



**REQUEST FOR PROPOSAL
FOR
PHASE 8 SSES PROJECT**

Proposal No. 407202.78.0126

December 15, 2020



City of Memphis, Tennessee

Black & Veatch and Overland Contracting Inc., a subsidiary of Black & Veatch, are the Program Manager and Construction Manager respectively, for the SARP10 Program for the City of Memphis.

Black & Veatch Corporation
845 Crossover Lane, Suite 120 Memphis, TN 38117

Table of Contents

00180 - Request for Proposal	1
00180.1 Introduction	1
00180.2 Project Overview.....	1
00180.3 Scope of Work	1
00180.4 Proposal Submission Instructions	2
00180.5 Request for Proposal Definitions	2
00180.6 Not Used	2
00180.7 Proposal Format	2
00180.8 Clarification of Proposal.....	4
00180.9 Acceptance of Proposal Content	4
00180.10 Responsiveness	4
00180.11 Examination of Request for Proposal Documents.....	4
00180.12 Interpretations and Addenda	4
00180.13 Modification or Withdrawal of Submittals.....	5
00180.14 Rejection of Responses.....	5
00180.15 Other Items	5
00180.16 Selection Process	6
00180.17 Selection Schedule	6
00180.18 Selection Criteria	6
00180.19 Mandatory Pre-Proposal Meeting.....	6
00280 - Instructions to Bidders	7
00280.1 Bidder's Compliance with Request for Proposal	7
00280.2 General Proposal Parameters	7
00280.3 Proposal Pricing.....	7
00280.4 Supplemental Proposal Information	7
00280.5 Schedule Compliance.....	8
00280.6 Compliance with Request for Proposal	8
00280.7 Nondiscrimination	8
00280.8 Equal Business Opportunity Program (EBO)	8
00380 – Commercial Proposal Form (13 pages)	9
00581 - Supplementary Terms and Conditions	10
00581.1 Notices and Correspondence	10
00581.2 Not Used	10
00581.3 Liquidated Damages.....	11
00581.4 Taxes	11
00582 - General Terms and Conditions	12
00582.1 Definitions	12
00582.2 Interpretation.....	13
00582.3 Service Contractor's Representations and Status.....	14
00582.4 Service Contractor Scope of Work	14
00582.5 Not Used.....	14
00582.6 Payment.....	14
00582.7 Schedule	15
00582.8 Waivers of Lien	16
00582.9 Subcontracting.....	16
00582.10 Assignment	16
00582.11 Quality Control	16
00582.12 Inspection	16
00582.13 Passage of Title	17
00582.14 Standards of Performance.....	17
00582.15 Compliance with Laws	18
00582.16 Business Practices	18
00582.17 Claims and Service Contract Revisions	19
00582.18 Intellectual Property	20

00582.19	Non-Disclosure	20
00582.20	Suspension of Work.....	20
00582.21	Termination for Cause	21
00582.22	Termination Without Cause	21
00582.23	Indemnity	22
00582.24	Insurance Requirements	23
00582.25	Audit.....	24
00582.26	Governing Law and Disputes	24
00582.27	Hazardous Conditions	25
00582.28	Force Majeure.....	25
00585	- Safety, Health and Accident Prevention.....	26
00585.1	Project Safety and Health Program	26
00585.2	Safety, Health, and Accident Prevention Program	26
00585.3	Hazardous Waste Project Health and Safety Plan.....	26
00585.4	Protective Clothing, Equipment and Instrumentation	26
00585.5	Safety and Health Representative.....	26
00585.6	Safety and Health Goal.....	27
00585.7	Drug Prevention Program.....	27
00585.8	Fall Protection.....	27
00585.9	Confined Spaces	28
00585.10	Third Party Medical Triage	28
00681	- Service Contract Attachments	29
00681.1a	Partial Waiver and Release	29
00681.1b	Final Waiver and Release	31
00681.2	SARP10 Safety Guidelines.....	33
00681.3	Loss Control Manual.....	34
00681.4	Certificate of Nondiscrimination.....	35
00681.5	Equal Business Opportunity Program Compliance Form (1 page)	36
00681.6	Not Used.....	38
00681.7	Report of Disadvantaged Business Enterprise Participation Form (1 page).....	38
00681.8	Schedule Impact Due to Weather.....	39
	Technical Specifications	40

00180 - Request for Proposal

00180.1 Introduction

This Request for Proposal ("RFP") is comprised of the documents listed below:

407202.78.0126 Complete RFP // pdf Format

407202.78.0126 00380 Proposal Fill-In Form // xls Format

00180.2 Project Overview

The Program consists of the management of the capital program needed to bring the city's wastewater and sewer system into compliance with federal and state regulations per The City of Memphis Wastewater Collection and Transmission System (WCTS) Condition Assessment and Rehabilitation Program Consent Decree signed on September 21, 2012, including the procurement of studies, design and construction services associated with the City of Memphis SARP10 Program.

00180.3 Scope of Work

The scope of work for this RFP is as follows:

Nonconnah South Tributaries: North Whitehaven (NS01, NS03, NS04)

Service Contractor 78.0126 shall be responsible for completion and correct documentation per Technical Specifications of a condition assessment of the sanitary sewer lines and manholes in the assigned Phase 8 Area. This work would consist of smaller diameter assessment in residential, commercial and easement locations as well as large diameter interceptor assessment. The Nonconnah South Tributaries North Whitehaven (NS01, NS03, NS04)

Nonconnah South Tributaries: Hurricane Creek (NS05-1 and NS06)

Service Contractor 78.0127 shall be responsible for completion and correct documentation per Technical Specifications of a condition assessment of the sanitary sewer lines and manholes in the assigned Phase 8 Area. This work would consist of smaller diameter assessment in residential, commercial and easement locations as well as large diameter interceptor assessment. Nonconnah South Tributaries Hurricane Creek (NS05-1 and NS06)

Nonconnah South Tributaries: Tenmile Creek-Southwind (NS07-2, NS09-3, NN09)

Service Contractor 78.0128 shall be responsible for completion and correct documentation per Technical Specifications of a condition assessment of the sanitary sewer lines and manholes in the assigned Phase 8 Area. This work would consist of smaller diameter assessment in residential, commercial and easement locations as well as large diameter interceptor assessment. Nonconnah Tributaries Tenmile Creek-Southwind (NS07-2, NS09-3, NN09)

Wolf River Interceptor (WO05, WO06, WO07, WO08)

Service Contractor 78.0129 shall be responsible for completion and correct documentation per Technical Specifications of a condition assessment of the sanitary sewer lines and manholes in the assigned Phase 8 Area. This work would consist of mostly large diameter easement interceptor assessment and some smaller diameter assessment. Wolf River Interceptor (WO05, WO06, WO07, WO08)

IRP Reassessment 2021 Segments

Service Contractor 78.0130 shall be responsible for completion and correct documentation per Technical Specifications of a condition assessment of the sanitary sewer lines in multiple areas around the City of Memphis. This work would consist of smaller diameter assessment in residential, commercial and easement locations as well as large diameter interceptor assessment.

Purchaser reserves the right to combine or split the stated Service Contracts above.



00180.4 Proposal Submission Instructions

Digital Submission:

Proposals will be received at the office of the Black & Veatch SARP10 Program, Attn: Bently Green Program Manager, 845 Crossover Lane, Suite 120, Memphis TN, 38117. Proposals must be submitted in a digital format via CD, DVD, or flash drive. The digital submission must include one PDF document that includes all pages and documents of the proposal, and one Excel file of the Proposal Fill-In form. (Reference: **SSES Phase 8 Project**, PROPOSAL No. **407202.78.0126**)

One electronic copy shall be prepared and emailed to:

Program Mailbox: MemphisWCTS@bv.com

(Reference: SARP10 Program **Phase 8 SSES Project**, PROPOSAL No. **407202.78.0126**)

PROPOSAL DUE DATE: 3:00 PM (local time), **February 2, 2021**

****Responses will NOT be accepted after 3:00 PM****

The Sealed Envelope or other container containing the PROPOSAL shall be marked at a minimum with the Respondent's name, the name of the Project and the PROPOSAL number. Sealed Statements that are sent through the mail or other such delivery service shall be sent in such a manner so as to allow the opening of the "Mailing Container" and still have intact the sealed PROPOSAL. On the Mailing Container the sender shall state the words that a "**SEALED RESPONSE IS ENCLOSED**" and the PROPOSAL number.

**Firms desiring to submit a Proposal should carefully review these instructions.
Compliance with all requirements will be solely the responsibility of the Respondent.**

00180.5 Request for Proposal Definitions

Terms used in this Request for Proposal documents are defined and have the meanings assigned to them as follows. The term "B&V", "Purchaser" or "Program Manager" means Black & Veatch. The term "Respondent", "Firm", "Company", "Service Contractor" or "Bidder" means one who submits a Response directly to Black & Veatch for the purpose stated in this Solicitation Request for Proposal documents. The terms "Proposal", "Response", "PROPOSAL", or "Respondent's Response" mean all submittal documents provided by the Respondent as required by this Request for Proposal. The terms "Request for PROPOSAL" or "PROPOSAL Documents" mean the documents included in this Request for Proposal.

Every effort has been made to use industry-accepted terminology in this Request for Proposal. Any statement in this document, which uses words such as "must", "shall", "should", "provide for" or "have/provide the capability of/for", means that compliance with the intent of the statement is mandatory and that failure by the Respondent to satisfy that intent may be cause for the Response to be rejected.

00180.6 Not Used

00180.7 Proposal Format

Proposals should be concise. Excessive language or unclear responses may jeopardize your Firm's point accumulation for the project. Proposals must comply with the format and content described in the following Sections. Dividers with tabs should separate each Section, and the tabs should be labeled with the Section numbers listed below. Proposals shall be limited to a maximum of 35 pages total for Sections I through IV (not including the front and back covers and the dividers). Section V shall be limited to 00380 Proposal Fill-In Form only. Do not include any information in your Proposal that is not specifically requested. Scoring methodology is identified in Section 00180.18. Failure of a respondent to include all listed items may result in the rejection of respondent's proposal.



Section I – Project Approach and Schedule

In this section, the respondent shall describe in detail its plans and approach for fulfilling the requirements reflected in the RFP. The RFP describes the minimum level of services to be provided by the respondent. The respondent must present respondent's understanding of the requirements and respondent's ability to fulfill all requirements successfully. The approach proposed by the respondent should demonstrate the respondent's ability to minimize costs, ensure compliance with the Consent Decree, and meet the proposed project schedule.

The respondent's Project Approach section should also set forth a summary of any problems and challenges anticipated during the term of the Project. The respondent should identify and submit proposed solutions for each of the anticipated problems and challenges.

This section should describe respondent's ability to meet the proposed project schedule as indicated in Table 00380.5.1 Milestone Completion Dates and Applicable Liquidated Damages from notice to proceed (Effective Date), the anticipated challenges in meeting the schedule and what the respondent proposes in order to mitigate those challenges.

Provide a realistic calendar day Work schedule as a Gantt Chart for each project with a Notice to Proceed date assumed to be within three weeks of the proposal submission date. Any proposed schedule, which can realistically be achieved in less time, will be duly considered.

Section II – Project Team and Experience

This section should describe at a minimum the respondent's experience in successfully completing projects of a similar size and scope and include the following:

- Identify the key roles, definitions of the identified roles and the personnel proposed for each role of the respondent's team.
- Include an organizational chart depicting the entire organizational structure. This chart should demonstrate the relationship of the individuals performing under the agreement to the overall organizational structure.
- Detailed resumes should be submitted for all management, supervisory, and key personnel who will be acting under the agreement. Resumes should be structured to emphasize the relevant qualifications and experience of these individuals in successfully completing projects of similar size and scope.
- State the name(s) of all prime contractors and subcontractors that will assist respondent in completing the project.
- State the level of participation of local prime contracts and subcontracts that will assist in completing the project.
- List three references of projects you have performed with similar size, scope, and duration. Please list client, project name, contact name, and contact's phone number/email.

Section III –M/WBE Participation

This section shall set forth the respondent's M/WBE Participation Plan that must be submitted and include: (1) the level and dollar amount of participation your firm anticipates to achieve in the performance of the contract resulting from this RFP; (2) the type of work to be performed by the M/WBE firms participating; and (3) the names of the M/WBE firms the Respondent plans to utilize in the performance of the project Service Contract resulting from this RFP.

The SARP10 combined M/WBE goal is **21%** for this project. Firms meeting the requirements for the SARP10 M/WBE goals must be registered on the City's Equal Business Opportunity (EBO) list.

Section IV - Cost Information

This section captures all cost information submitted for this Proposal and shall include the completed 00380 Proposal Fill-in Form included with this RFP.

00180.8 Clarification of Proposal

B&V reserves the right to obtain clarification of any point in a Response or to obtain additional information as necessary to properly evaluate a particular Response. Failure to respond to such a request for additional information or clarification in a timely manner may result in rejection of the Response.

00180.9 Acceptance of Proposal Content

The contents of any PROPOSAL submitted for consideration will become, at B&V's option, a part of any future contract agreement. Failure to accept this condition may result in rejection of the Response.

00180.10 Responsiveness

Respondents should respond to all requirements of the PROPOSAL to the maximum extent possible and are required to clearly identify any limitations.

00180.11 Examination of Request for Proposal Documents

Before submitting a Response, each Respondent must:

- Consider federal, state and local laws, ordinances, and any other rules and regulations that may in any manner affect the Response, including but not limited to: Executive Orders 11625, 11246, as amended, 12138 and 12432.
- Study and carefully correlate the Respondent's observations and responses with the PROPOSAL Documents.
- Notify B&V, of all conflicts, errors and discrepancies, if any, in the PROPOSAL document submitted.

Respondents by and through the submission of their Response, agree that they shall be held responsible for having therefore familiarized themselves with the nature and extent of the requirements in the PROPOSAL Documents.

Black & Veatch is an affirmative action employer. Accordingly, the parties hereby incorporate by reference the requirements of Executive Order 11246, as amended, and the applicable regulations contained in 41 C.F.R. Parts 60-1 through 60-60; 29 U.S.C. Section 793 and the applicable regulations contained in 41 C.F.R. Part 60-741; 38 U.S.C. Section 4212 and the applicable regulations contained in 41 C.F.R. Part 60-250 and/or 60-300; and 29 C.F.R. Part 471, Appendix A to Subpart A.

