK

1.1.1 The purpose of the project is to remove the identified asbestos containing floor tile and mastic adhesives on the main level and a small quantity of white duct tape in the basement mechanical room. This removal is to be followed by demolition of the building.

The scope includes 1) the removal of asbestos floor tile and associated mastics from all identified rooms, 2) removal of asbestos white duct tape from the basement mechanical room.

This project is being performed to allow for the clean disposal or reuse of the concrete slab and allow safe access by the demolition contractor to the metal ducts in the basement mechanical room. The scope of removal is described in detail below.

The attached quantities were found to be present in the building which will require removal. It is the intention of the City of Chattanooga to release the full building for abatement. A single clearance will be performed once all abatement is completed. Any retests due to failed visuals and or failed air clearances will be charged to the abatement contractor. Payment to the consultant must be made before final invoice will be approved and processed. Drawings have been attached identifying the location of the asbestos floor tile and mastic adhesives.

Quantities were calculated in the field during the preparation of the drawings. While we believe these quantities to be accurate, abatement contractor is responsible for the quantities used to bid the project. Change orders will not be considered unless it is a true hidden condition where the materials could not be reasonably found.

The following site conditions, scope and scheduling requirements need to be taken into consideration when preparing your quotes.

The contractor must document any damage to surfaces, building component or equipment. Contractor will need to document conditions at the start of the project. Documented pre-existing damages must be brought to the consultant and owner's attention prior to the abatement contractor starting work. Contractor will need to video or take digital pictures to document any damages prior to the abatement. ***Damages noted will need to be brought to the attention of the consultant and City of Chattanooga prior to the commencement of abatement. Demolition contractor has salvage rights. Without documentation, contractor will be held responsible for all damages including pre-existing damages which may impact it's value to the demolition contractor.***

- A. Timing of the abatement is critical path. Abatement contractor will be given the building as unoccupied. Contractor has only 10 calendar days to complete the project, including clearance and removal of critical barriers. The Consultant will perform a visual inspection for completeness prior to air sampling. Air sampling will be performed upon passing visual inspection.

Abatement contractor will be responsible for the removal of all base cabinets and attached fixtures that are covering the asbestos materials to be removed.

- B. Abatement contractor will be allowed to make use of the bathrooms. No work is currently planned in the bathrooms. Contractor will be responsible for keeping the bathroom clean at all times. Contractor will be responsible for any supplies used. Failure to keep the bathroom clean can and will cause the abatement contractor to lose bathroom privileges and cause the contractor to bring in porta-johns.
- C. The abatement contractor will be responsible for the protection of remaining surfaces. Mastic stained surfaces will need to be repaired by the abatement contractor. **No mastic stains.** Contractor must protect these surfaces. Any mastic stains will be the responsibility of the contractor to clean.
- D. Abatement contractor will need to remove all asbestos floor tile and associated mastic adhesive indicated on the drawings. **No three-dimensional mastic or mastic residue shall remain.**
- E. Even though the building to be abated will be unoccupied, other buildings will be occupied on the site. Some of these occupants and visitors are children. Abatement contractor will need to keep site around the building clean and without hazards. Building must remain secured to prevent children or other site occupants or visitors from entering building being abated.
- F. Care and precautions must also be made pertaining to the asbestos waste dumpster. Dumpsters will be covered by a secured tarp when not actively being filled. The tarp must be securable using cables etc.. When not being loaded or picked up, the containers must remain covered and secured. Asbestos container must be properly marked.

The abatement contractor will be responsible for meeting all Federal, State and Local EPA, TOSHA and local ordinances. Below are minimum requirements expected to be used by the contractor.

- 1) Critical barriers must be sealed with 2 independent layers of 6-mil polyethylene sheeting. Mechanical systems and wall penetrations must be checked for seals at seams and at penetrations. HVAC supplies and returns must be sealed off to the work areas. Critical barriers will remain in place until air clearance has been obtained.
- 2) Contractor must have a proper method for the workers to clean hands and face. Must be potable water. HEPA vacuuming is only allowed for clothing cleaning.
- 3) Containment preparation will include at least a single layer of 4-mil polyethylene 3' high on all wall surfaces to protect surfaces during the floor tile and mastic removal. Any mastic or floor tile debris found during the inspection constitutes a visual failure. This includes any raised mastic or mastic residue on remaining building surfaces.

- 4) Contractor will be responsible for all aspects of safety with respect to his/her employees and other occupants or visitors to the building.
- 5) Contractor will have access to electrical service and water at the building. Any special connections for GFCI panels, water connections, etc., however, will be the responsibility of the abatement contractor. Any and all temporary electrical work must meet all applicable electrical standards.
- 6) A courtesy NESHAP notification will need to be made to the Chattanooga-Hamilton County Air Pollution Control Bureau. A copy of the full asbestos NESHAP inspection will be provided to the successful contractor.

G. Abatement contractor must be accredited with the State of Tennessee Asbestos Program. This will include the firm, supervisors and workers.

1.1.2 Protection of Existing Areas / Surfaces To Remain

All project work including, but not limited to, asbestos work, storage, transportation, and disposal shall be performed without damaging or contaminating adjacent work and areas. Where such work or areas are damaged or contaminated, the abatement contractor shall restore work and areas to the original condition at no additional cost to the Owner. This includes any damage to the drywall, plaster, painted concrete block (inside or outside the work area), doors, remaining millwork, lighting, sinks, water heaters, plumbing, toilets, tubs, etc. that was caused by the abatement contractor. It is recommended that the abatement contractor document pre-existing conditions with photos or video.

1.1.3 Coordination with Other Work

The contractor shall coordinate asbestos abatement activities with work being performed in adjacent areas, if any. Coordination procedures shall be explained in the Contractor's Accident Prevention Plan and shall describe how the Contractor will prevent asbestos exposure to other contractors and/or Owner's Representatives (Architect, Consultant, Engineers, etc.) performing work unrelated to the asbestos hazard control activities.

1.2 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- | | |
|------------|---|
| ANSI Z9.2 | (1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems |
| ANSI Z88.2 | (1992) Respiratory Protection |

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701 (1999) Methods of Fire Tests for Flame-Resistant Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 84-100 (1984; Supple 1985, 1987, 1988 & 1990) NIOSH Manual of Analytical Methods

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

PURPLE BOOK (1985) Guidance for Controlling Asbestos-Containing Materials in Buildings

EPA 340/1-92-013 A Guide to Normal Demolition Practices Under the Asbestos NESHAP

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1926.1101(h) OSHA Asbestos Advisor

29 CFR 1910 Occupational Safety and Health Standards for Industry

29 CFR 1926 Occupational Safety and Health Standards for Construction

29 CFR 1926.21 Safety Training and Education

29 CFR 1926.33 Access to Employee Exposure and Medical Records

29 CFR 1926.55 Gases, Vapors, Fumes, Dust, and Mists

29 CFR 1926.59 Hazard Communication

40 CFR 763.120, 121 USEPA Regulations Governing Asbestos Abatement Project (Worker Protection)

40 CFR 61 USEPA National Emission Standards for Hazardous Air Pollutants (NESHAP - Integrated Version) Asbestos Regulations

29 CFR 1926.103 Respiratory Protection

40 CFR 763 USEPA ASHARA/AHERA Asbestos Model
Accreditation Plan: Interim Final Rule (Preamble &
Standard, February 3, 1994)

UNDERWRITERS LABORATORIES (UL)

UL 586 (1996; Rev thru Aug 1999) High-Efficiency,
Particulate, Air Filter Units

STATE OF TENNESSEE

TN Occupational Safety and Health Standards
(29 CFR 1910 for General Industry; 29 CFR 1926 for Construction)

State of Tennessee Asbestos Program (Chapter 1200-01-20)

1.3 SUBMITTALS

PRE-JOB

Contractor is required to provide the following pre-job submittals prior to mobilization to the project site. Contractor will not be allowed to begin until all submittals are approved by the Owner / Owner's Consultant.

1) Accident Prevention Plan

The accident prevention plan shall address occupational exposure issues and shall describe the procedures to be followed to protect employees from asbestos hazards while performing asbestos abatement activities. Prevention plan should also address measures to be taken to protect occupied areas. Each of the following elements shall be addressed in the plan:

- a). The location and brief description of each work activity that will potentially release asbestos fibers into the workplace atmosphere. A description of any components containing lead shall be included and keyed to the project drawings.
- b). Description of equipment and materials, controls, crew size, worker responsibilities, and operating and maintenance procedures.
- c). Description and sketch of the asbestos containment/work area, including decontamination areas. Sketch shall include the emergency egress to be used in the event of a fire or other emergency. Evacuation plan shall be posted at each work area.
- d). Description of the specific methods and procedures to protect workers and other onsite contractors from asbestos exposure.