00180.12 Interpretations and Addenda

If any prospective Firm is in doubt as to the true meaning of any part of the Requirements for Preparing and Submitting Proposal for the requested services, they may submit a written request (verbal requests will not be accepted) for an interpretation up to five (5) business days prior to the due date of the submittal. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addendum transmitted to each party receiving a set of such documents. B&V will not be responsible for any other explanations or interpretations of the proposed documents. Any requests not submitted within this time period will be deemed waived.

SUBMIT ALL QUESTIONS BY E-MAIL TO:

Attn: Josh Grabowski

jgrabowski@allworldmail.com

Cc: Ginny Dorsey

DorseyV@bv.com

Cc: Ivan Tamayo

TamayolP@bv.com

(Reference: SARP10 Program *Phase 8 SSES Project*, PROPOSAL No. 407202.78.0126)



All requests or questions should be clearly marked and must be received no later than the date and time listed in the Selection Schedule, as stated in 00180.17. A response will be returned via addendum to all Firms along with the original question(s).

There shall be no communication between the Firm, their employees or subcontractors concerning this Proposal to anyone within Black & Veatch, Overland Contracting, Allen & Hoshall, Allworld Project Management, Gresham Smith, Integrated Circle Technologies, Tamco, Carter-Malone Group, Rohadfox Construction Control Services Corporation or City of Memphis employees or any such person's spouse, child, parent, brother, sister, dependent or person assuming a relationship being the substantially equivalent of the above except through Bently Green, Program Manager. Selection Committee members or other Black & Veatch or Overland Contracting personnel, are not to be contacted prior to B&V's decision to approve or reject the Selection Committee's recommendation.

Failure to comply with this requirement will be grounds for disqualification.

00180.13 Modification or Withdrawal of Submittals

Responses may be modified or withdrawn by an appropriate document duly executed (in the same manner that a Response must be executed) and delivered to the place where Responses are to be submitted at any time prior to the submission deadline. A request for withdrawal or a modification must be in writing and signed by an authorized person. Evidence of such authority must accompany the request for withdrawal or modification. Withdrawal of a Response will not prejudice the rights of a Responder to submit a new Response prior to the Response deadline. After expiration of the period for receiving Responses, only B&V may request clarifications or additional information.

00180.14 Rejection of Responses

To the extent permitted by applicable local, state and federal laws and regulations, B&V reserves the right to reject any and all Responses, to waive any and all informalities not involving price, time, or changes in the work with the successful Respondent, and the right to disregard all non-conforming, non-responsive, unbalanced or conditional Responses. In addition, B&V reserves the right to reject a Response, in its sole discretion, if the City of Memphis believes that it would not be in its best interest to make an award to that Respondent.

B&V reserves the right to reject any Response if the evidence submitted by the Responder or if the investigation of such Respondent fails to satisfy B&V that such Respondent is properly qualified to carry out the obligations and to complete the work contemplated therein. All Responses will be rejected if there is reason to believe that collusion exists among Respondents. Responses will be considered irregular and may be rejected if they show serious omissions, alterations in form, additions not called for, conditions or unauthorized alterations, or irregularities of any kind.

00180.15 Other Items

This PROPOSAL does not commit B&V to enter into a contract, nor does it obligate B&V to pay for any costs incurred in the preparation and submission of Responses or in anticipation of a contract. Costs of preparing the Proposal in response to this request are solely the responsibility of the Respondent.

By responding to this solicitation, the respondent attests that no employee of Black & Veatch, Overland Contracting, Allen & Hoshall, Allworld Project Management, Gresham Smith, Integrated Circle Technologies, Tamco, Carter-Malone Group, Rohadfox Construction Control Services Corporation or City of Memphis employee or any such person's spouse, child, parent, brother, sister, dependent or person assuming a relationship being the substantially equivalent of the above, has an existing or pending, direct or indirect, financial interest in the respondent's business.

No Respondents to this solicitation shall discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or national origin.

00180.16 Selection Process

B&V intends to select one or more firm(s) based on experience and ability, including successful completion of similar projects; qualifications of personnel; and general construction performance; available bonding capacity; service experience including record keeping/administrative ability, critical path scheduling, cost control, quality control, and safety record, as described in the Selection Criteria below. Proposals will be reviewed based on the selection criteria and one or more firms will be selected to perform the work contained in the outlined scope of work.

00180.17 Selection Schedule

The following schedule will be adhered to during the selection process. It is subject to change at the sole discretion of B&V.

Event	Completed By
RFP Advertising Date	December 15, 2020
Pre-Proposal Meeting	January 12, 2021
Last Date for Receipt of Questions, Registration for Prequalification Information Deadline	January 19, 2021
Issue Final Addendum to Answer Questions	January 26, 2021
Receive and Open Proposals	February 2, 2021 by 3:00 pm local time
Public Notice of Intent to Award	February 23, 2021
Preconstruction Meeting with Subcontractor	March 2, 2021
Tentative Notice to Proceed	March 2, 2021

00180.18 Selection Criteria

The criteria that will be used to rank the firms will be based on a 100-point system and require applicable information as follows:

Selection Criteria	Points
Project Approach and Schedule	30
Project Team & Experience	25
M/WBE Participation	20
Cost of Scope of Work	25

00180.19 Mandatory Pre-Proposal Meeting

A mandatory pre-proposal meeting will be held at **9:30 AM** (local time) via Microsoft Teams Meeting, on **January 12, 2021**. A dial-in number and PIN information will be posted to the SARP10 website, by 5:00 PM January 11, 2021.

00280 - Instructions to Bidders

00280.1 Bidder's Compliance with Request for Proposal

Provide the information requested and any supporting information necessary to permit a complete analysis of your proposal. You acknowledge that preparation and submission of a proposal will be at your sole cost and that you will treat this RFP and any resulting discussions as confidential. If you do not agree to treat this RFP and associated discussions as confidential, return the complete RFP to Purchaser and delete or destroy any copies you made.

Purchaser may base its decision to award a subcontract solely on the initial proposal received by Purchaser without any discussion or clarification. Therefore, your initial proposal should include the most favorable commercial and technical terms you can offer for the duration of the proposal validity period identified in Article 00280.4.4. Purchaser reserves the right to: (a) award a subcontract solely on the initial proposal received by Purchaser without any discussion or clarification; (b) reject or accept a proposal that is not submitted in strict compliance with the RFP requirements; (c) make an award to other than the low bidder; and (d) issue multiple requests for proposals. Purchaser reserves the right to take the actions identified in the immediately preceding sentence without discussion or prior notification to you.

00280.2 General Proposal Parameters

Provide the information requested in Section 00280 and Section 00380 in the appropriate fields of Section 00380. Complete each line of Section 00380 in its entirety and submit it with your proposal in accordance with Article 00180.4. Do not alter Section 00380 forms in any way or deviate from the terminology used or the unit of measure indicated when completing Section 00380. Submit Section 00380 forms in their original core application software, with no embedded programming and no permissive encoding restricting access to the data provided.

00280.2.1 Bidder's Contact Information

Include contact information for your representative in Article 00380.2.1. Your representative must have the appropriate expertise and authority to negotiate on behalf of your company.

00280.2.2 Addenda to Request for Proposal

In Article 00380.2.2, list all addenda received from Purchaser and indicate "Yes" to show your receipt of and incorporation of the listed addenda into the proposal.

00280.3 Proposal Pricing

You must include numerical values in the applicable fields of Table 00380.3.1. Non-numerical values, such as "included" or "not applicable," are not acceptable. Purchaser will evaluate fields left blank or filled with a zero as scope included in your proposal at no cost.

00280.3.1 Unit Pricing

Provide the unit prices to perform the Work in accordance with this RFP in Table 00380.3.1. A unit price is the total amount to be billed to Purchaser for a specific unit of work. Unit pricing includes all costs, overhead, profit and mark-up associated with delivering the complete unit.

00280.4 Supplemental Proposal Information

00280.4.1 Company Status

In Article 00380.4.1, indicate the type of your organization's legal entity and the state and country in which it is organized.

00280.4.2 Not Used

00280.4.3 Not Used



00280.4.4 Proposal Validity Period

Indicate "Yes" in Article 00380.4.4 if your proposal is valid for ninety calendar days after the Proposal Due Date (the "Proposal Validity Period"). Purchaser may reject your proposal without prior notice if your proposal is not valid for the full Proposal Validity Period.

00280.4.5 Firm Non-Escalatable Pricing

Indicate "Yes" in Article 00380.4.5 if the proposal pricing is firm and not subject to escalation.

00280.4.6 Taxes

Tax requirements are identified in Article 00581.4. Indicate "Included" in Article 00380.4.6 if your proposal includes the tax requirements.

00280.4.7 Work at Jobsite

Identify the type of craft labor as "open shop," "merit shop," or "union shop." If you plan to subcontract any of the Work, indicate "Yes" in the appropriate section of Article 00380.4.7.

00280.5 Schedule Compliance

Indicate "Yes" in Article 00380.5 if you can meet the schedule dates included in Table 00380.5. If you indicate "No," submit an alternative summary level schedule with your proposal.

00280.6 Compliance with Request for Proposal

00280.6.1 Not Used

00280.6.2 Not Used

00280.7 Nondiscrimination

All entities contracting with the Purchaser agree to abide by and to take affirmative action when necessary to ensure compliance with the nondiscrimination clauses set out below and agree to show proof of non-discrimination upon request and to post in conspicuous places available to all associate agents and their employees. In the event of non-compliance with nondiscrimination clauses, or with provisions of Executive Orders 11141 (age), 11246, 11375 (women), 12086 (Vietnam veterans), 11478 (federal employees), 11625 (minority business) 11701 (veterans), Title 41, Chapter 60 (handicapped) and specifically the handicapped affirmative action clause in Section 60-741.6.9 of OFCCP Rules, and any and all other federal laws prohibiting discrimination, contracts may be canceled, terminated, or suspended in whole or in part by the Purchaser.

The Bidder shall execute the specified Nondiscrimination Certificate (see 00681.4) agreeing that, if awarded the Service Contract, he/she shall not discriminate against any subcontractor, employee, or applicant for employment on the grounds of race, color, national origin or sex, in accordance with the citations listed in the above paragraph; and shall require the execution of such a certificate for each subcontractor prior to award of any subcontract with the further requirement that each subcontractor shall include identical requirements in any lower tier subcontracts which might in turn be made. FAILURE TO EXECUTE AND SUBMIT SUCH CERTIFICATE WITH THE PROPOSAL MAY CAUSE THE PROPOSAL TO BE REJECTED AS NON-CONFORMING. The successful Bidder and all subcontractors under the general contract shall maintain copies of their payrolls and all subcontracts for each weekly payroll period for the life of the construction and for a period of **SEVEN (7) YEARS** after final release and payment is made by the Purchaser to the contractor.

00280.8 Equal Business Opportunity Program (EBO)

The Bidder must complete and return the Equal Business Opportunity Program Compliance Form included in Article 00681.5 of this RFP.

00380 – Commercial Proposal Form (13 pages)



00380 - Commercial Proposal Form

Bidder should refer to Section 00280, Instructions to Bidders, when completing this Proposal Form. Bidder shall complete this form entirely and return it with Bidder's Proposal.

00380.1 Proposal Submitted by	Bidder Response Column
Company Name	
Mailing Address/Number, Street	
Mailing Address/State, Zip Code	
Country	
Taxpayer ID Number (or EIN)	
Bidder's Proposal Date	
Bidder's Proposal No.	

00380.2 General Proposal Parameters	Bidder Response Column		
Bidder is providing the information defined by the articles comprising Section 00280, INSTRUCTIONS TO BIDDERS, in the corresponding fields of this Section 00380, COMMERCIAL PROPOSAL FORM.			
00380.2.1 Bidder's Contact Information			
Bidder's Representative Name			
Title			
Mailing Address/Number, Street			
Mailing Address/City			
Mailing Address/State, Zip Code			
Delivery Address/Number, Street			
Delivery Address/State, Zip Code			
Country			
Email Address			
Phone Number () - ()			
Mobile Phone Number () - ()			
Fax Number () - ()			
00380.2.2 Addenda to Request for Proposal			
Bidder acknowledges receipt and inclusion of the following Addenda to the RFP - Yes/No			
	Addenda Number	Date Issued	Received and Incorporated

00380.3 Proposal Pricing Information	Bidder Response Column
00380.3.1 Proposal Prices	See Attached Pricing Table(s) 00380.3.1

00380.4 Supplemental Proposal Information	Bidder Response Column
Bidder provides the following information to supplement the Bidder's Proposal pricing.	
00380.4.1 Company Status	
Bidder's company status:(i.e., partnership, individual owned, joint venture, corporation, etc.)	
in State of	
in Country of	
00380.4.2 Not Used	
00380.4.3 Not Used	
00380.4.4 Proposal Validity Duration	
Bidder's Proposal is valid for acceptance by the Purchaser for a period of 90 days from the Proposal due date. - Yes/No	
00380.4.5 Firm Non-Escalatable Pricing	
All of Bidder's prices herein proposed are firm and are non-escalatable for services conducted on or before June 30, 2015. - Yes/No	

00380.4.6 Taxes	
Bidder's prices included herein are inclusive of all applicable state or local sales, use, gross receipts, or excise taxes. - Yes/No	
00380.4.7 Work at Jobsite	
Bidder's source of craft labor to be utilized in the performance of the Work is. - Open-Shop/Merit-shop/Union-shop	
Bidder has accounted for all Jobsite existing and controlling conditions and limitations which may affect the Work performance and the Bidder's Proposal. - Yes/No	
Bidder proposes that it will perform all the Work at the Jobsite with its own forces. - Yes/No	
Bidder proposes that it will perform the majority (over 75% of total value) of the Work at the Jobsite with its own forces and that specific portions of the Work not performed by the Bidder will be sub-subcontracted. - Yes/No	
Bidder proposes that it will sub-subcontract the majority (over 50% of total value) of the Work at the Jobsite. - Yes/No	

00380.5 Schedule Compliance	Bidder Response Column
Bidder agrees to meet the schedule dates indicated in the RFP documents. - Yes/No	
If No, Bidder has completed and submitted an attached alternative summary level schedule. - Yes/No	

00380.6 Compliance with Request for Proposal	Bidder Response Column
NOTE: A Proposal based on Bidder's standard terms and conditions will not be considered.	
Bidder certifies that its Proposal complies with all RFP commercial and technical requirements - Yes/No	

00380.7 Proposal Attachments	Bidder Response Column
In addition to this Commercial Proposal Form and Tables indicated herein, the Bidder's Proposal contains supplemental information and details attached to this Proposal consisting of the following:	
(Attachment 1)	
(Attachment 2)	
(Attachment 3)	
(Attachment 4)	
(Attachment 5) (Add additional lines as needed)	