- e). Technologic equipment used to keep occupational exposure below the Permissible Exposure Limit (PEL). (i.e., HEPA-filtered vacuum equipment /cleaners, special negative air enclosure equipment and supplies, etc.).
 - f). Initial Exposure Assessment / Negative Exposure Assessment (1926.1101(f)(2). **Without a proper, complete and up to date negative exposure assessment, the abatement contractor will have to start the asbestos removal in PAPRs until a NEA can support a lower protection factor.**
 - g). Work Practices Program describing the protective clothing to be used to protect workers from asbestos exposure, house keeping procedures employed to minimize the spread of asbestos contamination in the asbestos control area and hygiene facilities.
 - h). Medical Surveillance practices and procedures used to monitor worker exposure to asbestos and to assure fitness for wearing respiratory protection devices.
 - i). Worker training meeting the requirements of definition of OSHA's Class I Supervisor and workers; EPA ASHARA MAP 40 CFR 763.
 - j). Copies of State of Tennessee asbestos and lead accreditations for the firm, supervisor and workers that will be on the site.
 - k). Security: Locked security area. A log book shall be used to document entry into and out of the asbestos hazard control area(s). Persons entering control areas shall be trained, medically evaluated, and equipped with personal protective equipment required for the specific control area to be entered.
- 2) Copy of courtesy "NESHAP Notification" to Chattanooga-Hamilton County Air Pollution Control Bureau.
 - 3) Copy of training certificates for workers and Supervisor.
 - 4) Copy of Doctor's written opinion for respirator use (workers and Supervisor)
 - 5) Copy of Tennessee contractor's license.
 - 6) Chain of Authority giving names and phone numbers. Phone numbers shall include cellular, office and home numbers for contact after hours.
 - 7) Copy of MSDS for all materials and chemicals to be used on the project.
 - 8) Certificate of Insurance naming the Owner as additional insured with the following minimum limits:

GENERAL LIABILITY INSURANCE	
General Aggregate	\$1,000,000
Products-Comp/Op. Agg.	\$1,000,000
Personal & Adv. Injury	\$1,000,000
Each Occurrence	\$1,000,000
Fire Damage (any one fire)	\$ 100,000
Medical Expense (any one person)	\$ 10,000
POLLUTION LIABILITY	
Each Occurrence	\$1,000,000
AUTOMOBILE LIABILITY	
Combined Single Limit	\$ 500,000
WORKERS COMPENSATION AND EMPLOYER LIABILITY	
	By Statute

During Job

Any new worker or Supervisor added to the job will need to have all of the above, as applicable, prior to being able to work. Any unlisted material or chemicals introduced to the project site must be accompanied by a MSDS. Certified payroll forms will be required to be submitted with each invoice covering all payroll during that period.

Post Job

- 1) Waste manifests
- 2) Sign In / Out Sheets
- 3) Visitor Logs
- 4) Daily Supervisor Log
- 5) OSHA Air Sampling Results

1.4. QUALIFICATIONS

1.4.1 Qualifications and Organization Report

The Contractor shall furnish a qualification and organization report. The report shall describe the qualifications of the Supervisor (Competent Person). The report shall include an organization chart showing the Contractor's personnel by name and title and project specific responsibilities and authorities, if more than one Supervisor assigned to the project. The report shall be signed by the Contractor to indicate that all personnel comply with certification and experience requirements of this section and that project personnel have been given the authority to complete the tasks assigned to them.

1.4.2 Personnel and Subcontractor Responsibilities and Qualifications

1.4.2.1 Qualifications of Competent Person

The Competent Person shall be on-site at all times when any work is being performed, not just during removal. Responsibilities include but are not limited to: be responsible for the development of project specific requirements in the Accident Prevention Plan (APP); supervise implementation of the APP requirements; verify effectiveness of the APP and to coordinate resolution of unknown situations that may develop as

the work progresses; be able to provide consultation to the Owner or Owner's Designated Representative; review sampling and analytical results to evaluate occupational exposure levels, verify effectiveness of controls and determine if clearance requirements have been met.

1.4.2.2 Disposal Facility and Transporter Asbestos

The Contractor shall furnish written evidence that the landfill to be used is approved for asbestos disposal by USEPA and State of Tennessee Division of Solid Wastes. Copies of any required signed agreements between the Contractor (including subcontractors and transporters) and the asbestos disposal facility shall be provided.

1.5 CLEARANCE REQUIREMENTS

Building Interior

Asbestos Clearance Level 0.01 f/cm³ by PLM

1.6 HYGIENE FACILITIES

The Contractor shall describe the personal hygiene facilities to be used by the workers in the Accident Prevention Plan. The Contractor shall provide hygiene facilities for asbestos workers. Hygiene facilities shall consist of the following:

1.6.1 Hand Wash Stations

The Contractor shall provide hand washing facilities for use by abatement workers that are available during the preparation and removal of the containment when a shower is not provided for.

1.6.2 Change Areas

The Contractor shall provide a change area to workers. The change area shall be equipped so that contaminated work clothing and street clothes shall be stored separately to prevent cross contamination.

1.6.3 Showers

A full decon is not required for this project due to the type of material being removed. However, OSHA requires that proper protective equipment must be provided and a method for decontaminating the work force. Contractor must provide a means for face and hands to be washed with soap and water. TOSHA Regulations considers this to be a Class II Removal which requires a shower to be available at the site should conditions change and this becomes a Class I Removal.

1.6.4 Eating Area

The Contractor shall set aside an area or provide a room for taking breaks and eating lunch. This area shall be kept as free from contamination.

1.6.5 Toilet Facilities

The Contractor shall be allowed to use bathroom facilities in the building during the project. Use of the drains, tubs, showers, etc., for disposal of non filtered liquids is prohibited. All work generated waste must be properly handled and disposed of.

1.7 WASTE DISPOSAL PROCEDURES

Contractor must identify landfill and waste transporter as part of Accident Prevention Plan. (APP). All asbestos debris must be properly bagged, labeled and disposed of at an approved asbestos landfill.

1.8 CLEARANCE PROCEDURES

Abatement Contractor is responsible for coordination with the "Environmental Consultant" for conducting visual inspections and air sample clearance which is Alternative Actions, Inc. Costs of the initial clearances will be paid by City of Chattanooga. ***Associated costs of failures, including failed visuals and/or failed samples will be the responsibility of the abatement contractor. Abatement contractor must pay for any retesting prior to their payment application being approved.***

Areas with failures will be re-cleaned and re-tested at the expense of the Contractor. Should a work area fail a second time, the Contractor will be required to stop work until the reason for the failure can be identified. Should the failure be a result of poor cleaning practices by the Contractor, and a third failure occurs, the Contractor will be subject to being removed from the project and the Owner will have the option to replace the Contractor with another Abatement Contractor. Additional cost incurred by the Owner, should the Contractor have to be replaced, will be deducted from revenues due to the Contractor.

Quantities – Asbestos

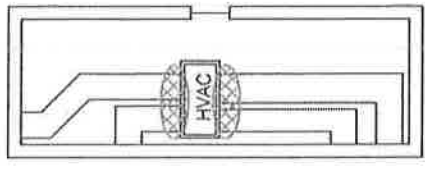
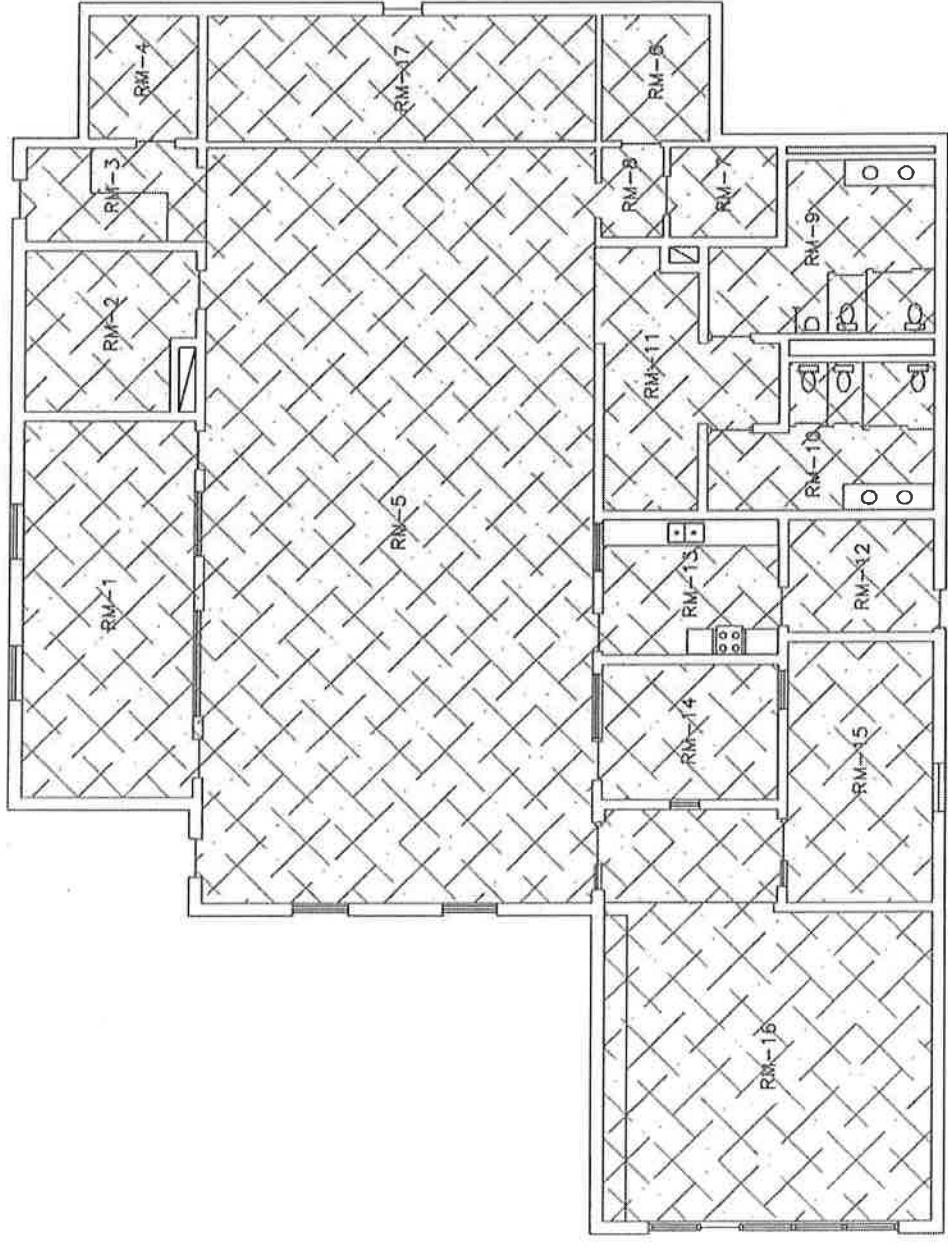
<u>Type of Material</u>	<u>Building Location</u>	<u>Quantities</u>
Floor Tile & Mastic Adhesives	Main Level	4,800 SF
White Duct Tape	Basement	10 SF

The following is a summary of the asbestos sample results associated with this project. All floor tile and all floor tile mastic are considered to be asbestos containing, regardless of previous testing.