00380.8 Declarations	Bidder Response Column
The Bidder declares that it has familiarized itself with the conditions affecting the Work. The Bidder also declares that only the persons or firms interested in the Proposal as principal or principals are named herein; that no other persons or firms have any interest in this Proposal or in the Service Contract to be entered into; that this Proposal is made without connection with any person, company, or party likewise submitting a Proposal; and that it is in all respects for and in good faith, without collusion or fraud. - Yes/No	
If written notice of acceptance of this Proposal is delivered to the Bidder within "Proposal Validity" days after the date set for receipt of Proposals, or any time thereafter before the Proposal validity expires, the Bidder will, within 5 days after receipt of a formal Service Contract for signature, exercise and deliver to Purchaser a signed Service Contract in the form provided by the Purchaser in accordance with the documents provided herein. - Yes/No	

Bidder's Signature Required	
------------------------------------	--

*must be signed, not typed

Table 00380.3.1 - Unit Price Proposal Form

Bidder should refer to Section 00280, Instructions to Bidders, when completing this Proposal Form. Bidder shall complete this form entirely and return it with Bidder's Proposal.					
Submitted by (Company Name)					
00380.3 Proposal Pricing Information					
00380.3.1 Unit Pricing					
Bidder proposes to complete the RFP Work based on firm, fixed, unit prices (US dollars), which prices multiplied by the final Work quantities would represent the full consideration to Bidder for its complete and satisfactory performance of the Work in compliance with all the terms and conditions of the RFP Documents. The Unit Prices in this Table include the cost of all the work which is required or implied by the RFP documents or which may be inferred therefrom, and which is customarily provided in furnishing a complete and finished work item of its kind. Further, any and all alterations, modifications, and adjustments to the work item, which is reasonably foreseeable or customarily encountered in providing and installing equipment, material, and services of the work item kind, will be performed without additional compensation.					
In the event of a Purchaser-approved change in the scope of Work for which a unit price from this Table is not applicable, as determined by the Purchaser, the Service Contractor shall provide a new unit price for review and acceptance by the Purchaser. Service Contractor shall provide all information requested by the Purchaser to substantiate the value of the new unit price.					
00380.3.1.1 Unit Prices				Bidder Response	
Item Number	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Extension Price
Nonconnah South Tributaries: North Whitehaven (NS01, NS03, NS04)					
Manholes					
02544-4.01.A	GPS at Submeter Accuracy	Each	1,182	\$ -	\$ -
02544-4.01.B	Manhole Assessment and Certification Program (MACP Level 1 Inspection)	Each	5	\$ -	\$ -
02544-4.01.C.1	Manhole Assessment and Certification Program (MACP Level 2 Inspection - No 3D Scan)	Each	1,167	\$ -	\$ -
02544-4.01.C.2	Manhole Assessment and Certification Program (MACP Level 2 Inspection - with 3D Scan)	Each	10	\$ -	\$ -
Smoke Testing					
02544-4.01.A	Smoke Testing with GPS at Submeter Accuracy				
	6 inch - 21 inch pipe	Linear Feet	294,021	\$ -	\$ -
02546-4.01.B.1	Dye Testing Type 1	Each	3	\$ -	\$ -
02546-4.01.B.2	Dye Testing Type 2	Each	3	\$ -	\$ -
02546-4.01.B.3	Dye Testing Type 3	Each	3	\$ -	\$ -
02546-4.01.C.1	Dye Testing Type 1	Crew Hour	3	\$ -	\$ -
02546-4.01.C.2	Dye Testing Type 2	Crew Hour	3	\$ -	\$ -
02546-4.01.C.3	Dye Testing Type 3	Crew Hour	3	\$ -	\$ -
CCTV					
02541-4.01.A	Pipeline Assessment and Certification Program (PACP) CCTV Inspection with Light Cleaning of Sewer				
	6 inch pipe	Linear Feet	588	\$ -	\$ -
	8 inch pipe	Linear Feet	245,900	\$ -	\$ -
	10 inch pipe	Linear Feet	14,735	\$ -	\$ -
	12 inch pipe	Linear Feet	15,608	\$ -	\$ -
	15 inch pipe	Linear Feet	2,720	\$ -	\$ -
	18 inch pipe	Linear Feet	8,154	\$ -	\$ -
	21 inch pipe	Linear Feet	6,316	\$ -	\$ -
02541-4.01.B	Heavy Cleaning of Sewer Line				
	6 inch pipe	Crew Hour	30	\$ -	\$ -
	8 inch pipe	Crew Hour	225	\$ -	\$ -
	10 inch pipe	Crew Hour	80	\$ -	\$ -
	12 inch pipe	Crew Hour	80	\$ -	\$ -
	15 inch pipe	Crew Hour	45	\$ -	\$ -

Item Number	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Extension Price
	18 inch pipe	Crew Hour	95	\$ -	\$ -
	21 inch pipe	Crew Hour	60	\$ -	\$ -
02541-4.01.C	Remote Trimming of Protruding Service Lateral	Each	5	\$ -	\$ -
02541-4.01.D	Siphon Cleaning and CCTV Inspection				
	8 inch pipe	Linear Feet	759	\$ -	\$ -
02541-4.01.E	Traffic Control	Lump Sum	1	\$ -	\$ -
02541-4.02.A	Sonar/TV				
	24 inch pipe and greater	Linear Feet	3,164	\$ -	\$ -
Miscellaneous					
	Mobilization and Demobilization (not to exceed 8% of the total of all other bid items or \$50,000)	Lump Sum	1	\$ -	\$ -
North Whitehaven (NS01, NS03, NS04) Subtotal Estimated Unit Price Value					\$ -

Table 00380.3.1 - Unit Price Proposal Form

Bidder should refer to Section 00280, Instructions to Bidders, when completing this Proposal Form. Bidder shall complete this form entirely and return it with Bidder's Proposal.					
Submitted by (Company Name)					
00380.3 Proposal Pricing Information					
00380.3.1 Unit Pricing					
Bidder proposes to complete the RFP Work based on firm, fixed, unit prices (US dollars), which prices multiplied by the final Work quantities would represent the full consideration to Bidder for its complete and satisfactory performance of the Work in compliance with all the terms and conditions of the RFP Documents. The Unit Prices in this Table include the cost of all the work which is required or implied by the RFP documents or which may be inferred therefrom, and which is customarily provided in furnishing a complete and finished work item of its kind. Further, any and all alterations, modifications, and adjustments to the work item, which is reasonably foreseeable or customarily encountered in providing and installing equipment, material, and services of the work item kind, will be performed without additional compensation.					
In the event of a Purchaser-approved change in the scope of Work for which a unit price from this Table is not applicable, as determined by the Purchaser, the Service Contractor shall provide a new unit price for review and acceptance by the Purchaser. Service Contractor shall provide all information requested by the Purchaser to substantiate the value of the new unit price.					
00380.3.1.1 Unit Prices				Bidder Response	
Item Number	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Extension Price
Nonconnah South Tributaries: Hurricane Creek (NS05-1 and NS06)					
Manholes					
02544-4.01.A	GPS at Submeter Accuracy	Each	1,373	\$ -	\$ -
02544-4.01.B	Manhole Assessment and Certification Program (MACP Level 1 Inspection)	Each	5	\$ -	\$ -
02544-4.01.C.1	Manhole Assessment and Certification Program (MACP Level 2 Inspection - No 3D Scan)	Each	1,348	\$ -	\$ -
02544-4.01.C.2	Manhole Assessment and Certification Program (MACP Level 2 Inspection - with 3D Scan)	Each	20	\$ -	\$ -
Smoke Testing					
02544-4.01.A	Smoke Testing with GPS at Submeter Accuracy				
	6 inch - 21 inch pipe	Linear Feet	334,459	\$ -	\$ -
02546-4.01.B.1	Dye Testing Type 1	Each	3	\$ -	\$ -
02546-4.01.B.2	Dye Testing Type 2	Each	3	\$ -	\$ -
02546-4.01.B.3	Dye Testing Type 3	Each	3	\$ -	\$ -
02546-4.01.C.1	Dye Testing Type 1	Crew Hour	3	\$ -	\$ -
02546-4.01.C.2	Dye Testing Type 2	Crew Hour	3	\$ -	\$ -
02546-4.01.C.3	Dye Testing Type 3	Crew Hour	3	\$ -	\$ -
CCTV					
02541-4.01.A	Pipeline Assessment and Certification Program (PACP) CCTV Inspection with Light Cleaning of Sewer				
	8 inch pipe	Linear Feet	247,991	\$ -	\$ -
	10 inch pipe	Linear Feet	44,715	\$ -	\$ -
	12 inch pipe	Linear Feet	24,146	\$ -	\$ -
	15 inch pipe	Linear Feet	16,390	\$ -	\$ -
	18 inch pipe	Linear Feet	1,107	\$ -	\$ -
	21 inch pipe	Linear Feet	110	\$ -	\$ -
02541-4.01.B	Heavy Cleaning of Sewer Line				
	8 inch pipe	Crew Hour	225	\$ -	\$ -
	10 inch pipe	Crew Hour	150	\$ -	\$ -
	12 inch pipe	Crew Hour	90	\$ -	\$ -
	15 inch pipe	Crew Hour	80	\$ -	\$ -
	18 inch pipe	Crew Hour	30	\$ -	\$ -
	21 inch pipe	Crew Hour	5	\$ -	\$ -

Item Number	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Extension Price
02541-4.01.C	Remote Trimming of Protruding Service Lateral	Each	5	\$ -	\$ -
02541-4.01.D	Siphon Cleaning and CCTV Inspection				
	8 inch pipe	Linear Feet	851	\$ -	\$ -
	10 inch pipe	Linear Feet	1,496	\$ -	\$ -
02541-4.01.E	Traffic Control	Lump Sum	1	\$ -	\$ -
02541-4.02.A	Sonar/TV				
	24 inch pipe and greater	Linear Feet	26,793	\$ -	\$ -
Miscellaneous					
	Mobilization and Demobilization (not to exceed 8% of the total of all other bid items or \$50,000)	Lump Sum	1	\$ -	\$ -
Hurricane Creek Subtotal Estimated Unit Price Value					\$ -

Table 00380.3.1 - Unit Price Proposal Form

Bidder should refer to Section 00280, Instructions to Bidders, when completing this Proposal Form. Bidder shall complete this form entirely and return it with Bidder's Proposal.					
Submitted by (Company Name)					
00380.3 Proposal Pricing Information					
00380.3.1 Unit Pricing					
Bidder proposes to complete the RFP Work based on firm, fixed, unit prices (US dollars), which prices multiplied by the final Work quantities would represent the full consideration to Bidder for its complete and satisfactory performance of the Work in compliance with all the terms and conditions of the RFP Documents. The Unit Prices in this Table include the cost of all the work which is required or implied by the RFP documents or which may be inferred therefrom, and which is customarily provided in furnishing a complete and finished work item of its kind. Further, any and all alterations, modifications, and adjustments to the work item, which is reasonably foreseeable or customarily encountered in providing and installing equipment, material, and services of the work item kind, will be performed without additional compensation.					
In the event of a Purchaser-approved change in the scope of Work for which a unit price from this Table is not applicable, as determined by the Purchaser, the Service Contractor shall provide a new unit price for review and acceptance by the Purchaser. Service Contractor shall provide all information requested by the Purchaser to substantiate the value of the new unit price.					
00380.3.1.1 Unit Prices				Bidder Response	
Item Number	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Extension Price
Nonconnah South Tributaries: Tenmile Creek - Southwind (NS07-2, NS09-3, NN09)					
Manholes					
02544-4.01.A	GPS at Submeter Accuracy	Each	1,637	\$ -	\$ -
02544-4.01.B	Manhole Assessment and Certification Program (MACP Level 1 Inspection)	Each	5	\$ -	\$ -
02544-4.01.C.1	Manhole Assessment and Certification Program (MACP Level 2 Inspection - No 3D Scan)	Each	1,603	\$ -	\$ -
02544-4.01.C.2	Manhole Assessment and Certification Program (MACP Level 2 Inspection - with 3D Scan)	Each	34	\$ -	\$ -
Smoke Testing					
02544-4.01.A	Smoke Testing with GPS at Submeter Accuracy				
	6 inch - 21 inch pipe	Linear Feet	392,578	\$ -	\$ -
02546-4.01.B.1	Dye Testing Type 1	Each	3	\$ -	\$ -
02546-4.01.B.2	Dye Testing Type 2	Each	3	\$ -	\$ -
02546-4.01.B.3	Dye Testing Type 3	Each	3	\$ -	\$ -
02546-4.01.C.1	Dye Testing Type 1	Crew Hour	3	\$ -	\$ -
02546-4.01.C.2	Dye Testing Type 2	Crew Hour	3	\$ -	\$ -
02546-4.01.C.3	Dye Testing Type 3	Crew Hour	3	\$ -	\$ -
CCTV					
02541-4.01.A	Pipeline Assessment and Certification Program (PACP) CCTV Inspection with Light Cleaning of Sewer				
	6 inch pipe	Linear Feet	61	\$ -	\$ -
	8 inch pipe	Linear Feet	280,724	\$ -	\$ -
	10 inch pipe	Linear Feet	29,779	\$ -	\$ -
	12 inch pipe	Linear Feet	32,255	\$ -	\$ -
	15 inch pipe	Linear Feet	21,539	\$ -	\$ -
	18 inch pipe	Linear Feet	22,839	\$ -	\$ -
	21 inch pipe	Linear Feet	5,380	\$ -	\$ -
02541-4.01.B	Heavy Cleaning of Sewer Line				
	6 inch pipe	Crew Hour	2	\$ -	\$ -
	8 inch pipe	Crew Hour	250	\$ -	\$ -
	10 inch pipe	Crew Hour	110	\$ -	\$ -
	12 inch pipe	Crew Hour	120	\$ -	\$ -
	15 inch pipe	Crew Hour	80	\$ -	\$ -

Item Number	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Extension Price
	18 inch pipe	Crew Hour	125	\$ -	\$ -
	21 inch pipe	Crew Hour	50	\$ -	\$ -
02541-4.01.C	Remote Trimming of Protruding Service Lateral	Each	5	\$ -	\$ -
02541-4.01.C	Remote Trimming of Protruding Service Lateral	Each	5	\$ -	\$ -
02541-4.01.D	Siphon Cleaning and CCTV Inspection				
	8 inch pipe	Linear Feet	980	\$ -	\$ -
	10 inch pipe	Linear Feet	207	\$ -	\$ -
02541-4.01.E	Traffic Control	Lump Sum	1	\$ -	\$ -
00003-6.03	Sonar/TV				
	24 inch pipe and greater	Linear Feet	9,842	\$ -	\$ -
Miscellaneous					
00004 - 6.02	Mobilization and Demobilization (not to exceed 8% of the total of all other bid items or \$50,000)	Lump Sum	1	\$ -	\$ -
Tenmile Creek - Southwind (NS07-2, NS09-3, NN09) Subtotal Estimated Unit Price Value					\$ -

Table 00380.3.1 - Unit Price Proposal Form

Bidder should refer to Section 00280, Instructions to Bidders, when completing this Proposal Form. Bidder shall complete this form entirely and return it with Bidder's Proposal.					
Submitted by (Company Name)					
00380.3 Proposal Pricing Information					
00380.3.1 Unit Pricing					
Bidder proposes to complete the RFP Work based on firm, fixed, unit prices (US dollars), which prices multiplied by the final Work quantities would represent the full consideration to Bidder for its complete and satisfactory performance of the Work in compliance with all the terms and conditions of the RFP Documents. The Unit Prices in this Table include the cost of all the work which is required or implied by the RFP documents or which may be inferred therefrom, and which is customarily provided in furnishing a complete and finished work item of its kind. Further, any and all alterations, modifications, and adjustments to the work item, which is reasonably foreseeable or customarily encountered in providing and installing equipment, material, and services of the work item kind, will be performed without additional compensation.					
In the event of a Purchaser-approved change in the scope of Work for which a unit price from this Table is not applicable, as determined by the Purchaser, the Service Contractor shall provide a new unit price for review and acceptance by the Purchaser. Service Contractor shall provide all information requested by the Purchaser to substantiate the value of the new unit price.					
00380.3.1.1 Unit Prices				Bidder Response	
Item Number	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Extension Price
Wolf River Interceptor (WO05, WO06, WO07, WO08)					
Manholes					
02544-4.01.A	GPS at Submeter Accuracy	Each	107	\$ -	\$ -
02544-4.01.B	Manhole Assessment and Certification Program (MACP Level 1 Inspection)	Each	3	\$ -	\$ -
02544-4.01.C.1	Manhole Assessment and Certification Program (MACP Level 2 Inspection - No 3D Scan)	Each	57	\$ -	\$ -
02544-4.01.C.2	Manhole Assessment and Certification Program (MACP Level 2 Inspection - with 3D Scan)	Each	50	\$ -	\$ -
Smoke Testing					
02544-4.01.A	Smoke Testing with GPS at Submeter Accuracy				
	6 inch - 21 inch pipe	Linear Feet	28,285	\$ -	\$ -
02546-4.01.B.1	Dye Testing Type 1	Each	3	\$ -	\$ -
02546-4.01.B.2	Dye Testing Type 2	Each	3	\$ -	\$ -
02546-4.01.B.3	Dye Testing Type 3	Each	3	\$ -	\$ -
02546-4.01.C.1	Dye Testing Type 1	Crew Hour	3	\$ -	\$ -
02546-4.01.C.2	Dye Testing Type 2	Crew Hour	3	\$ -	\$ -
02546-4.01.C.3	Dye Testing Type 3	Crew Hour	3	\$ -	\$ -
CCTV					
02541-4.01.A	Pipeline Assessment and Certification Program (PACP) CCTV Inspection with Light Cleaning of Sewer				
	8 inch pipe	Linear Feet	18,137	\$ -	\$ -
	10 inch pipe	Linear Feet	7,696	\$ -	\$ -
	12 inch pipe	Linear Feet	682	\$ -	\$ -
	18 inch pipe	Linear Feet	1,699	\$ -	\$ -
	21 inch pipe	Linear Feet	70	\$ -	\$ -
02541-4.01.B	Heavy Cleaning of Sewer Line				
	8 inch pipe	Crew Hour	100	\$ -	\$ -
	10 inch pipe	Crew Hour	40	\$ -	\$ -
	12 inch pipe	Crew Hour	10	\$ -	\$ -
	18 inch pipe	Crew Hour	30	\$ -	\$ -
	21 inch pipe	Crew Hour	3	\$ -	\$ -
	Remote Trimming of Protruding Service Lateral	Each	5	\$ -	\$ -

Item Number	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Extension Price
02541-4.01.D	Siphon Cleaning and CCTV Inspection				
	8 inch pipe	Linear Feet	50	\$ -	\$ -
02541-4.01.E	Traffic Control	Lump Sum	1	\$ -	\$ -
02541-4.02.A	Sonar/TV				
	24 inch pipe and greater	Linear Feet	85,548	\$ -	\$ -
Miscellaneous					
	Mobilization and Demobilization (not to exceed 8% of the total of all other bid items or \$50,000)	Lot	1	\$ -	\$ -
Wolf River Interceptor (WO05, WO06, WO07, WO08) Subtotal Estimated Unit Price Value					\$ -

Table 00380.3.1 - Unit Price Proposal Form

Bidder should refer to Section 00280, Instructions to Bidders, when completing this Proposal Form. Bidder shall complete this form entirely and return it with Bidder's Proposal.					
Submitted by (Company Name)					
00380.3 Proposal Pricing Information					
00380.3.1 Unit Pricing					
Bidder proposes to complete the RFP Work based on firm, fixed, unit prices (US dollars), which prices multiplied by the final Work quantities would represent the full consideration to Bidder for its complete and satisfactory performance of the Work in compliance with all the terms and conditions of the RFP Documents. The Unit Prices in this Table include the cost of all the work which is required or implied by the RFP documents or which may be inferred therefrom, and which is customarily provided in furnishing a complete and finished work item of its kind. Further, any and all alterations, modifications, and adjustments to the work item, which is reasonably foreseeable or customarily encountered in providing and installing equipment, material, and services of the work item kind, will be performed without additional compensation.					
In the event of a Purchaser-approved change in the scope of Work for which a unit price from this Table is not applicable, as determined by the Purchaser, the Service Contractor shall provide a new unit price for review and acceptance by the Purchaser. Service Contractor shall provide all information requested by the Purchaser to substantiate the value of the new unit price.					
00380.3.1.1 Unit Prices				Bidder Response	
Item Number	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Extension Price
IRP Reassessment 2021 Segments					
CCTV					
02541-4.01.A	Pipeline Assessment and Certification Program (PACP) CCTV Inspection with Light Cleaning of Sewer				
	6 inch pipe	Linear Feet	821	\$ -	\$ -
	8 inch pipe	Linear Feet	33,018	\$ -	\$ -
	10 inch pipe	Linear Feet	8,417	\$ -	\$ -
	12 inch pipe	Linear Feet	1,804	\$ -	\$ -
	15 inch pipe	Linear Feet	4,568	\$ -	\$ -
	21 inch pipe	Linear Feet	711	\$ -	\$ -
02541-4.01.B	Heavy Cleaning of Sewer Line				
	6 inch pipe	Crew Hour	15	\$ -	\$ -
	8 inch pipe	Crew Hour	190	\$ -	\$ -
	10 inch pipe	Crew Hour	30	\$ -	\$ -
	12 inch pipe	Crew Hour	15	\$ -	\$ -
	15 inch pipe	Crew Hour	25	\$ -	\$ -
	18 inch pipe	Crew Hour	5	\$ -	\$ -
	21 inch pipe	Crew Hour	5	\$ -	\$ -
02541-4.01.C	Remote Trimming of Protruding Service Lateral				
		Each	5	\$ -	\$ -
02541-4.02.A	Sonar/TV				
	24 inch pipe and greater	Linear Feet	15,285	\$ -	\$ -
Miscellaneous					
	Mobilization and Demobilization (not to exceed 8% of the total of all other bid items or \$50,000)	Lump Sum	1	\$ -	\$ -
IRP Reassessment 2021 Segments Subtotal Estimated Unit Price Value					\$ -

Please Note: IRP Reassessment 2021 Segments will not be a standalone contract. Only those firms awarded one of the Phase 8 SSES projects, will be considered for award of IRP Reassessment 2021 Segments.

00380.5 Schedule

00380.5.1 Milestone Completion Dates and Applicable Liquidated Damages

Item	Milestone Description	Milestone Completion Date	*LDs Apply?
1	Completion ¹ of all work and submission of all data under this Service Contract	365 calendar days after Notice to Proceed	Yes

In accordance with Service Contract Article 00582.7.3 Scheduling Submittals, Sequence and Work Hours, the Work will be completed by **TBD**.

*LD indicates that completion of the Work after the "Milestone Completion Date" is subject to liquidated damages per applicable Articles of Section 00581.

*Note Service Contractor performance will directly impact future procurements for the SARP10 Program, schedule is critical and must be maintained.

¹ Completion is defined as: (a) the Work is complete and complies with the requirements of this Service Contract; and (b) Service Contractor has fulfilled all its obligations under this Service Contract except obligations that survive completion of the Work.

00380.5.2 Schedule of Submittals and Applicable Liquidated Damages							
Effective Date:		TBD					
The list is not all-inclusive. There are more requirements for Service Contractor to "provide notice," to "advise," to "update," to "inform," etc., or to "submit" should a condition precedent occur. These have not been included in the list. It will however remain Service Contractor's responsibility to comply with the submittal requirements whether or not the submittal is actually included on the following:							
Item	Reference Section	Submittal Item	Submittal Dates			LDs Apply?	
			Calendar Days	Event	Due Date		
Commercial Submittals							
C01	00582	Initial Issue Service Contractor's Work Schedule	7	After	Effective Date		No
C02	00582	Updated Issue Service Contractor's Work Execution Schedule	Weekly	After	Initial Issue Service Contractor's Work Schedule		No
C03	00582	Initial Payment Estimate Breakdown	30	After	Effective Date or Prior to First Payment		No
C04	00582	Progress Payment Breakdown w/ Backup	Monthly	Prior to	Monthly Progress Payment		No
C05	00582	Workers Compensation and Evidence of Coverage and Current Contributions	14	Prior to	Mobilization Onsite		No
C06	00582	Insurance Certificates		Prior to	Mobilization Onsite		No
C07	00681	Lien Waivers and Report of Disadvantaged Business Enterprise Form		With	Each Payment Invoice		No
C08	Loss Control Manual	Purchaser approval of Subcontractor Safety Documentation		Prior to	Mobilization Onsite		No
C09	Loss Control Manual	Subcontractor Safety Documentation		With	Proposal		No
C10	SRF	W-9 of Service Contractor and Subcontractors		With	Proposal		No
C11	00681	Certificate of Nondiscrimination for Service Contractor and Subcontractor		With	Proposal		No
C12	00681	Equal Business Opportunity Program Compliance Form for Service Contractor and Subcontractors		With	Proposal		No
C13	Technical	Technical Data Submittals	Weekly	After	Mobilization Onsite		Yes
Technical Submittals							
Refer to Technical Specifications for Technical Submittal requirements.							

00581 - Supplementary Terms and Conditions

00581.1 Notices and Correspondence

The Parties agree to send all notices arising out of or relating to this Service Contract by one of the following methods: (a) personal delivery; (b) certified mail with return receipt; (c) nationally recognized overnight mail or courier service, with delivery receipt requested; or (d) email. The Parties may send routine correspondence by email or first-class mail, each without confirmation of receipt. The Parties agree to address correspondence as indicated in this article.

Electronic Technical Correspondence

Addressed to Purchaser:

To: Bently Green
GreenB2@bv.com
Cc: Joe Collins
CollinsJJ@overlandcontracting.com

Addressed to Service Contractor:

To:

Cc:

Non-Electronic Technical Correspondence

Addressed to Purchaser:

Black & Veatch Corporation
845 Crossover Lane, Suite 120
Memphis, TN 38117
Attention: Bently Green
407202.78.0126

Addressed to Service Contractor:

Attention:
407202.78.0126

Electronic Commercial Correspondence (excluding invoices)

Addressed to Purchaser:

To: Ginny Dorsey
Dorsey@bv.com

Addressed to Service Contractor:

To:

Cc:

Non-Electronic Commercial Correspondence (excluding invoices)

Addressed to Purchaser:

Black & Veatch Corporation
8400 Ward Parkway
Kansas City, MO 64114
Attention: Ginny Dorsey
407202.78.0126

Addressed to Service Contractor:

Attention:
407202.78.0126

Electronic Invoices

Subcontractor will submit invoices via the web-based project management platform, Prolog. Invoices will be reviewed, and either approved or returned to Service Contractor for correction. The Black & Veatch Project Manager will forward invoices to Black & Veatch Accounts Payable, once they are approved.

00581.2 Not Used



00581.3 Liquidated Damages

00581.3.1 General

Service Contractor's failure to meet the requirements identified in this Article 00581.3 will cause Purchaser to incur harm that will be very difficult to ascertain with certainty. The Parties therefore agree the liquidated damages specified in this Article 00581.3 represent a reasonable estimate of Purchaser's harm and are not intended as a penalty. Service Contractor's obligation to pay liquidated damages for breach of one specified requirement does not relieve Service Contractor of its obligation to pay liquidated damages for breach of another specified requirement. Service Contractor's payment of liquidated damages for breach of the specified requirement is Purchaser's sole and exclusive remedy with regard to Service Contractor's breach of that requirement, except for any other express remedies stated in the Service Contract. If Purchaser terminates this Service Contract for cause, liquidated damages will cease to accrue after the termination date and Service Contractor's remaining liability will be calculated in accordance with Article 00582.21.

00581.3.2 Not Used

00581.3.3 Milestone Completion

Each milestone subject to liquidated damages for late completion is listed in the article titled "Milestone Completion Dates and Applicable Liquidated Damages". If not all portions of the Work comprising the milestone meet the Service Contract requirements on the milestone completion date, liquidated damages will accrue for each failure as shown below.

Beginning on the first calendar day after the specified milestone completion date for each milestone and continuing for thirty calendar days or until the milestone is completed, whichever is earlier, delay liquidated damages will be assessed at the rate of one thousand dollars (\$1,000.00) per calendar day.

Beginning on the thirty first calendar day after the specified milestone completion date for each milestone and continuing until the milestone is completed, delay liquidated damages will be assessed at the rate of one thousand five hundred dollars (\$1,500.00) per calendar day.