Asbestos by PLM

Floor Tile	Cross Contaminated by mastic adhesives
Mastic Adhesives	2-3% Chrysotile Asbestos
White Duct Tape	65% Chrysotile Asbestos

- ☒ Contaminated Floor Tile
- ☒ Black Mastic
- ☒ White Duct Tape



Basement

Asbestos Locations
 The Avondale Youth and Family Development Center
 1305 Dodson Avenue, Chattanooga, TN

SECTION 02120
VIDEO TAPING

PART 1 – GENERAL

1.01 SCOPE

- A. The work covered by this section consists of furnishing all labor, equipment, and material required to provide a video tape record of all easement areas before construction begins in each area. One copy of the video tape(s) shall be presented to the Owner for their records.
- B. The purpose of the video tape(s) is to aid the Owner in determining the extent of construction damage to property in easement areas.

PART 2 – PRODUCTS

2.01 VIDEO TAPE

- A. The video tape shall be a standard VHS video cassette similar or equal to those produced by Sony, Fuji, or Scotchbrand.

PART 3 – EXECUTION

- A. Contractor shall use a quality video camera with sound available. The camera must have zoom capabilities, date record, and produce a clear, concise color picture of the easement area.
- B. Before construction begins, Contractor shall video record each easement by walking along the sewer alignment, recording all topographic features (i.e. trees, sheds, gardens, pools, fences, shrubs, buildings, walls, etc.) on line and also to the left and right of the centerline. The limits shall be determined by the Contractor and the Engineer as the area estimated to be disturbed by the construction.
- C. Contractor shall add sound to the video tape by denoting the line number, date and time, and stations at manholes or names and addresses or property owners.
- D. Contractor shall especially record and denote areas of existing damage prior to the construction (i.e. existing cracks in walls).

END OF SECTION

EMBANKMENT AND BACKFILLING

PART 1. GENERAL

- 1.1 This work shall consist of forming embankments, with materials from excavation or other approved sources and in conformance with the lines, grades and cross-section shown on the drawings.
- 1.2 Complete the clearing and grubbing of embankment areas.
- 1.3 Conduct all embankment operations in accordance with the requirements of the erosion control plan approved by the A/E.
- 1.4 RELATED SECTIONS
 - A. Item 1 – Common Excavation
 - B. Section 02260 – Finish Grading

PART 2. PRODUCTS

- 2.1 Use only acceptable materials in embankment formation. Place no frozen material, stumps, logs, roots or other perishable materials in any embankment. Place no stone or masonry fragment greater than 4 inches in any dimension within 12 inches of the finished subgrade elevation.

PART 3. EXECUTION

- 3.1 Remove topsoil from all areas to be backfilled to a depth of approximately 6 inches, or to a greater depth wherever the soils investigation report so indicates.
- 3.2 Form soil, soft shale, soft sandstone, weathered rock, bank gravel or creek gravel embankment by distributing the material in successive uniform horizontal layers no more than 12 inches thick (loose depth) to the full width of the cross-section. However, layers less than 12 inches in loose thickness will be required whenever necessary to obtain the specified density. Compact each layer as specified below. Shape the upper surface of the embankment so as to provide complete drainage of surface water at all times. The forming of ruts will not be permitted.

- 3.3 Compact all areas to the density specified below:
- A. Trail areas shall be compacted to 95 percent of the maximum density as determined by ASTM D698 (Standard Proctor).
- 3.4 During compaction, embankment material that does not have enough moisture for proper compaction, shall have water added and thoroughly mixed as necessary to obtain proper compaction. Embankment material containing an excess of moisture shall be allowed to dry before compacting; manipulating as necessary to speed drying.
- 3.5 Perform construction operations so that simultaneous rolling and placing of material in the same lane or section is prevented. To avoid uneven compaction, see that hauling equipment traverses the full width of the cross-section as much as possible. Compact each layer as necessary before depositing material for the next layer.
- 3.6 The density requirements shall be the controlling factor in compaction. Use only such equipment as will satisfy the density requirements at all times.

END OF DOCUMENT

SECTION 02220
EARTHWORK

PART 1 - GENERAL

1.01 SCOPE

- A. This specification section includes earthwork and related operations, including, but not limited to, clearing and grubbing the construction site, dewatering, excavating all classes of material encountered, pumping, draining and handling of water encountered in the excavations, handling, storage, transportation, and disposal of all excavated and unsuitable material, construction of fills and embankments, backfilling around structures and pipe, backfilling all trenches and pits, compacting, all sheeting, shoring and bracing, preparation of subgrades, surfacing and grading, and any other similar, incidental, or appurtenant earthwork operation which may be necessary to properly complete the work.
- B. The Contractor shall provide all services, labor, materials and equipment required for all earthwork and related operations necessary or convenient to the Contractor for furnishing a complete work as shown on the Drawings or specified in these Contract Documents.

1.02 GENERAL

- A. The elevations shown on the Drawings as existing are taken from the best existing data and are intended to give reasonable, accurate information about the existing elevations. They are not precise, and the Contractor should satisfy himself as to the exact quantities of excavation and fill required.
- B. Earthwork operations shall be performed in a safe and proper manner with appropriate precautions being taken against all hazards.
- C. All excavated and filled areas for structures, trenches, fills, topsoil areas, embankments and channels shall be maintained by the Contractor in good condition at all times until final acceptance by the Owner. All damage caused by erosion or other construction operations shall be repaired by the Contractor using material of the same type as the damaged material.
- D. If soil borings are available for the area of this work, they will be on file at the Owner's address where they will be made available for review. This information is made available to the Contractor for such use as he may choose to make of it in the preparation of his Bid, but the Owner gives no guarantee, either expressed or implied, that it represents a true or complete cross-section of all of the material to be encountered performing the excavation and earthwork on this project.

- E. Earthwork within the rights-of-way of the State Department of Transportation, the County Road Department, and the City shall be done in accordance with requirements and provisions of the permits issued by those agencies for the construction within their respective rights-of-way. Such requirements and provisions, where applicable, shall take precedence and supersede the provisions of these Specifications.
- F. The Contractor shall control grading in a manner to prevent water running into excavations. Obstruction of surface drainage shall be avoided and means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains, or temporary drains. Material for backfill or for protection of excavation in public roads from surface drainage shall be neatly placed and kept shaped so as to cause the least possible interference with public travel. Free access must be provided to all fire hydrants, watergates, meters, and private drives.
- G. No classification of excavated materials will be made. Excavation and trenching work shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof.
- H. Tests for compaction and density shall be conducted by the Engineer or by an independent testing laboratory selected by him. Costs of compaction tests performed by an independent testing laboratory shall be paid for directly by the Owner and not as a part of this Contract. The Contractor shall make all necessary excavations and shall supply any samples of materials necessary for conducting compaction and density tests. The cost of all retests made necessary by the failure of materials to conform to the requirements of these Contract Documents shall be paid by the Contractor.
- I. All earthwork operations shall comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, Excavations, Trenching, and Shoring, and Subpart O, Motor Vehicles Mechanized Equipment, and Marine Operations, and shall be conducted in a manner acceptable to the Engineer.
- J. It is understood and agreed that the Contractor has made a thorough investigation of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and flood plains, particularly in areas where construction activities may encounter water-bearing sands and gravels or limestone solution channels. The Contractor shall be responsible for providing all services, labor, equipment, and materials necessary or convenient to him for completing the work within the time specified in these Contract Documents.

PART 2 - EXECUTION

2.01 INITIAL SITE PREPARATION

- A. Preparatory to beginning of construction operations, the Contractor shall remove from the site all vegetative growth, trees, brush, stumps, roots, debris, and any of other objectionable matter, including fences, buildings, and other structures shown on the Drawings in the construction areas which are designated for removal or which, if left in place, would interfere with the proper performance or completion of the contemplated work, would impair its subsequent use, or would form obstructions therein.
- B. Stumps and roots shall be grubbed and removed to a depth not less than 5 feet below grade. All holes or cavities which extend below the subgrade elevation of the proposed work shall be filled with compacted layers of crushed rock or earth backfill conforming to the requirements specified here for backfill. Organic material from clearing operations shall not be incorporated in excavation backfill or embankment material.
- C. The Contractor shall exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, buildings, and other structures which are located in the construction area but not within designated clearing limits as shown on the Drawings or within the limits of embankments, excavations, or proposed structures. The Contractor shall be responsible for the repair and/or replacement of any of the aforementioned items damaged by his operation or construction activities.
- D. The Contractor shall remove and dispose of all excess material resulting from clearing or site preparation operations. The Contractor shall dispose of such materials in a manner acceptable to the Engineer and at an approved location where such materials can be lawfully disposed.

2.02 DEWATERING

- A. The Contractor shall provide and maintain at all times during construction ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. Dewatering shall be accomplished by methods which will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. Methods of dewatering may include sump pumps, well points, deep wells, or other suitable methods which do not damage or weaken structures, foundations, or subgrades. Shallow excavations may be dewatered using open ditches provided such ditches are kept open and free-draining at all times. The actual dewatering methods used shall be acceptable to the Engineer.

- B. Unless specifically authorized by the Engineer, no concrete or mortar shall be placed in water nor shall water be allowed to rise over newly-placed concrete or mortar for at least 24 hours after placement. No concrete structure shall be exposed to unequal hydrostatic forces until the concrete has reached its specified 28-day strength. Water shall not be allowed to rise above bedding during pipe laying operations. The Contractor shall exercise care to prevent damage to pipelines or structures resulting from flotation, undermining, or scour. Dewatering operations shall commence when ground or surface water is first encountered and shall be continuous until such times as water can safely be allowed to rise in accordance with the provisions of this section. Excavations shall be protected from the entrance of surface water to the extent possible by the use of dikes and/or covers.
- C. Standby pumping equipment shall be on the job site. A minimum of one standby unit (a minimum of one for each ten in the event well points are used) shall be available for immediate installation should any pumping unit fail. The design and installation of well points or deep wells shall be suitable for the accomplishment of the work. Drawings or diagrams on proposed well point or deep well dewatering systems shall be submitted to the Engineer for review.
- D. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with crushed rock at no cost to the Owner.
- E. The Contractor shall dispose of the water from the work in a suitable manner without damage to adjacent property. Conveyance of the water shall be such as to not interfere with traffic flow or treatment facilities operation. No water shall be drained into work built or under construction without prior consent of the Engineer. The Contractor will be held responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free of sediment.
- F. Sedimentation and desilting basins shall be provided as necessary or when directed by the Engineer to prevent the entrance of excessive or injurious amounts of sand and silt from surface runoff or dewatering operations into storm drains or receiving waters. The system used for desanding or desilting the water shall be a baffled structure and shall provide not less than five minutes detention time and shall be designed to have a "flow-through" velocity not exceeding 0.2 feet per second at the anticipated peak flow. The method of desanding or desilting and the point of disposal shall be subject to the approval of the Engineer.
- G. Water shall be disposed of in such a manner as not to be a menace to the public health and in accordance with applicable Environmental Protection Agency, Corps of Engineers, and State Water Quality Control Division standards and permits, and the Storm Water Division of the Department of Public Works, City of Chattanooga, Tennessee.

2.03 SHEETING, SHORING, AND BRACING

- A. The sides of all excavations shall be sufficiently sheeted, shored, and braced as necessary to prevent slides, cave-ins, settlement or movement of the banks, to maintain the excavation clear of all obstructions, and to provide safe working conditions. Wood or steel sheeting of approved design and type shall be used in wet, saturated or flowing ground. All sheeting, shoring, and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and to maintain shape and position under all circumstances.
- B. The responsibility for correctly assessing the need for sheeting and analyzing the stresses induced shall be the total responsibility of the Contractor. Since the Engineer does not dictate or determine the Contractor's sequence or limits of excavation, the Engineer assumes no responsibility for sheeting and shoring. The Contractor must employ or otherwise provide for adequate professional structural and geotechnical engineering supervision to assess the need for sheeting and shoring and design same. Results of sheeting and shoring analysis and design shall be submitted to the Engineer on request.
- C. Excavations adjacent to existing or proposed buildings and structures, or in paved streets or alleys shall be sheeted, shored, and braced adequately to prevent undermining beneath or subsequent settlement of such structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition. Any damage to structures or pavements occurring through settlements, water or earth pressures, slides, caves, or other causes; due to failure or lack of sheeting or bracing, or due to improper bracing; or occurring through negligence or fault of the Contractor in any other manner shall be repaired by the Contractor at his own expense.
- D. Sheeting, shoring, or bracing materials shall not be left in place unless otherwise specified or shown on the Drawings or ordered by the Engineer in writing. Such materials shall be removed in such manner that no danger or damage will occur to new or existing structures or property, public or private, and so that cave-ins or slides will not take place. Trench sheeting shall be left in place until backfill has been brought to a level 12 inches above the top of the pipe. It shall then be cut off and the upper portion removed. Sheeting for structures shall be left in place until backfill has been brought to a level of 12 inches above the top of the bottom footing. It shall then be cut off and the upper portion removed.

- E. All holes and voids left in the work by the removal of sheeting, shoring, or bracing shall be filled and thoroughly compacted.

2.04 EXCAVATION

A. GENERAL

1. Excavation shall include the removal of all material from an area necessary for the construction of a pipeline, structure, basin, flume, or building. Excavations shall provide adequate working space and clearances for the work to be performed therein.
2. Except where otherwise shown on the Drawings, specified herein, or authorized by the Engineer, all material excavated below the bottom of concrete walls, footings, and foundations shall be replaced, by and at the expense of the Contractor, with Class B Concrete to the lines and grades shown on the Drawings.
3. Where quicksand, soft clay, spongy, swampy, or other materials unsuitable or subgrade or foundation purposes are encountered below the excavation limits, they shall be removed and disposed of to the level of suitable material. Areas so excavated shall be backfilled with Class B Concrete or with compacted layers of crushed rock, sand, or other approved material conforming to the requirements specified herein for backfill to the lines and grades shown on the Drawings.
4. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Lights shall also be placed along excavations from sunset each day to sunrise of the next day until the excavations are backfilled. All excavations shall be barricaded in such a manner to prevent persons from falling or walking into any excavation.

B. ROCK EXCAVATION

1. Rock encountered in the process of excavation for structures shall be uncovered and stripped of all loose materials over the entire limits of excavation. Rock encountered for removal in a trench section shall be uncovered for a distance of not less than 50 feet.
2. Rock and large boulders in trenches shall be excavated over the horizontal limits of excavation and to depths as shown on the Drawings.
3. The space below grade for pipe lines shall then be backfilled to the proper grade with compacted layers of crushed rock or sand conforming to the

requirements specified herein for backfill. Where pipe sewers are constructed on concrete cradles, rock shall be excavated to the bottom of the cradle as shown on the Drawings.

4. Rock under structures shall be excavated to lines and grades shown on the Drawings. Unless specified otherwise, where rock excavation has been carried below grade, the contractor shall backfill to grade with Class B concrete at his own expense.

5. Where rock foundation is obtained at grade for over 50 percent of the area of any one structure, the portion of the foundation that is not rock shall be excavated below grade to reach a satisfactory foundation of rock. The portion below grade shall be backfilled with Class B Concrete.

6. Where rock foundation is obtained at grade for less than 50 percent of any one structure and satisfactory rock cannot be found over the remaining area by reasonable additional excavation, the rock shall be removed for a depth of 12 inches below grade and the space below grade shall be backfilled to the proper grade with compacted layers of crushed rock conforming to the requirements specified herein for backfill.

7. Drilling and blasting operations shall be conducted with due regard for the safety of persons and property in the vicinity and in strict conformity with requirements of all ordinances, laws and regulations governing blasting and the use of explosives. Rock excavation near existing pipelines or other structures shall be conducted with the utmost care to avoid damage. Injury or damage to other structures and properties shall be promptly repaired to the satisfaction of the Owner by the Contractor at his own expense.

8. Rock excavation for all structures and adjacent trenches under this Contract and any other rock excavation directed by the Engineer shall be completed before the construction of any structure is started in the vicinity.

C. BORROW EXCAVATION

1. Wherever the backfill of excavated areas or the placement of embankments or other fills requires specified material not available at the site or material in excess of suitable material available from the authorized excavations, such material shall be obtained from other sources. This may require the opening of borrow pits at points not immediately accessible from the work. In such cases the Contractor shall make suitable arrangements with the property owner and shall pay all costs incident to the borrowed material including royalties, if any, for the use of the material. Before a borrow pit is opened, the quality and suitability of the material to be obtained there from shall be approved by the Engineer.

2. Borrow pits shall be cleared, grubbed and finish graded in accordance with the requirements specified herein.

D. ROADWAY EXCAVATION

Roadway excavation shall consist of excavation for roadways and parking areas in conformity with lines, grades, cross sections, and dimensions shown on the Drawings. After shaping to line, grade, and cross section, the subgrade shall be rolled until compacted to a depth of at least 6 inches to 100 percent of the maximum density at optimum water content as determined by AASHTO T 99, Method A. This operation shall include any reshaping and wetting required to obtain proper compaction. All soft or otherwise unsuitable material shall be removed and replaced with suitable material.

E. TRENCH EXCAVATION

1. Trench excavation shall consist of the removal of materials necessary for the construction of water, sewer, and other pipelines and all appurtenant facilities including manholes, inlets, outlets, headwalls, collars, concrete saddles, piers and pipe protection called for on the Drawings.
2. Excavation for pipelines shall be made in open cut unless shown otherwise on the drawings. Trenches shall be cut true to the lines and grades shown on the Drawings or established by the Engineer on the ground. The banks of trenches shall be cut in vertical, parallel planes equidistant from the pipe centerline. From an elevation 12 inches above the top of the pipe to the bottom of the trench, the horizontal distance between vertical planes for different sizes of pipe shall not exceed those shown on the Drawings. When sheeting is used, the width of the trench shall be considered as the distance between the inside faces of the sheeting. The bottom of the trench shall be cut carefully to the required grade of the pipe except where bedding materials or cradles are shown, in which case the excavation shall extend to the bottom of the bedding or cradles as shown on the Drawings. Minimum pipe cover shall be as shown on the Drawings or specified in these Contract Documents.
3. The use of a motor-powered trenching machine will be permitted but full responsibility for the preservation, replacement, and/or repair of damage to any existing utility services and private property shall rest with the Contractor.
4. Bell holes for bell and spigot pipe and/or mechanical joint pipe shall be excavated at proper intervals so the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper installation of all joints in the pipe. Bell holes shall not be excavated more than 10 joints ahead of pipe laying. No part of any bell or coupling shall

be in contact with the trench bottom, trench walls, or granular embedment when the pipe is jointed.