00581.4 Taxes

Service Contractor shall pay all payroll and other related employment compensation taxes for Service Contractor's employees, federal, state and other taxes which may be assessed on Service Contractor's income from the Project, engineering and business license costs (collectively, the "Service Contractor Taxes"). Service Contractor shall administer and pay all sales, use, gross receipts and excise taxes (collectively, the "Project Taxes"). Service Contract price includes Service Contractor Taxes and all Project Taxes. Purchaser will not be responsible for any additional charges related to tax that were not included as part of the Service Contract Price. Where applicable, Purchaser shall furnish to Service Contractor a certificate complying with state and local governmental laws, regulations and ordinances identifying any components of the Work to be considered exempt from the Project Taxes. Service Contractor shall cooperate with Purchaser to establish appropriate procedures and minimize the amount of such taxes to the extent reasonable and practical. Service Contractor is responsible for all property taxes on the construction equipment; Owner is responsible for property taxes on all other items incorporated into the project. Service Contractor shall notify Purchaser, and Purchaser shall have the right to review prior to Service Contractor's response to such document, of any correspondence with a federal or local taxing authority as it relates to sales and use, gross receipts, or excise taxes.

00582 - General Terms and Conditions

00582.1 Definitions

The terms below have the following definitions when used in this Service Contract:

"Applicable Law" means all laws, statutes, regulations, codes, rules, treaties, ordinances, judgments, permits, decrees, approvals, interpretations, injunctions, writs, orders, or other legal requirements of a Governmental Authority having jurisdiction over the Jobsite or performance of the Work.

"Claims" means claims, actions, suits, liabilities, demands, damages, losses, costs, expenses (including reasonable attorneys' fees), impacts to price, impacts to schedule, awards, fines and judgments, of every kind and nature.

"Completion" means: (a) the Work is complete and complies with the requirements of this Service Contract; and (b) Service Contractor has fulfilled all its obligations under this Service Contract except obligations that survive completion of the Work.

"Consent Decree" means the negotiated plan between Owner, Department of Justice, Environmental Protection Agency, Tennessee department of Environment and Conservation, and the Tennessee Clean Water Network that requires Owner to develop and implement plans to improve its wastewater systems.

"Engineer" means the entity providing engineering services to Purchaser for this Project.

"Governmental Authority" means any governmental body entitled to exercise any administrative, executive, judicial, legislative, police, regulatory or taxing power.

"Indemnified Parties" means Owner and its officials, Purchaser, Engineer, and the parent companies, related companies, affiliated companies, subsidiaries, successors, and assigns of each, including the shareholders, officers, directors, partners, employees, and agents of each of the above firms.

"Indemnified Parties" does not include Service Contractor or any Subcontractor.

"Jobsite" means the parcel of land upon which the Project is constructed.

"Notice to Proceed" means the written notice provided by Purchaser to Service Contractor releasing Service Contractor to proceed with all or part of the Work.

"Owner" means the City of Memphis, Tennessee.

"Parties" means Purchaser and Service Contractor.

"Party" means Purchaser or Service Contractor.

"Prime Agreement" means the agreement between Owner and Purchaser.

"Program Manager" means Black & Veatch Corporation or Overland Contracting Inc.

"Project" means the project undertaken by Owner for which Purchaser is procuring the Work.

"Project Acceptance Date" means the date the Project is fully complete and accepted by Owner.

"Purchaser" means the Party so identified in the Service Contract Agreement.

"Purchaser's Engineer" means "Engineer".

"Service Contract" means the agreement between Purchaser and Service Contractor consisting of: (a) the Service Contract Agreement; (b) the documents listed in the Service Contract Agreement; (c) Service Contract Revisions; (d) attachments, appendices and exhibits to the Service Contract documents; (e) documents expressly incorporated by reference into the Service Contract; and (f) any requirements that can be reasonably inferred from any of the foregoing.

"Service Contract Agreement" means the Service Contract form executed by Purchaser and Service Contractor.

"Service Contractor or Contractor" means the Party so identified in the Service Contract Agreement.

"Service Contract Price" means the total compensation to be paid to Service Contractor by Purchaser under this Service Contract.

"Service Contract Revision" means a written order issued to Service Contractor under Article 00582.17 amending this Service Contract.

"Subcontractor" means any party, at any tier, having an agreement with Service Contractor or with a Subcontractor, to perform a portion of the Work.

"Supplier" has the same meaning as "Service Contractor".

"Work" means that which Service Contractor is to perform or provide under this Service Contract.

00582.2 Interpretation

00582.2.1 This Service Contract is the complete and final agreement between the Parties relating to the Work. All prior or contemporaneous negotiations and agreements relating to the Work are superseded by this Service Contract. The terms of this Service Contract are not supplemented, explained, or qualified by trade usage or a course of prior dealing. Service Contractor may only accept this Service Contract by signing and returning the Service Contract Agreement or by commencing the Work. Exceptions or terms submitted by Service Contractor in the course of accepting this Service Contract are void.

00582.2.2 The Service Contract documents are intended to complement one another. What is called for by one document is to be given effect as if called for by all documents. Service Contractor agrees to obtain Purchaser's written clarification before proceeding with Work that may be affected by an apparent conflict, discrepancy or error in the Service Contract. If Service Contractor does not obtain Purchaser's written clarification, the provision imposing the more stringent requirement on Service Contractor will apply as determined in Purchaser's sole discretion.

00582.2.3 Provisions of this Service Contract which contemplate performance or obligations subsequent to completion or termination of the Work or which contain waivers or limitations of liability, including, but not limited to, Articles 00582.14, 00582.18, 00582.21, 00582.23 and 00582.26 will survive such completion or termination. Termination of the Work will not affect the rights and obligations that arose before termination.

00582.2.4 No obligation under this Service Contract may be waived without the written agreement of the Party against whom enforcement of the waiver is sought. Failure or delay in exercising a right or remedy or requiring the satisfaction of an obligation under this Service Contract does not constitute a waiver of that right, remedy or obligation.

00582.2.5 If any provision of this Service Contract is held to be unenforceable, the remaining provisions of this Service Contract will remain in effect. Provisions held to be unenforceable may be amended to effect, to the extent permitted by law, the original intent of the provision.

00582.2.6 English is the controlling language of this Service Contract. The Parties agree to make all payments due under this Service Contract in US dollars.

00582.3 Service Contractor's Representations and Status

00582.3.1 Service Contractor represents that it has sufficient resources and capacity and is fully qualified, properly equipped, sufficiently financed and otherwise able to perform the Work in accordance with the Service Contract requirements. Purchaser may require that Service Contractor provide reasonable assurance of Service Contractor's continued satisfaction of these representations.

00582.3.2 Service Contractor also represents that it has satisfied itself as to the character, quality and quantity of surface and subsurface materials, structures, utilities, or other obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the Jobsite and the Service Contract. Service Contractor agrees that Purchaser has no responsibility or liability for Service Contractor's conclusions or interpretations based on information Purchaser has made available to Service Contractor.

00582.3.3 Service Contractor is an independent contractor in the performance of the Work. Service Contractor is solely responsible for the means, methods, sequences, procedures, and safety precautions used or adopted by Service Contractor and any Subcontractor in the performance of the Work. Except as provided in Article 00585, Service Contractor has sole authority and responsibility to employ, manage, discharge, and otherwise control its employees.

00582.4 Service Contractor Scope of Work

Service Contractor shall furnish all materials, tools, equipment, vehicles, supplies, services, labor and supervision required to perform the Work. Service Contractor may only perform Work as authorized in a Notice to Proceed. There is no obligation for Purchaser to authorize any Work pursuant to this Service Contract.

00582.5 Not Used

00582.6 Payment

00582.6.1 Payment to Service Contractor for any Work performed, including any retention if specified, will be made by Purchaser after Purchaser's receipt of Owner's payment for the same Work and upon Purchaser's approval of such Work. Purchaser shall bill Owner for all Works performed by Service Contractor, excluding any amount that has been designated as authorized retentions, withholding, or back charges under this Service Contract, and shall pay Service Contractor within fifteen days from the time Purchaser receives the correlated payment from Owner on account thereof, or from Purchaser's receipt of Service Contractor's invoice, whichever occurs later. To the extent permitted by Applicable Laws, Owner's payment to Purchaser for Works performed by Service Contractor is a condition precedent to Purchaser's obligation to pay Service Contractor for such Works. Therefore, Service Contractor will only be paid if and to the extent, that Purchaser receives payment for the Work from Owner. Service Contractor shall include with the invoice supporting documentation required by this Service Contract and any additional information requested by Purchaser. Each invoice must clearly show the invoice number, the Work covered by the invoice, taxes, and the billing period (if applicable). If an invoice does not contain the requested documentation or information, Purchaser will notify Service Contractor of the deficiency. Calculation of the time for payment for an invoice begins when Purchaser receives an invoice free of deficiencies.

00582.6.2 Service Contractor agrees to provide additional itemization of the invoice as Purchaser reasonably requests. If payment to Service Contractor will be on a cost reimbursable basis or a unit price basis, or if Subcontractor files a Claim under Article 00582.17, Service Contractor shall furnish Purchaser complete breakdowns and supporting information in the detail required by Purchaser to verify the accuracy of the invoiced or claimed amounts. Service Contractor shall retain the breakdowns and supporting information for seven years after the Project Acceptance Date, during which time Purchaser or Purchaser's designee may audit the aforementioned records at Purchaser's expense.

00582.6.3 Purchaser may withhold or set-off amounts due under this Service Contract on account of: (a) Claims arising out of or relating to Service Contractor's breach or reasonably anticipated breach of this Service Contract; (b) any amounts owed by Service Contractor to Purchaser under this Service Contract; (c) non-conforming Work not yet corrected; (d) a claim filed against Service Contractor or reasonable evidence indicating a claim may be file against Service Contractor; or (e) any amounts owed by Service Contractor to Purchaser or to a parent, partner, joint venture, affiliate or subsidiary of Purchaser under any other contracts, claims, demands, lawsuits or other matters. If amounts owed by Service Contractor to Purchaser exceed the unpaid balance of this Service Contract, Service Contractor agrees to pay those amounts within forty-five calendar days after receipt of Purchaser's notice identifying the amounts due.

00582.6.4 Payment by Purchaser does not: (a) constitute approval or acceptance of any portion of the Work; (b) waive any of Purchaser's rights; or (c) relieve Service Contractor from responsibility or liability arising out of or relating to this Service Contract. Acceptance by Service Contractor of final payment constitutes a release and waiver of all Claims by Service Contractor against Indemnified Parties.

00582.7 Schedule

00582.7.1 Performance of the Work as scheduled is of the essence. Service Contractor shall furnish progress reports of the Work as requested by Purchaser. If the Work is not progressing as scheduled, Service Contractor shall implement appropriate corrective measures to get the Work back on schedule and advise Purchaser of such corrective actions. Service Contractor will be solely responsible for costs incurred to implement the corrective measures.

00582.7.2 Service Contractor shall give Purchaser written notice of any delay or anticipated delay within three calendar days after the occurrence of the event, giving rise to the delay. Service Contractor's notice must identify the cause of the delay or the anticipated delay and the actions Service Contractor is undertaking to recover from or avoid the delay. If Service Contractor does not take steps that Purchaser determines are necessary to recover from or avoid a delay or if Service Contractor does not bring its performance into compliance with the schedule requirements of this Service Contract, Purchaser may direct Service Contractor to accelerate the Work by whatever means Purchaser deems necessary to recover and maintain the Service Contract schedule. Service Contractor shall be solely liable for costs to accelerate the Work. In the instance of schedule impact due to weather, reference 00681.8.

00582.7.3 Scheduling Submittals, Sequence and Work Hours

Submittals

The Service Contractor shall submit to the Program Manager weekly schedules by Thursday at noon for the following week's work. Daily schedules shall be submitted to the Program Manager prior to Work starting each day.

The Service Contractor shall submit weekly and monthly progress updates to the Program Manager. At a minimum, the Service Contractor's progress update shall show Work completed versus estimated Work remaining for each Work item, time spent and time remaining, and notes on pending Work to be performed.

Sequence and Working Hours

In general, the Service Contractor shall begin the manhole smoke testing and CCTV operations at the top of each of the collection systems being inspected and work downstream from there.

Typical Work days consist of a Monday through Friday schedule with a 7am start at the earliest with a 6pm finish at the latest, for manhole inspections, smoke testing, and CCTV operations. Saturday Work may be permitted as necessary, and Sunday Work will only be permitted as warranted. No Work on Memorial Day, Independence Day, Labor Day, Thanksgiving Thursday and Friday, Christmas Eve, Christmas and New Year's Day during the Service Contract duration.

For weekend operations, request in writing by Thursday at NOON.

In cases where the Program Manager does not have the resources available to observe Saturday, Sunday and/or night work, the request will be denied, and no time extension or impact will be considered. Night Work is understood for CCTV when lower flow levels are present in the sewers and will be permitted as requested (48-hour advance notice required).

Noise attenuated equipment for night work is required when working in residential neighborhoods.

00582.8 Waivers of Lien

As a condition precedent to payment, Service Contractor shall furnish a lien waiver in the form of Article 00681.1a with each invoice except the final invoice. As a condition precedent to payment of the final invoice, Service Contractor shall furnish a lien waiver in the form of Article 00681.1b with the final invoice. If a lien is filed and Service Contractor does not remove or bond around the lien within seven calendar days after receipt of written notice from Purchaser or Owner, then Purchaser or Owner may remove the lien. Service Contractor shall reimburse Purchaser or Owner, as applicable, for all costs and expenses incurred by Purchaser or Owner in removing the lien, including reasonable attorneys' fees and court costs.

00582.9 Subcontracting

Except for portions of the Work for which a Subcontractor is named in this Service Contract, Service Contractor may not subcontract the Work without first obtaining Purchaser's written consent. If Service Contractor subcontracts any portion of the Work, Service Contractor remains responsible for complying with the Service Contract requirements and will be liable to Purchaser for the acts and omissions of Subcontractors as if the acts and omissions were those of Service Contractor. Purchaser has the right to contact Subcontractors to discuss their progress of the Work.

00582.10 Assignment

00582.10.1 Service Contractor may not assign all or part of this Service Contract voluntarily, by operation of law, or otherwise, nor may Service Contractor assign any of the money payable under this Service Contract, without obtaining Purchaser's prior written consent. Any assignment of this Service Contract in violation of the foregoing is voidable at the option of Purchaser. Subject to the foregoing, the provisions of this Service Contract will extend to the benefit of and be binding on the successors and assigns of the Parties.

00582.10.2 Purchaser may, at its sole discretion, assign this Service Contract to its affiliates or to Owner or Owner's designee and, upon such assignment, Purchaser will be released from all obligations or liabilities arising out of or relating to this Service Contract.

00582.11 Quality Control

Service Contractor agrees to maintain a Purchaser-approved quality control system during performance of the Work. Service Contractor also agrees to require each Subcontractor to maintain a quality control system appropriate for the Subcontractor's scope of work during Subcontractor's performance of the Work. If Service Contractor or a Subcontractor does not maintain a quality control system as required by this Article 00582.11, Purchaser may reject all or part of the Work.