5. Excavation for manholes, outlets, collars, saddles, piers, and other pipeline structures shall conform to the additional requirements specified herein for structural excavation.

6. Pipe trenches shall not be excavated more than 400 feet in advance of pipe laying and all work shall be performed to cause the least possible inconvenience to the public. Adequate temporary bridges or crossings shall be constructed and maintained where required to permit uninterrupted vehicular and pedestrian traffic.

7. Unless otherwise specified herein or shown on the Drawings, wherever pipe trenches are excavated below the elevation shown on the Drawings, the Contractor, at his own expense, shall fill the void thus made to the proper grade with Class B Concrete or with compacted layers of crushed rock or sand conforming to the requirements specified herein for backfill.

8. In all cases where materials are deposited along open trenches they shall be placed so that no damage will result to the work and/or adjacent property in case of rain or other surface wash.

F. STRUCTURAL EXCAVATION

1. Structural excavation shall consist of the removal of all materials necessary for the construction of structures, including tanks, foundations, footings, wetwells, dry wells, box culverts, flumes, channels, buildings, and other miscellaneous structures.

2. The bottom of structural excavations shall be true to the lines and grades shown on the Drawings. Faces of excavations shall not be undercut for extended footings.

Except as provided herein for excavation of unsuitable material or rock, where the excavation is carried below the grade elevation shown on the Drawings, the Contractor shall backfill the void thus made to the proper grade with Class B concrete at his own expense.

2.05 BACKFILLING

A. MATERIALS

Materials for backfilling shall conform to the following requirements:

1. SELECT EARTH BACKFILL

Fine, sound, loose earth containing optimum moisture content for compaction to 90 percent of maximum density, free from all wood, vegetable matter, debris, and other objectionable material, and having scattered clods, stones, or broken concrete less than 2 inches in maximum dimension except that the maximum particle size shall be 3/4 inch when used with PVC, other flexible thermoplastic pipe, or extremely brittle pipe.

2. COMMON EARTH BACKFILL

Sound, loose earth containing optimum moisture content for compaction to 90 percent of maximum density, free from all wood, vegetable matter, debris, and other objectionable material, and having scattered clods, stones, or broken concrete and pavement less than 6 inches in maximum dimension. Such backfill shall be placed a minimum of one foot above top of pipe.

3. SAND

Natural or imported sand conforming to ASTM D1073.

4. CRUSHED ROCK

Crushed rock conforming to Class A aggregate as specified in Section 903.05 and Section 903.22, Size 7 of the Tennessee Department of Transportation Standard Specifications for Road and Bridge Construction.

5. CLASS B CONCRETE

Class B concrete as specified in the Section entitled "Cast-In-Place Concrete" of these Specifications.

B. GENERAL

1. Unless otherwise specified herein, earth backfill shall be compacted to not less than 90 percent of the maximum density at optimum water content as determined by AASHTO T-99, Method A. Crushed stone and sand shall be compacted or consolidated to not less than 83 percent of the solid volume density as determined from the bulk specific gravity by AASHTO T-84 AND T-85 and the dry weight of the aggregate.

2. Material that is too dry for adequate compaction shall receive a prior admix of sufficient water to secure optimum moisture content. Material having excessive water content shall not be placed at any time.

3. Unless otherwise specified herein backfill material required to be compacted shall be placed in horizontal layers not to exceed 6 inches in thickness (before compaction) and compacted in place by ramming, tamping, or rolling. Compaction shall be accomplished by power driven tools and machinery wherever possible. Compaction and consolidation of sand and crushed rock backfill shall be accomplished using vibrating equipment in a manner acceptable to the Engineer.

C. BACKFILLING TRENCHES

1. The backfilling of sewer, water, and other pipeline trenches shall be started immediately after the construction of same has been inspected and approved by the Engineer. Select backfill or bedding material if specified shall be placed in the trench under and on each side of the pipe in 6-inch layers for the full width of the trench and thoroughly and uniformly compacted by ramming and/or tamping to a minimum of 90% of the maximum density determined as specified herein. Select earth backfilling shall start above the class of pipe bedding as specified or shown the Drawings. Sufficient select earth backfill shall be placed around the pipe and compacted to provide a cover of not less than 12 inches over the top of the pipe. Mechanical compactors or tampers shall not be used within 12 inches of pipe. Compaction in this area shall be accomplished by hand methods. Sand or specified crushed stone bedding material shall be substituted for select earth backfill when the pipe is bituminous coated steel pipe or wrapped steel pipe or when crushed stone trench backfill is required. Backfilling shall proceed simultaneously on both sides of the pipe to prevent lateral displacement.

2. Caution shall be used during backfill operations for PVC or other flexible thermoplastic pipe (non-pressure or sewer pipe) to prevent pipe deformation. PVC or other flexible thermoplastic pipe (sewer pipe) shall not be subjected to roller or wheel loads until a minimum of 36 inches of backfill has been placed over the top of the pipe and a hydrohammer shall NOT be used until a minimum depth of 48 inches backfill has been placed over the top of the pipe.

3. Backfilling of PVC pressure pipe or other flexible thermoplastic pipe (water pipe) shall be as described in Paragraph 1 above.

4. In streets, alleys, across sidewalks and driveways, paved areas, and at any other places subject to vehicular traffic

or other superimposed loads, crushed rock backfill shall be placed and compacted in 6-inch layers from the level of 12 inches above the top of the pipe upward for the full depth of the trench, except for the top 48 inches of backfill, which shall be compacted pugmill mix. Crushed rock shall be clean, uniform-sized stone placed in lifts of 6 inches maximum and compacted by use of a hydrohammer or approved vibratory compactor for the full depth of the trench, except for the top 48 inches of crushed rock backfill, which shall be compacted pugmill mix.

5. Trenches under concrete slabs and footings of structures shall be completely backfilled with compacted sand or crushed rock or filled with Class B concrete as shown on the Drawings.

6. In all other areas not affected by superimposed loads, common earth backfill may be placed from a level of 12 inches above the top of pipe upward for the full depth of the trench without compaction. At these places, backfill shall be neatly rounded over the trench to sufficient height to allow for settlement to grade after consolidation. In no event, however, will storm water be allowed to pond due to the backfilled trench.

7. All backfilling shall be done in such a manner that the pipe or structure over or against which it is being placed will not be disturbed or injured. Any pipe or structure injured, damaged, or moved from its proper line or grade during backfilling operations shall be removed and repaired to the satisfaction of the Engineer and then rebackfilled.

D. BACKFILLING AROUND STRUCTURES

1. Backfilling around structures shall consist of common earth backfill placed in 6-inch layers and compacted by tamping to a minimum of 90% of the maximum density determined as specified herein for the full depth of the excavation from the bottom to the finished grade. No backfill shall be placed against concrete structures until the concrete has reached its specified 28-day compressive strength. Where practical, compaction of structural backfill shall be accomplished by power-driven tamping equipment.

2. Where crushed rock mats under slabs and foundations are called for on the Drawings, the Contractor shall excavate below grade to the depth of the crushed rock mat as shown on the Drawings and shall install a compacted crushed rock bed. This shall be finished to a true line or plane and even with the subgrade of

the concrete foundations, piers, footings or slabs. Before placing any crushed rock, all loose earth or debris shall be removed. This crushed rock mat shall extend 12 inches beyond all slabs and foundations or to edges of sheet piling.

3. Crushed rock mats, 12 inches or less in thickness shall be constructed of compacted layers of crushed rock conforming to Section 903.22, Size Number 67 (3/4-inch to No. 4), of the Tennessee Department of Transportation, Standard Specifications for Road and Bridge Construction.

4. Crushed rock mats of thickness greater than 12 inches shall have the top 12 inches constructed of compacted layers of crushed rock as specified above. That portion below the top 12 inches shall be constructed of compacted layers of crushed rock conforming to Section 903.05, Class A, with a modified gradation of 6 inches to dust as received from the crusher.

5. Unless otherwise shown on the Drawings, the use of earth backfill to support footings, foundations, and structures shall not be permitted.

2.06 FILLS AND EMBANKMENTS

A. Fills and embankments shall consist of all earth fills except backfills in trenches or around structures. Unless special material is specified or shown on the Drawings, material for fills and embankments shall consist of excavated material from structures or of a mixture of such excavated materials and materials borrowed from other sources by the Contractor. All material used for fills and embankments shall be free from wood, vegetable matter, debris, soft or spongy earth or clay, large rock, or other objectionable material and shall be acceptable to the Engineer.

B. Material shall be placed in the fill or embankment in successive layers 6 inches or less in thickness before compaction, each layer being approximately horizontal and extending to the full limit of the required cross section and shall be compacted at optimum water content over the entire surface to not less than 95% of the maximum density as determined by AASHTO T-99, Method A. The process shall be repeated for each layer of material until the fill or embankment conforms to the plan lines, grades, and cross-sections. The degree of compaction and moisture content required, the method of tamping, and the equipment used shall be approved by the Engineer.

C. The area over which the fill or embankment is to be constructed shall first be cleared of all vegetation, debris, and other objectionable material and, if the ground is in a loose, uncompacted condition, it shall be compacted to a maximum density determined as specified herein.

D. No material shall be placed beyond the sloping lines of embankment unless so ordered by the Engineer. Material allowed to be placed beyond the lines of embankment shown on the Drawings will be compacted as required above unless otherwise authorized by the Engineer.

E. Material for embankments or roadway fills shall be placed in 6-inch maximum lifts and shall be compacted by rolling with power rollers weighing not less than 10 tons, with sheeps foot rollers, with vibrating rollers, or with pneumatic tire rollers, as required to accomplish the work. While and as each layer is deposited, water shall be applied in sufficient amount to ensure optimum moisture to secure the compaction specified.

F. The use of truck, carryalls, scrapers, tractors, or other heavy hauling equipment shall not be considered as rolling in lieu of rollers, but the traffic of such hauling equipment shall be distributed over the fill in such a manner as to make the use of the compaction afforded thereby as an addition to compaction by the use of rollers.

G. Wherever a trench passes through a fill or embankment, the fill or embankment material shall be placed and compacted to an elevation 12 inches above the top of the pipe before the excavation of the trench begins.

H. On subgrades for all roadbeds, the density for the top 6 inches of the finished subgrade shall be equal to not less than 100% of the maximum density as determined by AASHTO T-99, Method A. When field tests show failure to meet the density requirement, the subgrade shall be loosened by disking, harrowing or other approved methods to a depth of not less than 6 inches, then reshaped and recompacted as indicated in this paragraph.

2.07 DISPOSAL OF WASTE AND UNSUITABLE MATERIALS

A. All materials removed by excavation, which are suitable for the purpose, shall be used to the extent possible for backfilling pipe trenches, foundation, and footings and for making embankment fills or for such other purposes as may be shown on the Drawings. All materials not used for such purposes shall be considered as waste materials and the disposal thereof shall be made by the Contractor in a manner and at locations subject to the approval of the Engineer.

B. Waste materials shall be spread in uniform layers and neatly leveled and shaped. Spoil banks shall be provided with sufficient and adequate openings to permit surface drainage of adjacent lands.

C. Unsuitable materials, consisting of wood, vegetable matter, debris, soft or spongy clay, peat, and other objectionable material so designated by the Engineer shall be removed from the work site and disposed of by the Contractor in a

manner and at a location approved by the Engineer.

D. No unsuitable or waste material shall be dumped on private property unless written permission is furnished by the Owner of the property and unless a dumping permit is issued from the local jurisdiction.

2.08 FINAL GRADING

A. After other earthwork operations have been completed, the sites of all structures, roads, and embankments shall be graded within the limits and to the elevations shown on the Drawings. Grading operations shall be so conducted that materials shall not be removed or loosened beyond the required limits. The finished surfaces shall be left in smooth and uniform planes such as are normally obtainable from the use of hand tools. If the Contractor is able to obtain the required degree of evenness by means of mechanical equipment he will not be required to use hand labor methods. Slopes and ditches shall be neatly trimmed and finished to slopes shown on the Drawings unless otherwise approved by the Engineer.

B. Unless otherwise specified or shown on the Drawings, all finished ground surfaces shall be graded and dressed to present a surface varying not more than plus or minus 0.10 foot as regards local humps or depressions and shall be acceptable to the Engineer.

2.09 TOPSOIL

A. All areas to be sprigged or planted with trees, shrubs, or grass as shown on the plans shall be prepared by grading to a smooth, even surface to a level 4 inches or other specified depth below the elevation of the finished grade shown on the Drawings. It shall then be brought to a neat and finished grade by the addition of 4 inches or other specified depth of approved topsoil as specified or directed in Section 02485.

B. Topsoil removed from the construction area may be stockpiled and reused or topsoil may be obtained from approved borrow areas. If obtained from borrow areas, the Contractor shall make suitable arrangements with the property owner and shall pay all costs incident to the borrowed material including royalties.

2.10 SETTLEMENT

A. The Contractor shall be responsible for all settlement of backfill, fills, and embankments which may occur within one (1) year after final acceptance of the work by the Owner.

B. The Contractor shall make, or cause to be made, all repairs or replacement made necessary by settlement within 30 days after receipt of written notice from the Engineer or Owner.

2.11 PREVENTION OF BLASTING DAMAGE

A. GENERAL

The Contractor shall be responsible for all property damage and personal injury caused by blasting for excavation work on this project. This includes events in which flying debris, air blast, or ground vibrations cause personal injury or property damage.

B. PREVENTING DAMAGE BY FLY-ROCK

A qualified Explosive Engineer and experienced Powder Foreman shall be available to direct and supervise the design of the blasting work. This shall consist of selecting the correct burden, spacing and stemming dimensions for the explosives used and the rock being blasted. This includes, but is not limited to, controlling water in the blast hole and using the proper stemming. The objective is to select the optimum blast dimensions which ensure that just enough explosive is available to break the rock, and that there is no excess explosive to propel the rock fragments beyond safe limits.

Blasting mats and/or backfill materials shall be used for each "shot" to help confine the limits of fly-rock in populated areas.

Traffic and access to blasting areas shall be closed off and blasting signals audible for 2,000 feet shall be sounded in time for all workers and nearby residents to get under cover. Also, residents immediately adjacent to a blast should be notified personally before any blast occurs.

C. PREVENTING DAMAGE BY AIR BLAST

Design measures shall be taken to reduce or control air blast to levels below which actual damage will not occur. Microphones to which a metering device is attached to record over pressure levels shall be used to monitor air results of all blasts. These records shall be filed and maintained throughout the construction of the project.

The use of detonating cord on the surface shall be avoided.

The use of sufficient burden, spacing and stemming to prevent the premature release of explosive gases shall be required for all blasting in closely populated areas.

The specific gravity of stemming material shall always be equal to or greater than that of the rock, and its length equal to 0.7 of the burden. The shape of the stemming material shall be coarse and angular.

There should be no top priming of any holes.

Decking shall be used to bridge limestone cavities or other weak areas in any hole.

In closely populated areas, all blast shall be designed to limit the peak particle velocity to less than two (2) inches per second.

D. PREVENTING DAMAGE BY GROUND VIBRATIONS

The Explosive Engineer and Powder Foreman shall design each "shot" to obtain the desired fragmentation without providing extra explosives which could be used to produce ground vibrations. In closely populated areas where old residential or auxiliary structures in poor condition exists, the two (2) inches per second peak particle velocity limit shall be lowered. Monitoring of these structures with seismographs shall be required and the data filed and maintained for the duration of the project.

Delay intervals such as millisecond caps or millisecond connectors shall be used to reduce the vibration effects of large blasts to the range of smaller charges at reduced peak particle velocity.

Tight confined shots that require increased powder charges shall not be attempted.

Excessive sub-drilling shall not be permitted.

In decking charges where small weights of powder are used, the inert material between decks shall be one (1) to two (2) feet thick.

The use of sensitive explosives such as straight dynamite shall not be permitted.

In drilling blast holes with cavities, the driller shall measure the depth and size of each cavity encountered. This log shall be used by the Powder Foreman in loading the explosive in the rock parts and filling with the stemming material in cavity parts.

Delay pattern shall be designed to provide maximum amount of free faces which reduces the amount of energy-transfer in ground vibrations.

Where potential settlement of a structure is involved, a pre-split line shall be required to help reduce the peak particle velocity beneath the structure to be protected.

SECTION 02242

CLAY OR FLOWABLE MORTAR FILL FOR CUTOFF WALLS

PART 1 - GENERAL

1.01 SCOPE

The work covered by this section includes furnishing all labor, equipment, and materials to form a cutoff consisting of flowable mortar fill or clay material at the location shown on the Drawings or as directed by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS FOR FLOWABLE MORTAR FILL

- A. Materials used in this construction shall meet the following requirements:

Material	Specification
Portland Cement Type 1	AASHTO M 85
Fly Ash, Class C or Class F	AASHTO M 295
Water Potable	
Chemical Additives	AASHTO M 194

- B. Fine aggregate shall be well graded from coarse to fine and when tested by means of laboratory sieves, shall conform to the following requirements:

Sieve Size	Total Percent Passing by Weight
3/4-inch	100
No. 4	95-100
No. 16	50-90
No. 50	10-30
No. 200	0-10

2.02 PROPORTIONING FOR FLOWABLE MORTAR FILL

- A. Flowable mortar shall be proportioned as follows:

Material	Per Cubic Yard
Portland Cement, Type 1	100 lbs. (maximum)
Fly Ash, Class C or F	250 lbs. (minimum)
Fine Aggregate	2,800 lbs.
Water	60 gals. (approximate)

- B. The above proportions may be adjusted by the Engineer to obtain the consistency required for satisfactory flow. Consistency shall be determined as follows:

Place an open-ended cylinder (pipe) 3 inches in diameter by 6 inches in height in an upright position on a smooth, level surface. Fill the cylinder with a representative sample of the flowable mortar proposed for use. Remove the cylinder by lifting it straight up thus allowing the sample to diffuse on the smooth, level surface. The flowable mortar should diffuse into a circular shape having an approximate diameter of not less than 8 inches.

2.03 FOR CLAY CUTOFF WALL

- A. Clay material shall have no organic material.
- B. Clay material shall be compacted to 95 percent Standard Proctor.

PART 3 - EXECUTION

3.01 GENERAL

- A. Flowable mortar shall be used where cutoffs are required and the area is in streets, alleys, across sidewalk and driveways, and at any other place subject to vehicular traffic or other superimposed loads.
- B. Installation of cutoffs shall be according to "Backfilling Trenches" in Section 0220, "Earthwork."
- C. The flowable mortar shall be covered or otherwise protected while in the plastic state. Backfill shall not be placed on the flowable mortar prior to final set or hardening as determined by the Engineer.
- D. Cutoff material shall be placed from bottom of trench to top of ground.