00582.12 Inspection

00582.12.1 Service Contractor shall identify for Purchaser all locations where Work is to be performed and shall furnish information reasonably required by Purchaser to verify that the Work conforms to the requirements of this Service Contract. Service Contractor agrees to allow Purchaser and Owner reasonable access to all locations where the Work is being performed so Purchaser and Owner may: (a) inspect the Work, and (b) test or witness tests of the Work. Service Contractor shall arrange for Purchaser and Owner to have the same rights of inspection and access to locations where any Subcontractor is performing Work.

00582.12.2 Inspection or acceptance of the Work does not preclude subsequent inspection and rejection of the Work if the Work is later discovered not to conform to the Service Contract requirements or if Purchaser has reasonable grounds upon which to believe the Work does not conform to the Service Contract requirements. Inspection of the Work, performance or witnessing of tests, or any release for shipment by Purchaser is solely for the benefit of Purchaser and does not discharge Service Contractor from complying with the Service Contract requirements.

00582.13 Passage of Title

Service Contractor warrants that the Work will be free of all liens, claims, charges, security interests, encumbrances or defects in title. Title to the Work will pass to Purchaser upon the earlier of Service Contractor's receipt of payment or delivery of the Work to Purchaser.

00582.14 Standards of Performance

00582.14.1 Service Contractor represents that the Work: (a) will meet the requirements of this Service Contract; (b) will meet standards of care, skill and diligence found in the industry to which the Work pertains; and (c) will conform with nationally recognized and accepted practices, codes and standards found in the industry to which the Work pertains. Personnel performing the Work must be qualified and competent personnel whose recommendations, guidance, and performance reflect the recognized standards of knowledge, judgment, and performance generally accepted and appropriate in the industry to which the Work pertains.

00582.14.2 Service Contractor acknowledges that: (a) review and comment by Purchaser of Service Contractor's submittals does not relieve Service Contractor of its obligations under this Service Contract; and (b) Purchaser's acceptance of the Work does not relieve Service Contractor of its obligations under this Service Contract.

00582.14.3 If, during the one year period following the earlier of completion or termination of the Work it is shown there is an error in the Work caused by Service Contractor's or any Subcontractors' failure to meet the standards, Service Contractor will perform, at its cost and expense, corrective action within the original scope of Work as may be necessary to remedy such error.

00582.14.4 This project is being implemented to provide services to Owner, through Owner's Program Manager, for implementation of the Consent Decree executed on September 20, 2012, civil action number 2:10-cv-02083-SHM-dkv (CD). Owner negotiated the Consent Decree with the United States Environmental Protection Agency and the Tennessee Department of Environment and Conservation to implement an assessment and rehabilitation program of Owner's wastewater collection and transmission system. Per section II, paragraph 5 of the Consent Decree, all contractors performing work required by the Consent Decree must be notified by Owner that a copy of the Consent Decree is posted on Owner's webpage. This article provides the required notification. The Consent Decree may be reviewed by accessing Owner's webpage at:

<http://www.memphistn.gov/Government/PublicWorks/ConsentDecree.aspx>

This page provides a link to the Consent Decree and associated documents. An explanation of each document is also provided. Click on any link to access. Alternatively, the Consent Decree is available at:

<http://www.sarp10.com/consent-decree/>

00582.14.5 Service Contractor acknowledges that Owner's failure to achieve 100 percent compliance with the Consent Decree requirements may result in the imposition of penalties, costs, and other damages imposed against the Owner and Purchaser. To the extent caused by Service Contractor's failure to perform the Work in accordance with this Service Contract or to the extent caused by the negligence of Service Contractor or any Subcontractor, Service Contractor agrees to pay penalties and costs incurred by Owner and Purchaser under the Consent Decree.

00582.15 Compliance with Laws

00582.15.1 Service Contractor shall comply with all Applicable Laws in effect during its performance of the Work, including but not limited to the Fair Labor Standards Act, Occupational Safety and Health Administration (OSHA), and the Americans with Disabilities Act (ADA). Service Contractor shall obtain all licenses, permits, and inspections applicable to the Work. Service Contractor shall also comply with the USA's Foreign Corrupt Practices Act.

00582.15.2 Purchaser and Service Contractor shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-4.3(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, or national origin. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.

00582.15.3 Neither party shall engage in any conduct or activity in the performance of this Service Contract that constitutes a conflict of interest under Applicable Laws.

00582.15.4 Water is provided by Memphis Light Gas and Water (MLGW) to the Service Contractor, but Service Contractor shall apply to MLGW's Building Services for permit and meter to record water usage. Service Contractor shall contact David Vick, 901-320-3939 (Water Meter Department Supervisor) directly to coordinate securing meter and permit. MLGW shall issue water permit and fire hydrant meter. Service Contractor shall provide a letter on Company letterhead that the Service Contractor is performing Work for the City of Memphis and acknowledging liability for any damage to or theft of the meter. Service Contractor is responsible for all costs associated with water usage.

00582.16 Business Practices

00582.16.1 Service Contractor shall uphold the good name and reputation of Purchaser and shall not take any action which is intended to, or which causes damage to or discredits Purchaser. Service Contractor shall not:

- (a) Offer to give or agree to give any director, officer, employee or agent of any potential client a gift or consideration of any kind as an inducement or reward for (i) doing or declining to do, or for having done or declined to do, any action in relation to obtaining or executing any contract or (ii) for showing or declining to show any favor or disfavor to any person in relation to any possible project; or
- (b) Induce or attempt to induce any officer, servant, or agent of any private or public body to depart from his or her duties to his or her client or, in the case of any officer, servant or agent of a public body, his or her duties to the applicable public body, the applicable body politic, or both.

00582.16.2 Service Contractor shall not engage or employ, on a full, part-time or any other basis during the term of the Prime Agreement and for a period of one year after the termination or expiration, any professional or technical personnel who are or have been at any time during the term of the Prime Agreement in the employ of Owner with the explicit written consent of Owner.

00582.16.3 Nondiscrimination:

- a) Service Contractor certifies and agrees that all persons employed by it, its affiliates, subsidiaries, or holding companies are and will be treated equally without regard to or because of race, creed, color, religion, ancestry, national origin, sexual orientation, sex, age, condition of physical or mental handicap, marital status, or political affiliation, in

compliance with all Applicable Laws. Service Contractor shall certify, at Purchaser's request, that it is in full compliance with all applicable EEO rules and laws.

- b) Purchaser and Owner reserve the right to investigate any claims of illegal discrimination by Service Contractor and in the event a finding of discrimination is made and upon written notification thereof, Service Contractor shall take all necessary steps to cure and rectify such action to the reasonable satisfaction of Purchaser and Owner. Service Contractor's failure or refusal to do so shall be cause for termination of this Service Contract in accordance with the terms of this Service Contract.

00582.16.4 Purchaser is an affirmative action employer. Accordingly, the parties hereby incorporate by reference the requirements of Executive Order 11246, as amended, and the applicable regulations contained in 41 C.F.R. Parts 60-1 through 60-60; 29 U.S.C. Section 793 and the applicable regulations contained in 41 C.F.R. Part 60-741; 38 U.S.C. Section 4212 and the applicable regulations contained in 41 C.F.R. Part 60-250 and/or 60-300; and 29 C.F.R. Part 471, Appendix A to Subpart A."

00582.16.5 Service Contractor represents and warrants that it has a code of conduct or other set of compliance requirements that is at least as broad as Purchaser's Code of Conduct for Global Business Relationships and all amendments thereto (hereinafter "Code of Conduct"), or that it will comply with Purchaser's Code of Conduct in all dealings that affect Purchaser. The Code of Conduct and its amendments are expressly incorporated herein by reference and full text of the same can be found at:

<https://www.bv.com/sites/default/files/reports-studies/Code-of-Conduct-for-Global-Business-Relationships>

00582.17 Claims and Service Contract Revisions

00582.17.1 Service Contractor must give written notice, with appropriate supporting documentation, of all Claims for extra compensation or additional time for performance of the Work within ten calendar days after occurrence of the event, giving rise to the Claim. If Purchaser agrees with the Claim, the Parties will negotiate an equitable adjustment to the Service Contract compensation or the schedule, or both, with the adjustment to be reflected in a Service Contract Revision. Service Contractor is responsible for all costs associated with the prosecution of the Claim. Service Contractor acknowledges that failure of Service Contractor to give Purchaser notice and appropriate supporting documentation within the required time frame constitutes a waiver of all Claims arising out of or relating to the event. Service Contractor may not halt Work, pending resolution of a Claim without Purchaser's prior written consent.

00582.17.2 Purchaser may make additions, deletions, reductions in scope, or other changes to the Work. If a proposed change will cause a material increase or decrease in Service Contractor's cost or time for performance, Service Contractor shall so notify Purchaser in writing within ten calendar days after Service Contractor's receipt of Purchaser's notice of change. Service Contractor's notice must include supporting documentation in order to be effective. If Purchaser agrees with Service Contractor's notice, the Parties will negotiate an equitable adjustment to the Service Contract compensation or the schedule, or both, with the adjustment to be reflected in a Service Contract Revision. Service Contractor, however, shall proceed with the change as directed in writing by Purchaser pending such agreement. Purchaser will not be liable to Service Contractor for Claims arising from a decrease in the Work. No change is effective without a Service Contract Revision issued by Purchaser.

00582.17.3 In estimating the impact of a proposed Service Contract Revision, Service Contractor shall account for all cost and time impacts arising from or related to the proposed Service Contract Revision, including cumulative impacts associated with all previous Service Contract Revisions. Service Contractor's acceptance of payment under a Service Contract Revision or Service Contractor's agreement to a Service Contract Revision constitutes a waiver of all Claims related to or arising from that Service Contract Revision or Claims arising out of or relating to cumulative impacts of that Service Contract Revision and any previous Service Contract Revisions.

00582.18 Intellectual Property

00582.18.1 Service Contractor represents that the Work does not infringe on any intellectual property right and does not constitute an unauthorized disclosure or use of a trade secret. Service Contractor hereby agrees to grant to Purchaser and Owner an irrevocable, royalty-free, fully paid-up, non-exclusive license under all intellectual property or trade secrets owned or controlled by Service Contractor or Subcontractors to the extent necessary for Purchaser's and Owner's use of the Work. Purchaser and Owner may reproduce any submittals received from Service Contractor, despite any notice to the contrary appearing on the document.

00582.18.2 If all or part of the Work is held to constitute an infringement of any intellectual property right or an unauthorized use or disclosure of a trade secret, and if the use of all or part of the Work is enjoined, Service Contractor shall, at its own expense, and at Purchaser's or Owner's option: (a) procure for Purchaser or Owner the perpetual right to use such Work; (b) replace the Work with Work that does not infringe any intellectual property right or constitute an unauthorized use or disclosure of a trade secret; or (c) modify the Work so it does not infringe any intellectual property right or constitute an unauthorized use or disclosure of a trade secret. Replacement of or modification of the Work does not relieve Service Contractor of the Service Contract requirements.

00582.19 Non-Disclosure

Service Contractor shall not make any news releases, authorize or participate in any interview concerning this Service Contract, or issue other advertising pertaining to the Project or this Service Contract without the prior written approval of Purchaser. Service Contractor shall treat all information provided by Purchaser as confidential and only disclose such information as necessary to perform the Work, and will require the employees, agents, and Subcontractors who need to know to adhere to the terms of this provision. Service Contractor agrees to require all Sub-subcontractors to whom such information is disclosed to also treat such information as confidential. Purchaser's disclosure of information to Service Contractor does not constitute a transfer of ownership of the information to Service Contractor. Service Contractor agrees Purchaser will be entitled to relief at law and in equity, including, but not limited to, injunctive relief and specific performance, upon any breach or anticipated breach of this Article 00582.19.

00582.20 Suspension of Work

00582.20.1 Purchaser may, at any time and in its sole discretion, suspend performance of all or part of the Work. Purchaser will provide a written notice to Service Contractor specifying the extent to which the Work is suspended and identifying the effective date of the suspension. Service Contractor shall suspend performance of the Work on the effective date to the extent specified in the notice but shall continue to perform the Work not suspended. Service Contractor shall use all reasonable means to minimize the consequences of a suspension.

00582.20.2 If the suspension is unrelated to Service Contractor's failure to comply with this Service Contract, Purchaser will adjust the schedule to reflect the reasonable delay due to the suspension and will reimburse Service Contractor for the reasonable and direct additional costs incurred by Service Contractor due solely to the suspension. Service Contractor's sole and exclusive remedies for a Purchaser-directed suspension are the remedies specified in this Article 00582.20.2.

00582.20.3 Service Contractor shall promptly resume performance of all or part of the suspended Work in accordance with Purchaser's written authorization to resume the Work. Service Contractor must present all Claims and supporting materials related to a suspension under this Article 00582.20 within ten calendar days after the date set by Purchaser for resumption of the suspended Work. Failure of Service Contractor to present all Claims within the ten-calendar day period will constitute a waiver of Service Contractor's right to receive an extension of the schedule or additional compensation related to the suspension.

00582.20.4 Service Contractor may not suspend performance of the Work except as directed by Purchaser under this Article 00582.20.

00582.21 Termination for Cause

00582.21.1 If Service Contractor defaults in any obligation under this Service Contract and does not cure the default within ten calendar days after receipt of Purchaser's written notice identifying the default, Purchaser may terminate all or part of the Work. If Purchaser terminates all or part of the Work, Purchaser will give Service Contractor written notice of termination specifying the extent to which the Work is terminated. Service Contractor shall continue to perform all portions of the Work not terminated.

00582.21.2 Upon request by Purchaser, Service Contractor shall promptly give Purchaser complete copies of agreements related to the terminated Work. Service Contractor shall, at Purchaser's request, preserve the Work purchased for or committed to the terminated Work, pending Purchaser's instructions. With respect to the terminated Work, Service Contractor shall promptly make every reasonable effort to cancel associated agreements and other commitments upon terms satisfactory to Purchaser or take other actions with respect to those agreements and other commitments as may be directed by Purchaser.

00582.21.3 Service Contractor, if and to the extent requested to do so by Purchaser, shall promptly assign to Purchaser or Owner, in form and content satisfactory to Purchaser, Service Contractor's rights, title, and interest to the Work purchased for or committed to the terminated Work, or shall otherwise dispose of same in accordance with Purchaser's instructions.