END OF DOCUMENT

SECTION 02270

SLOPE PROTECTION AND EROSION CONTROL

PART 1 - GENERAL

1.01 SCOPE

- A. This section shall consist of temporary control measures as shown in the plans or directed by the ENGINEER during the life of the Contract to control erosion and water pollution, through the use of berms, sediment basins, fiber mats, netting, mulches, grasses, slope drains, temporary silt fences, and other control devices.
- B. The temporary pollution control provisions contained herein shall be coordinated with the permanent erosion control features, to assure economical, effective, and continuous erosion control throughout the construction and post-construction period.
- C. The City of Chattanooga, Department of Public Works, Storm Management Division guidelines, "General Criteria for Controlling Erosion and Sediment from Land Disturbing Activities." 1988 edition shall be included in these specifications by references.

PART 2 - PRODUCTS

2.01 SEDIMENT STRUCTURES

Sediment basins, ponds, and traps, are prepared storage areas constructed to trap and store sediment from erodible areas in order to protect properties and stream channels below the construction areas from siltation.

2.02 TEMPORARY SEEDING AND MULCHING

Temporary seeding and mulching are measures consisting of seeding, mulching, fertilizing, and matting utilized to reduce erosion. All cut and fill slopes including waste sites and borrow pits shall be seeded when and where necessary to eliminate erosion. See Section 02485.

2.03 BALED HAY OR STRAW CHECKS

- A. Baled hay or straw erosion checks are temporary measure to control erosion and prevent siltation. Bales shall be either hay or straw containing five (5) cubic feet or more of material.
- B. Baled hay or straw checks shall be used where the existing ground slopes toward or away from the embankment, along the toe of slopes, in ditches, or other areas where siltation erosion or water run-off is a problem.

2.04 TEMPORARY SILT FENCES

Silt fences are temporary measure utilizing woven wire or other approved material attached to posts with filter cloth composed of burlap, plastic filter fabric, etc., attached to the upstream side of the fence to retain the suspended silt particles in the run-off water.

2.05 EROSION CONTROL FABRIC

Erosion control fabric shall be Hold/Gro Erosion Control Fabric as manufactured by Gulf States Paper Corporation, or approved equal, and shall consist of strips of biodegradable paper, interwoven with yarn that is subject to degradation by ultraviolet light.

PART 3 - EXECUTION

3.01 PROJECT REVIEW

Prior to the preconstruction conference, the Contractor shall meet with the ENGINEER and go over in detail the expected problem areas in regard to the erosion control work. Different solutions should be discussed so that the best method might be determined. It is the basic responsibility of the Contractor to develop an erosion control plan acceptable to the ENGINEER.

3.02 PRECONSTRUCTION CONFERENCE

At the preconstruction conference, the Contractor shall submit for acceptance his schedule for accomplishment of temporary and permanent erosion control work, as are applicable for clearing and grubbing, grading, bridges and other structures at watercourses, construction, and paving. He shall also submit for acceptance his proposed method of erosion control on haul roads and borrow pits and his plan for disposal of waste materials. No work shall be started until the erosion control schedules and methods of operations have been accepted by the ENGINEER.

3.03 CONSTRUCTION REQUIREMENTS

- A. The ENGINEER has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, and borrow and fill operations, and the authority to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds, or other water impoundment. Such work may involve the construction of sediment basins, and use of temporary mulches, mats, seeding or other control devices or methods as necessary to control erosion. Cut and fill slopes shall be seeded and mulched as the excavation proceeds to the extent directed by the ENGINEER.
- B. The Contractor shall be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in his accepted schedule. Temporary pollution control measures shall be used to correct conditions

that develop during construction that were not foreseen during the design stage that are needed prior to installation of permanent pollution control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

- C. Where erosion is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise erosion control measures may be required between successive construction stages. Under no conditions shall the surface area of erodible earth material exposed at one time by clearing and grubbing, exceed 15,000 square feet without approval by the ENGINEER.
- D. The ENGINEER will limit the area of excavation, borrow, and embankment operations in progress commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.
- E. Under no conditions shall the amount of surface area or erodible earth material exposed at one time by excavation or fill within the project area exceed 15,000 square feet without prior approval by the ENGINEER.
- F. The ENGINEER may increase or decrease the amount of surface area of erodible earth material to be exposed at one time by clearing and grubbing, excavation, borrow and fill operations as determined by his analysis of project conditions.
- G. In the event of conflict between these requirements and Federal or State or local agencies, the more restrictive laws, rules, or regulations shall apply.

3.04 CONSTRUCTION OF STRUCTURES

A. SEDIMENT STRUCTURES

- 1. Sediment structures shall be utilized to control sediment at the foot of embankments where slope drains outlet; at the bottom as well as in the ditch lines atop waste sites; in the ditch lines or borrow pits. Sediment structures may be used in most drainage situations to prevent excessive siltation of pipe structures. All sediment structures shall be at least twice as long as they are wide.
- 2. When use of temporary sediment structures are to be discontinued, all sediment accumulation shall be removed, and all excavation backfilled and properly compacted. The existing ground shall be restored to its natural or intended condition.

B. TEMPORARY SEEDING AND MULCHING

Seeding and mulching shall be performed in accordance with the section entitled "Seeding and Mulching."

C. BALED HAY OR STRAW EROSION CHECKS

Hay or straw erosion checks shall be embedded in the ground 4 to 6 inches to prevent water flowing under them. The bales shall also be anchored securely to the ground by wooden stakes driven through the bales into the ground. Bales can remain in place until they rot, or be removed after they have served their purpose, as determined by the ENGINEER. The Contractor shall keep the checks in good condition by replacing broken or damaged bales immediately after damage occurs. Normal debris clean-out will be considered routine maintenance.

D. TEMPORARY SILT FENCES

1. Temporary silt fences shall be placed on the natural ground, at the bottom of fill slopes, in ditches, or other areas where siltation is a problem. Silt fences are constructed of wire mesh with a covering of burlap or some other suitable material on the upper grade side of the fence and anchored into the soil.
2. The Contractor shall be required to maintain the silt fence in a satisfactory condition for the duration of the project or until its removal is requested by the ENGINEER. The silt fence becomes the property of the Contractor whenever the fence is removed.

E. EROSION CONTROL FABRIC

1. Fabric shall be installed immediately after seeding operations have been completed in work areas. Mulch shall not be used under the fabric.
2. Installation instructions shall be supplied by the manufacturer, and fabric shall be applied in accordance with the manufacturer's recommendation as directed by the specifier.
3. Fabric shall be unrolled and draped loosely, without stretching, so that continuous ground contact is maintained. In ditches, fabric shall be unrolled and applied parallel to the flow direction. On slopes, fabric shall be applied parallel to the slope direction unless the ENGINEER approves an alternate application method.
4. In ditches and on slopes, each upslope and each downslope end of each piece of fabric shall be placed in a 4-inch trench, stapled on 9-inch centers, backfilled and tamped. Where one roll ends and a second roll starts, the upslope piece shall be brought over the end of the downslope roll so that there is a 12-inch overlap, placed in a 4-inch trench, stapled on 9-inch centers, backfilled and tamped.

5. On slopes where two or more widths of fabric are applied, the two edges shall be overlapped according to manufacturer's installation instructions and stapled at 18-inch to 24-inch intervals along the exposed edge of the lap joint. The body of the fabric shall be stapled in a grid pattern with staples 3 feet maximum on center each way.
6. Where heavy concentrations of water or extremely erodible soil conditions exist, erosion checks shall be installed at intervals up to 50 feet as directed by the ENGINEER. Erosion checks shall be a 4-inch deep trench perpendicular to the flow line across the width of the fabric. The fabric shall be stapled at 9-inch intervals along the bottom of the trench across the entire width of the fabric, backfilled and stamped.

3.05 MAINTENANCE

- A. The temporary erosion control features installed by the Contractor shall be acceptably maintained by the Contractor until no longer needed or permanent erosion control methods are installed. Any materials removed shall become the property of the Contractor.
- B. In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of work as scheduled, and are ordered by the ENGINEER, such work shall be performed by the Contractor at his own expense.
- C. Where the work to be performed is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls and falls within the specifications for a work item that has a contract price, the units of work shall be paid for at the proper contract prices.

3.06 EROSION CONTROL OUTSIDE PROJECT AREA

Temporary pollution control shall not include construction work outside the project area where such work is necessary as a result of construction such as: borrow pit operations, haul roads and equipment storage sites. Bid Price in such cases shall not include all necessary clearing and grubbing, construction incidentals, maintenance, and site restoration when no longer needed. This will be the responsibility of the Contractor.

END OF DOCUMENT

SECTION 02452
TRAFFIC SIGNS AND PAVEMENT MARKINGS

PART 1 GENERAL

1.1 STANDARD SPECIFICATIONS, TRAFFIC SIGNS

The Tennessee Department of Transportation (TDOT) Standard Specifications for Roads and Bridge Construction. March 1, 1995, Section 713, "Highway Signing," and Section 916, "Highway Signing Material," shall apply and are hereby amended as follows.

- A. Amend Section 713.04, "Construction Methods and Requirements," (b) – Post Supports for Ground Mounted Signs, by adding, "All ground mounted sign post shall be 2-pound-per-foot U-post painted with Jones/Blair two-part Pole Green, Item No. 4550. Acrylithane.C catalyst Item No. 99931 shall be used.
- B. Delete Section 713-06, "Method of Measurement."
- C. Delete Section 713-07, "Basis of Payment."

1.2 DRAWINGS, TRAFFIC SIGNS

The applicable Tennessee Department of Transportation Standard Details are listed below.

RD-A-1	12-18-99	STANDARD ABBREVIATIONS
T-S-10	05-27-03	STANDARD MOUNTING DETAILS FLAT SHEET SIGNS ALUMINUM – STEEL DESIGN
T-S-16	05-27-01	GROUND MOUNTED SIGN AND DETAILS
T-S-19	07-29-91	STANDARD MEMBERS BENDAWAY SIGN SUPPORTS STEEL DESIGN
T-S-20	05-27-01	SIGN DETAIL

1.3 STANDARD SPECIFICATIONS, PAVEMENT MARKINGS

The Tennessee Department of Transportation Standard Specifications for Roads and Bridge Construction. March 1, 1995, Section 716, "Pavement Markings," shall apply.