00582.21.4 Requests for compensation attributable to termination under this Article 00582.21 must be submitted to Purchaser in accordance with Article 00582.17. Service Contractor will not be entitled to recover from Purchaser any damages, losses, costs or expenses arising out of or relating to the terminated portion of the Work. Service Contractor's compensation under this Article 00582.21 will not exceed an amount commensurate with the ratio that the terminated Work accepted by Purchaser bears to all of the Work.

00582.21.5 Purchaser is not required to provide a cure period before terminating the Work under this Article 00582.21 for the following: (a) commencement of a case by or against Service Contractor under bankruptcy law; (b) a general assignment by Service Contractor for the benefit of its creditors; (c) the appointment of a receiver to take charge of Service Contractor's assets, (d) a confession of insolvency by Service Contractor; and (e) a material adverse change in Service Contractor's financial status that in Purchaser's sole opinion would affect Service Contractor's ability to perform the Work.

00582.21.6 If this Service Contract is terminated under this Article 00582.21 and it is later determined by Purchaser or adjudged that there was no default, the termination will be considered a termination without cause and the provisions of Article 00582.22 will apply.

00582.22 Termination Without Cause

00582.22.1 Purchaser may, at any time and in its sole discretion, terminate all or part of the Work. Purchaser will provide a written notice to Service Contractor specifying the extent to which the Work is terminated and the effective date of the termination. Service Contractor shall continue to perform all portions of the Work not terminated.

00582.22.2 Upon termination under this Article 00582.22, Service Contractor may only place new agreements related to the Work as necessary to complete the Work not terminated. Upon request by Purchaser, Service Contractor shall promptly give Purchaser complete copies of agreements related to the terminated Work. Service Contractor shall, at Purchaser's request, preserve and protect the Work purchased for or committed to the terminated Work, pending Purchaser's instructions. With respect to the terminated Work, Service Contractor shall promptly make every reasonable effort to cancel associated agreements and other commitments upon terms satisfactory to Purchaser or Service Contractor shall take other actions with respect to those agreements and other commitments as may be directed by Purchaser.

00582.22.3 Service Contractor shall, if and to the extent requested to do so by Purchaser, promptly assign to Purchaser or Owner, in form and content satisfactory to Purchaser, Service Contractor's rights, title, and interest to the Work purchased for or committed to the terminated Work or shall otherwise dispose of same in accordance with Purchaser's instructions.

00582.22.4 Subject to Service Contractor's compliance with the provisions of this Article 00582.22 and other applicable portions of this Service Contract, Service Contractor will recover from Purchaser, as the complete and final settlement for the terminated Work and all related Claims, a sum equal to Service Contractor's direct cost for the terminated Work satisfactorily performed as of the effective date of termination, plus an allowance for reasonable overhead and profit on such direct cost. Service Contractor's compensation under this Article 00582.22 will not exceed an amount equal to the ratio the terminated Work accepted by Purchaser bears to all of the Work, provided that Service Contractor will also recover from Purchaser the reasonable costs to terminate agreements with Subcontractors. Payment to Service Contractor for terminated Work will be reduced by the sum previously paid to Service Contractor on account of the terminated Work.

00582.22.5 If termination without cause is preceded by suspension under Article 00582.20, the Parties agree that any cost and schedule impacts associated with suspension will be addressed under that article and will be excluded from calculation of costs for termination under this Article 00582.22.

00582.22.6 Requests for compensation under this Article 00582.22 must be submitted to Purchaser in accordance with Article 00582.17. Except as provided in this Article 00582.22, Service Contractor will not be entitled to recover from Purchaser any damages, losses, costs or expenses arising out of or relating to the terminated portion of the Work. Payment of the compensation specified in this Article 00582.22 is the sole and exclusive remedy of Service Contractor against Purchaser arising out of or relating to termination under this Article 00582.22.

00582.23 Indemnity

00582.23.1 SERVICE CONTRACTOR AGREES TO DEFEND, INDEMNIFY, AND HOLD HARMLESS THE INDEMNIFIED PARTIES AGAINST ANY CLAIM, LOSS, DAMAGE, EXPENSE, OR LIABILITY (INCLUDING ATTORNEYS' FEES AND COSTS OF ANY SUCCESSFUL ENFORCEMENT OF THIS INDEMNITY ARTICLE) ARISING OUT OF THE PERFORMANCE OR NON-PERFORMANCE BY SERVICE CONTRACTOR OR ITS SUBCONTRACTORS, OR THEIR OFFICERS, EMPLOYEES, OR AGENTS.

00582.23.2 Providing that Purchaser is not in breach of its obligation to make payments to Service Contractor for the Work, Service Contractor shall indemnify, defend and hold harmless the Indemnified Parties from any claims or mechanic's liens brought against the Indemnified Parties or against the Project as a result of the failure of Service Contractor, or those for whose acts it is responsible, to pay for any services, materials, labor, equipment, taxes or other items or obligations furnished or incurred for or in connection with the Work. Within three (3) days of receiving written notice from Purchaser that such a claim or mechanic's lien has been filed, Service Contractor shall commence to take the steps necessary to discharge said claim or lien, including, if necessary, the furnishing of a mechanic's lien bond. If Service Contractor fails to do so, Purchaser will have the right to discharge the claim or lien and hold Service Contractor liable for costs and expenses incurred, including attorneys' fees.

00582.23.3 If an employee of Service Contractor, subcontractors, anyone employed directly or indirectly by any of them or anyone for whose acts any of them may be liable has a claim against any member of Indemnified Parties, its officers, directors, employees, or agents, Service Contractor's indemnity obligation set forth in this Article 00582.23.1 above shall not be limited by any limitation on the amount of damages, compensation or benefits payable by or for Service Contractor, subcontractors, or other entity under any employee benefit acts, including workers' compensation or disability acts.

00582.23.4 Service Contractor will immediately notify Purchaser of any claim or suit made or filed against Service Contractor or its Subcontractors in which Purchaser or Owner is named as a co-defendant.

00582.24 Insurance Requirements

00582.24.1 Service Contractor shall, at its sole cost, maintain insurance as required by this Service Contract and shall impose the obligations of this Article 00582.24 on all Subcontractors. Service Contractor shall give Purchaser ACORD insurance certificates evidencing the required coverage by the due date identified in the article titled "Schedule of Submittals and Applicable Liquidated Damages" and as Purchaser may request from time to time. Service Contractor shall also give Purchaser, as Purchaser requests from time to time, insurance policy information necessary to demonstrate Service Contractor maintains the insurance limits and endorsements required by this Service Contract. Insurance certificates shall specifically note "City of Memphis SARP10 Program" in the notes or description area. Service Contractor shall ensure the policies:

- a) Contain a provision or endorsement that the coverage will not be cancelled, materially changed, or renewal refused unless the insurer gives at least thirty calendar days prior written notice to Purchaser.
- b) Remain in effect through two years after completion of the Work.
- c) Are primary with respect to insurance covering Indemnified Parties as additional insureds. All insurance carried by Indemnified Parties will be excess insurance.
- d) Contain a waiver of all rights of subrogation by the insurance carriers in favor of Indemnified Parties, with the exception of professional liability coverage (if required under this Service Contract).
- e) Comply with all applicable laws of the jurisdiction in which any part of the Work is to be performed including, but not limited to, admitted and compulsory coverage.
- f) Are rated "A-" or better by A.M. Best's "Insurance Guide and Ratings".

00582.24.2 Service Contractor shall maintain broad form commercial general liability insurance protecting Service Contractor, and Indemnified Parties as additional insureds (using endorsements CG 20 10 and CG 20 37 or their equivalent), against claims arising out of or relating to bodily injury or property damage arising from the Work. The policy must include a cross-liability or severability of interest clause, a per project aggregate endorsement, and coverage for personal injury liability, contractual liability, products and completed operations (covering lawsuits brought in the USA and the country of the Jobsite), explosion, building collapse, and damage to underground property. Service Contractor shall maintain policy limits of at least one million dollars for each occurrence and in the aggregate.

00582.24.3 Service Contractor shall maintain worker's compensation insurance protecting Service Contractor against all claims under applicable worker's compensation laws. If Service Contractor is required to maintain worker's compensation insurance in the US, the worker's compensation insurance must contain an "all states" or "other states" endorsement. For Work performed in the US, Service Contractor shall also maintain employer's liability insurance protecting Service Contractor against claims for injury, disease or death of employees, which are not covered, by the worker's compensation insurance. Service Contractor shall maintain worker's compensation policy limits as required by statute and employer's liability policy limits of at least one million dollars for each occurrence and in the aggregate.

00582.24.4 Service Contractor shall maintain comprehensive automobile liability insurance protecting Service Contractor, and Indemnified Parties as additional insureds, against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, whether owned, non-owned, or hired. Service Contractor shall maintain policy limits of at least one million dollars combined single limit.

00582.24.5 Service Contractor shall maintain umbrella liability insurance that follows the form of the commercial general liability insurance, the employer's liability insurance and the automobile liability insurance. The umbrella liability insurance must protect Service Contractor, and Indemnified Parties as

additional insureds, against claims in excess of the limits of the commercial general liability insurance, the employer's liability insurance, and the automobile liability insurance. Service Contractor shall maintain policy limits of at least four million dollars for each occurrence and in the aggregate.

00582.24.6 Service Contractor acknowledges that maintenance of insurance as required under this Service Contract does not release or discharge Service Contractor of any obligations assumed by Service Contractor under this Service Contract. If Service Contractor does not provide insurance meeting the requirements of this Service Contract or does not provide insurance certificates as required by Article 00582.24.1, Purchaser may purchase such coverage and charge the expense to Service Contractor. However, Purchaser's failure to exercise this right does not relieve Service Contractor of the obligations imposed by this Article 00582.24. Service Contractor shall pay any deductibles applicable to insurance policies purchased by Purchaser under this Article 00582.24.6.

00582.24.7 Service Contractor is responsible for maintaining any and all property insurance on their own equipment and shall require all Subcontractors to do likewise.

00582.25 Audit

Purchaser reserves the right to audit the records of Service Contractor. Accordingly, Service Contractor shall make and keep as the same accrue, full and complete records and books of accounts of revenue and income, and costs and expenses that specifically relate to performance under this Service Contract. Records and books of account, together with any or all memoranda pertaining thereto that may be kept, maintained, or possessed by Service Contractor, shall be opened to examination during regular business hours by Purchaser or its representatives for the purposes of inspecting, auditing, verifying, or copying the same or making extracts therefrom. Service Contractor shall make and keep said records and books of account for a period of seven (7) years after the completion of the contract obligations of the final payment under the Service Contract, whichever is later.

00582.26 Governing Law and Disputes

00582.26.1 Except as detailed in Article 00582.26.2, claims and disputes arising out of or relating to this Service Contract will be governed by the law of the State of Missouri, USA, excluding provisions that would apply the law of another jurisdiction. The Parties hereby elect to exclude application of the United Nations Convention on Contracts for the International Sale of Goods pursuant to Article 6 of the Convention.

00582.26.2 Service Contractor agrees to be bound by all decisions arising out of or relating to the claims and dispute resolution process set forth in the Prime Agreement to the extent: (a) the decisions relate to the Work; (b) a claim by Owner against Purchaser involves the performance of Service Contractor or the Work; or (c) a Claim of Service Contractor gives rise to a claim by Purchaser against Owner. The initiation of claim and dispute resolution under the Prime Agreement will stay claim and dispute resolution under this Service Contract on any Claim related to the claim under the Prime Agreement.

00582.26.3 To the extent, Service Contractor will be bound as set forth in Article 00582.26.2, Purchaser consents to Service Contractor's participation in such claim and dispute resolution process. Service Contractor and Purchaser will each bear their own costs associated with their participation in the Prime Agreement claim and dispute resolution process. A Party will follow the other Party's directions regarding that other Party's Claims, unless such directions adversely affect the Party's own Claims.

00582.26.4 Disputes between Service Contractor and Purchaser not addressed in Articles 00582.26.2 and 00582.26.3, will be resolved exclusively by the Tenth Judicial District Court of Kansas, located in Johnson County, Kansas, or the United States District Court for the District of Kansas, located in Kansas City, Kansas, as their jurisdiction permits. To the extent Purchaser or Service Contractor prevails against the other Party on such dispute, reasonable dispute resolution costs including attorney fees shall be recoverable from the losing Party.

00582.26.5 Pending resolution of any claim or dispute, and without prejudice to Service Contractor's rights, Service Contractor shall continue to perform as directed by Purchaser.

00582.27 Hazardous Conditions

00582.27.1 Service Contractor is not responsible for any Hazardous Conditions encountered in the performance of the Work at the Jobsite. Upon encountering any Hazardous Conditions, Service Contractor will stop services immediately in the affected area and duly notify Purchaser. For purposes of this Service Contract, Hazardous Conditions is defined as any materials, wastes, substances and chemicals deemed to be hazardous under any Applicable Law or the handling, storage, remediation, or disposal of which are regulated by Applicable Laws and applies to any hazardous or toxic substance, material, or condition present at the locations in which the Work is performed which was not brought onto such site or sites by Service Contractor for the exclusive benefit of Service Contractor.

00582.27.2 Service Contractor shall be obligated to resume the Work at the affected areas only after Owner's expert provides it with written certification that (i) the Hazardous Conditions have been removed or rendered harmless and (ii) all necessary approvals have been obtained from all Governmental Authority having jurisdiction over the location.

00582.27.3 Service Contractor will be entitled, to an adjustment in its compensation and all times for performance of the Work to the extent Service Contractor's cost or time of performance have been adversely impacted by the presence of Hazardous Conditions, subject to submission of appropriate documentation by Service Contractor and Service Contractor's duty to mitigate.

00582.28 Force Majeure

00582.28.1 If Service Contractor is delayed in the performance of the Work due to acts, omissions, conditions, events, or circumstances beyond its control, the times for performance shall be reasonably extended by on a not less than day for day basis. By way of example and not of limitation, events that will entitle Service Contractor to an extension of the times for performance include without limitation acts or omissions of Owner or Purchaser, or anyone under Owner's control (including separate contractors), Hazardous Conditions, wars, terrorism, civil unrest, actions and inactions of delay of Governmental Authorities, floods, labor disputes and unrest, unusual delay in transportation, epidemics, earthquakes, tsunami, adverse weather conditions, and acts of God.

00582.28.2 In addition to Service Contractor's right to a time extension for those events set forth above, Service Contractor shall also be entitled to an appropriate increase in the compensation due to the impacts or delays arising from such events. Service Contractor will file all claims in accordance with Article 00582.17.

00585 - Safety, Health and Accident Prevention

00585.1 Project Safety and Health Program

Purchaser will implement and coordinate the overall Project Safety and Health Program as defined in the Loss Control Manual, which is available for inspection at <http://www.sarp10.com/facts/>.