1.4 DRAWINGS, PAVEMENT MARKINGS

The applicable Tennessee Department of Transportation Standard Details are listed below.

RD-A-1	12-18-99	STANDARD ABBREVIATIONS
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T-M-1	04-15-04	DETAILS OF PAVEMENT MARKINGS FOR CONVENTIONAL ROADS AND MARKINGS ABBREVIATIONS
T-M-2	04-15-04	DETAILS OF PAVEMENT MARKINGS FOR CONVENTIONAL ROADS
T-M-3	09-19-91	MARKING STANDARDS FOR TRAFFIC ISLANDS, MEDIANS & PAVED SHOULDERS ON CONVENTIONAL ROADS
T-M-4	05-27-01	STANDARD INTERSECTION PAVEMENT MARKINGS

END OF DOCUMENT

SECTION 02485
SEEDING AND MULCHING

PART 1 - GENERAL

1.01 SCOPE

- 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 which are to remain as finish grade surfaces; and on all existing turf areas which 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.

1.02 QUALITY ASSURANCE

- A. Prior to seeding operations, the CONTRACTOR shall furnish to the ENGINEER 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 Service or other certified testing laboratory.

- C. All existing lawns encountered shall be replaced with topsoil and seeding of the same type and quality as that existing prior to construction and shall be restored to original condition or better.

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. Sources of topsoil shall be approved by the ENGINEER prior to disturbance.

- 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 1/2 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 5.5 to 7.0. Topsoil shall contain not less than 5 percent nor more than 20 percent, by weight, of organic matter as determined by loss on ignition of oven-dried samples to 65 degrees C. The ignition test shall be performed on samples which have been thoroughly oven-dried to constant weight at a temperature of 221 degrees F.

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 98% for purity and 90% for germination. At the discretion of the ENGINEER, samples of seed may be taken for check against the growers analysis.
- D. Species, rate of seeding, fertilization, and other requirements are shown in the Seeding Requirements Table.

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 and shall be equivalent to the grade or grades specified in the Seeding Requirements Table. Container bags shall have the name and address of the manufacturer, the brand name, net weight, and chemical composition.

Seeding Requirements Table

<u>Area</u>	<u>Sowing Season</u>	<u>Species</u>	<u>Seed</u>	<u>Fertilizer</u>	<u>Limestone</u>
Flat to rolling Terrain with slopes less than 3:1	3/1-6/1	Kentucky 31			

- C. Agricultural limestone shall be a pulverized limestone having a calcium carbonate content on not less than 85% by weight. Agricultural limestone shall be crushed so that at least 85% of the material will pass a No. 10 mesh screen and 50% will 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 Weyer-Hauser 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 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 and shall be acceptable to the ENGINEER.
- B. Emulsified asphalt binder shall be Grade SS-1, ASTM D 977. Cut-back asphalt binder shall be Grade RC 70 or RC 250.

2.06 INNOCULANTS FOR LEGUMES

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

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 SECURING AND PLACING TOPSOIL

- A. Topsoil shall be secured from areas from which topsoil has not been previously removed, either by erosion or mechanical methods. Topsoil shall not be removed to a depth in excess of the depth approved by the ENGINEER.
- B. The area or areas from which topsoil is secured shall possess such uniformity of soil depth, color, texture, drainage, and other characteristics as to offer assurance that, when removed the product will be homogeneous in nature and will conform to the requirements of these Specifications.
- C. All areas from which topsoil is to be secured, shall be cleaned of all sticks, boards, stones, lime, cement, ashes, cinders, slag, concrete, bitumen, or its residue, and any other refuse which will hinder or prevent growth.
- D. In securing topsoil from a designated pit or elsewhere, should strata or seams of material occur which do not come under the requirements for topsoil, such material shall be removed from the topsoil, or if required by the ENGINEER, the pit shall be abandoned.
- E. Before placing or depositing topsoil upon any areas, all improvement within the area shall be completed, unless otherwise approved by the ENGINEER.

3.02 SEEDBED PREPARATION

- A. Before fertilizing and seeding, the topsoil surfaces shall be trimmed and worked to true line free from unsightly variation, bumps, ridges and depressions, and all detrimental materials, roots, and stones larger than 1 inch in any dimension shall be removed from the soil.
- B. Not earlier than 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 2 inches with a weighted disc, tiller, pulvimixer, or other equipment, until the surface is smooth and in a condition acceptable to the ENGINEER.
- C. If the prepared surface becomes eroded as a result 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 the application rates shown in the Seeding Requirements Table. Copies of all weight tickets shall be furnished to the ENGINEER.
- 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 1/2 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 30 minutes when a hydraulic seeder is used.
- D. Agricultural limestone shall be thoroughly mixed into the soil according to the rates in the Seeding Requirements Table. The specified rate of application of limestone may be reduced by the ENGINEER 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 ENGINEER for adjustment in rates.
- E. It is the responsibility of the Contractor to make one application of maintenance fertilizer according to the recommendations listed in the Seeding Requirements Table.

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 dates shown in the Seeding Requirements Table unless otherwise approved by the ENGINEER. Seed mixtures may be sown together provided they are kept in a thoroughly mixed condition during the seeding operation. Copies of all weight tickets shall be furnished to the ENGINEER.
- B. Seeds shall be uniformly sown by any approved mechanical method to suite 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. Hydro-seeding and hydro-mulching may be used on steep embankments, provided full coverage is obtained. Care shall be taken to adjust the seeder for seedings 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 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 inoculated in accordance with the manufacturer's mixing instructions.

3.05 MULCHING

- A. All seeded areas shall be uniformly mulched in a continuous blanket immediately after seeding. The mulch shall be applied so as to permit some sunlight to penetrate and the air to circulate and at the same time shade the ground, reduce erosion, and conserve soil moisture. Approximately 25 percent of the ground shall be visible through the mulch blanket.
- B. One of the following mulches shall be spread evenly over the seeded areas at the following application rates:
 - 1. Wood Cellulose Fiber 1,400 lbs./acre
 - 2. Straw 4,000 lbs./acre
 - 3. Stalks 4,000 lbs./acre

These rates may be adjusted at the discretion of the ENGINEER at no additional cost to the OWNER, depending on the texture and condition of the mulch material and the characteristics of the seeded area.

- C. Mulch on slopes greater than 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 5 gallons per 1,000 square feet as required to hold the mulch in place.
- D. 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.
- E. 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 insure adequate plant growth until a satisfactory stand is obtained. If necessary, watering shall be performed to maintain an adequate water content in the soil.
- B. Watering shall be accomplished by hoses, tank trucks, 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 areas without additional payment

until final acceptance of the work by the Owner. Seeding work shall be repeated on defective areas until a satisfactory uniform stand is accomplished. Damage resulting from erosion, gullies, washouts, or other causes shall be repaired by filling with topsoil, compacting, and repeating the seeding work at contractor's expense.

SECTION 03575

**FLOWABLE CONTROLLED LOW STRENGTH MATERIAL (CLSM) FOR
ABANDONED UNDERGROUND PIPE**

PART 1 – GENERAL

1.01 SCOPE

The work covered by this section includes furnishing all labor, equipment, and materials to pump CLSM into abandoned underground pipes as noted on the Drawings or as directed by the Engineer.

PART 2 – PRODUCTS

2.01 MATERIALS FOR CLSM

A. Materials used in this construction shall meet the following requirements:

Material	Specification
Portland Cement Type 1	AASHTO M85
Fly Ash, Class C or Class F	AASHTO M295
Water, Potable	

B. Fine aggregate shall be well graded from coarse to fine and when tested by means of laboratory sieves, shall conform to the following requirements:

Sieve Size	Total Percent Passing By Weight
¾-inch	100
No. 4	95-100
No. 16	50-90
No. 50	10-30
No. 200	0-10

2.02 PROPORTIONING FOR CLSM

A. CLSM shall be proportioned as follows:

Material	Per Cubic Yard
Portland Cement, Type 1	50 lbs. (maximum)
Fly Ash, Class C or F	250 lbs. (maximum)
Fine Aggregate	2,500 lbs.
Water	34 gals.
Cellflow Foaming Agent (or approved substitute)	3 oz. (added at the jobsite)

- B. The above proportions may be adjusted by the Engineer to obtain the consistency required for satisfactory pumping flow. Consistency shall be determined as follows:

Slump before adding foaming agent shall be 1.5-inches +/-.

Slump after adding foaming agent and mixing for at least 5 minutes and no more than 10 minutes shall be 7-inches to 9-inches.

PART 3 – EXECUTION

3.01 GENERAL

CLSM shall be used where underground pipes are to be abandoned in place.

- A. Before adding foaming agent, check initial slump. If slump meets this specification, reverse the drum and slowly move the mix to the discharge end of the drum.
- B. Pour the foaming agent directly into the mix. Run the drum forward to blend the product into the mix.
- C. **DO NOT SPRAY THE FINS.** If the foaming agent remains on the fins, bring mix to discharge end of drum several times to clean the foaming agent off.
- D. Mix at full mixing speed for 5 minutes minimum. The mix should be very fluid after mixing.
- E. Only add water **AFTER** the foaming agent has mixed for a minimum of 5 minutes. Unnecessary water is detrimental to the performance of the mix.
- F. Minimum batch for foaming agent is 3 cubic yards.
- G. Pump pipes to capacity.

END OF DOCUMENT