00585.2 Safety, Health, and Accident Prevention Program

00585.2.1 Service Contractor shall implement and maintain a written Safety, Health and Accident Prevention Program specifically applicable to the Work. Service Contractor's Safety, Health and Accident Prevention Program must meet the requirements of Applicable Laws and adhere to the Project Safety and Health Program, if implemented by Purchaser. Service Contractor shall submit Service Contractor's Safety, Health and Accident Prevention Program for Purchaser's review at least thirty calendar days before starting Work at the jobsite. Purchaser's review does not relieve Service Contractor of Service Contractor's sole responsibility for safety and health in relation to the Work, nor does Purchaser's review limit Service Contractor's obligation to undertake any action necessary to establish and maintain safe working conditions relating to the Work at the jobsite. Service Contractor must include training, Master Job Hazard Analysis (JHA) and daily JSAs.

00585.2.2 Purchaser may monitor Service Contractor's safety and health performance and may require changes to Service Contractor's Safety, Health and Accident Prevention Program during the performance of the Work. Purchaser's monitoring and requirement of changes does not relieve Service Contractor of Service Contractor's sole responsibility for safety and health in relation to the Work, nor does Purchaser's monitoring and requirement of changes limit Service Contractor's obligation to undertake any action necessary to establish and maintain safe working conditions relating to the Work at the jobsite. Purchaser must approve sub-tier subcontractors prior to mobilization to the jobsite.

00585.3 Hazardous Waste Project Health and Safety Plan

Service Contractor understands that the Work may involve hazardous substances or hazardous wastes. Service Contractor shall comply with all Applicable Laws, Owner's facility rules and regulations, and applicable guidance documents. Service Contractor shall prepare and implement a jobsite-specific Hazardous Waste Project Health and Safety Plan, based on Service Contractors Safety, Health and Accident Prevention Program and all written programs required by Applicable Laws. Service Contractor is responsible for the completeness and accuracy of Service Contractor's Hazardous Waste Project Health and Safety Plan. Service Contractor shall submit Service Contractor's Hazardous Waste Project Health and Safety Plan to Purchaser at least thirty calendar days before starting Work at the jobsite and shall maintain a copy at the jobsite for review by Purchaser, Owner, and regulatory personnel.

00585.4 Protective Clothing, Equipment and Instrumentation

Service Contractor agrees to furnish special protective clothing, respiratory protective equipment, and monitoring instrumentation as required by Applicable Laws, the project's safety-related plans and programs, and Purchaser's and Owner's rules and regulations. Service Contractor shall ensure that personnel performing Work at the jobsite properly use the clothing, equipment, and instrumentation. Service Contractor shall furnish and maintain all safety equipment, including but not limited to, barriers, signs, warning lights, and guards necessary for adequate protection of persons and property.

00585.5 Safety and Health Representative

The Service Contractor shall identify a qualified person to be its representative for Environmental, Safety, Health & Security matters and make this person available as needed and requested by the Purchaser. The representative must have authority to correct unsafe conditions and to stop Work in the area of an unsafe condition. In addition, the representative shall routinely visit the jobsite.

00585.6 Safety and Health Goal

Service Contractor shall endeavor to attain the project's safety goal of zero injuries. Service Contractor shall maintain accurate accident and injury reports and shall furnish Purchaser a monthly summary of injuries and man-hours lost due to injuries by the third of each month. Service Contractor accident rates must be calculated monthly in accordance with the Bureau of Labor Statistics incident rate, frequency rate, and days away from work rate methods. If Service Contractor or Subcontractor accident rates exceed the project's safety goal, Service Contractor shall take immediate corrective action, which may include, but is not limited to:

- (a) Submittal of a written corrective action plan to Purchaser by Service Contractor;
- (b) Additions or modifications to Service Contractor's Safety, Health and Accident Prevention Program;
- (c) Removal from the jobsite of any Service Contractor or Subcontractor personnel not implementing or following the necessary safety and health measures; and
- (d) Increasing the amount of Service Contractor safety and health training.

00585.7 Drug Prevention Program

As part of the Work, Service Contractor shall assist Purchaser in administering the project requirements for a drug detection and prevention program. Service Contractor agrees that all costs for drug testing and alcohol testing are included in the Service Contractor's price. Service Contractor must provide evidence to Purchaser that all personnel assigned to the Work at the jobsite have passed the drug test within three calendar days of completion of the test. The drug detection and prevention program will include, but will not be limited to, the following: (a) a pre-jobsite assignment test; and (b) additional assignment tests, such as reasonable suspicion tests, post-accident tests, and unannounced random drug tests of ten percent of the workforce on a monthly basis. The drug test must be completed and passed no more than 10 days prior to arriving on the jobsite.

00585.8 Fall Protection

The OSHA Fall Protection Standard 29 CFR 1926 Subpart M shall be strictly adhered to by the Service Contractor. Fall protection is required for all of Service Contractor's Work operations one hundred percent of the time, whether climbing, traveling, or working. NO WORK OPERATION is exempt from the six (6) foot fall protection requirement.

Prior to starting work operations requiring fall protection, Service Contractor shall submit to Purchaser a fall protection plan. The fall protection plan shall include, but not be limited to, the following:

- Name of qualified person in charge of operation.
- Description of work operation.
- List of fall exposures.
- Description of fall protection methods used to eliminate fall exposures.
- Training and enforcement methods used to ensure employee compliance with the plan.

Fall protection body harnesses, lanyards, and lifelines shall be used in accordance with OSHA Standard 1926 Subpart 502D, with the following exceptions:

- Full body harnesses shall be used in lieu of safety belts.
- Only lanyards with shock absorbers and locking type snap hooks shall be used.
- At least two lanyards shall be used to provide one hundred percent fall protection when moving around obstructions, connection points, or other similar items.

Fall protection guardrail systems shall comply with OSHA Standard 1926 Subpart 502(b) except manila, plastic, or synthetic rope shall not be used as guardrails.



00585.9 Confined Spaces

All employees entering confined spaces and all attendants for such entries including supervisors shall receive confined space entry training and emergency rescue training at a minimum of once per year.

00585.10 Third Party Medical Triage

Service Contractor shall retain the services of a third-party medical triage company that meets the following criteria:

- Must employ medical doctors that understand occupational medicine and the rules set forth by OSHA for first aid treatment of work-related injuries and illnesses
- Ability to provide virtual real-time consultation with medical doctors for injury triage, with injured worker
- Available 24 hours a day, 7 days per week, and 365 days per year

Service Contractor shall require retention of identical services for each subcontractor, with the further requirement that each lower tier subcontractor shall include identical requirements in any lower tier subcontracts, which might in turn be made.

00681 - Service Contract Attachments

00681.1a Partial Waiver and Release

AFFIDAVIT AND PARTIAL WAIVER OF CLAIMS AND LIENS AND RELEASE OF RIGHTS FOR SERVICE CONTRACTORS

The undersigned, who is the _____ (designate title) of _____ which is the Service Contractor (designate whether subcontractor, supplier or otherwise) for the _____ (designate the type of work, supplies or services rendered) on the improvements constructed on the premises hereafter identified, declares that his or her contract with **Black & Veatch Corporation (General Contractor)** is in the total amount of \$_____, which includes extras and all change orders to the date hereof.

The undersigned further states that as of _____ (date) the total value of work completed, and material stored is \$_____. Of this amount \$_____ has been received (the receipt and sufficiency of which is hereby acknowledged by the undersigned including \$_____ in payment of Payment Application or Invoice Number _____).

In consideration of the amounts and sums received, the undersigned does hereby waive and release to the **City of Memphis (Owner)** and to **Black & Veatch Corporation (General Contractor)** any and all claims and liens and rights to liens upon the premises described below and upon improvements now thereon, and upon the monies or other considerations (due as of the date of the aforesaid payment application or invoices from the **City of Memphis (Owner)** or **Black & Veatch Corporation (General Contractor)** or from any other person, firm or corporation), said claims and liens and rights to liens being on account of labor, services, materials, fixtures or apparatus heretofore furnished by or at the request of the undersigned. The premises as to which said claims and liens and rights to liens are hereby released are identified as follows:

Project Name: Phase 8 SSES Project

Address of Project:

City: Memphis **County:** Shelby **State:** TN **Zip Code:** _____

The undersigned further represents and warrants that he or she is duly authorized and empowered to sign and execute this waiver on his or her own behalf and on behalf of the company or business for which he or she is signing; that he or she has properly performed all work and furnished all the materials of the specified quality per plans and specifications and in a good and workmanlike manner through the date of said payment application or invoice; that he or she has paid for all the labor, materials, equipment, and services that he or she has used or supplied to the above premises through the date of said payment application or invoice; that he or she has no other outstanding and unpaid payment applications, invoices, retentions, holdbacks, chargebacks or unbilled work or materials against **Black & Veatch Corporation (General Contractor)** as of the date of the aforementioned payment application; and that any materials which have been supplied or incorporated into the above premises were either taken from his or her fully-paid or open stock or were fully paid for and supplied as stated on the payment application or invoice.

The undersigned further agrees to reimburse and does hold harmless and fully indemnify the **City of Memphis (Owner)** and **Black & Veatch Corporation (General Contractor)** for any losses or expenses should any such claims, lien or right to a lien be asserted (by the undersigned or by any laborer, materialman or subcontractor of the undersigned), including, without implied limitation, attorneys' fees incurred in the defense thereof.



The undersigned further accepts and acknowledges the receipt of the aforesaid sums in full accord and satisfaction for the aforementioned claims with full knowledge that the contractors, **City of Memphis (Owner)** and **Black & Veatch Corporation (General Contractor)**, their successors and assigns, are relying thereon; and furthermore, the undersigned agrees to perform, now and in the future, each and every covenant and provision of this written contract or supplier's agreement (as the case may be) as modified or changed in writing with **Black & Veatch Corporation (General Contractor)** or any subcontractor of **Black & Veatch Corporation (General Contractor)** hereby acknowledging that said contract or supplier's agreement is now in full force and effect.

In addition, for and in consideration of the amounts and sums received, the undersigned hereby waives, releases and relinquishes any and all claims, rights or causes of action whatsoever arising out of or in the course of the work performed on the above-mentioned project, contract or event transpiring prior to the date hereof, excepting the right to receive payment for work performed and properly completed and retainage, if any, after the date of the above-mentioned payment application or invoices.

Signed and delivered the _____ day of _____, 20____.

Company _____

By: _____
(Printed Name)

(Signature)

Title: _____

Before me, the undersigned Notary Public in and for the said County and State, personally appeared _____, and acknowledged execution of the foregoing affidavit as his or her voluntary act and deed and further stated that the facts recited are true of his or her personal knowledge.

My Commission Expires: _____

Notary Public

Residence County/State: _____

00681.1b Final Waiver and Release

**AFFIDAVIT AND FINAL WAIVER OF CLAIMS AND LIENS
AND RELEASE OF RIGHTS FOR SERVICE CONTRACTORS**

The undersigned, who is the _____ (designate title) of _____ which is the Service Contractor (designate whether subcontractor, supplier or otherwise) for the _____ (designate the type of work, supplies or services rendered) on the improvements constructed on the premises hereafter identified, declares that his or her contract with **Black & Veatch Corporation (General Contractor)** is in the total amount of \$_____, which includes extras and all change orders to the date hereof.

The undersigned further states that as of _____ (date) all work on said project has been performed and completed in accordance with the plans and specifications for the project and said work has been accomplished in accordance with the terms and conditions of his or her subcontract and those documents which, by reference, are a part of said subcontract. The total value of work completed, and material stored is \$_____. Of this amount \$_____ has been received (the receipt and sufficiency of which is hereby acknowledged by the undersigned including \$_____ in payment of Payment Application or Invoice Number _____).

In consideration of the amounts and sums received, the undersigned does hereby waive and release to the **City of Memphis (Owner)** and to **Black & Veatch Corporation (General Contractor)** any and all claims and liens and rights to liens upon the premises described below and upon improvements now thereon, and upon the monies or other considerations (due as of the date of the aforesaid payment application or invoices from the **City of Memphis (Owner)** or **Black & Veatch Corporation (General Contractor)** or from any other person, firm or corporation), said claims and liens and rights to liens being on account of labor, services, materials, fixtures or apparatus heretofore furnished by or at the request of the undersigned. The premises as to which said claims and liens and rights to liens are hereby released are identified as follows:

Project Name: Phase 8 SSES Project

Address of Project:

City: Memphis **County:** Shelby **State:** TN **Zip Code:** _____

The undersigned further represents and warrants that he or she is duly authorized and empowered to sign and execute this waiver on his or her own behalf and on behalf of the company or business for which he or she is signing; that he or she has properly performed all work and furnished all the materials of the specified quality per plans and specifications and in a good and workmanlike manner as required by the contract; that he or she has paid for all the labor, materials, equipment, and services that he or she has used or supplied to the above premises as required by the contract; that he or she has no other outstanding and unpaid payment applications, invoices, retentions, holdbacks, chargebacks or unbilled work or materials against **Black & Veatch Corporation (General Contractor)**; and that any materials which have been supplied or incorporated into the above premises were either taken from his or her fully-paid or open stock or were fully paid for and supplied as stated on the payment application or invoice.

The undersigned further agrees to reimburse and does hold harmless and fully indemnify the **City of Memphis (Owner)** and **Black & Veatch Corporation (General Contractor)** for any losses or expenses should any such claims, lien or right to a lien be asserted (by the undersigned or by any laborer, materialman or subcontractor of the undersigned), including, without implied limitation, attorneys' fees incurred in the defense thereof.



The undersigned further accepts and acknowledges the receipt of the aforesaid sums in full accord and satisfaction for the aforementioned claims with full knowledge that the contractors, **City of Memphis (Owner)** and **Black & Veatch Corporation (General Contractor)**, their successors and assigns, are relying thereon; and furthermore, the undersigned agrees to perform, now and in the future, each and every covenant and provision of this written contract or supplier's agreement (as the case may be) as modified or changed in writing with **Black & Veatch Corporation (General Contractor)** or any subcontractor of **Black & Veatch Corporation (General Contractor)** hereby acknowledging that said contract or supplier's agreement is now in full force and effect.

In addition, for and in consideration of the amounts and sums received, the undersigned hereby waives, releases and relinquishes any and all claims, rights or causes of action whatsoever arising out of or in the course of the work performed on the above-mentioned project, contract or event transpiring prior to the date hereof, except retainage, if any, after the date of the above-mentioned payment application or invoices.

Signed and delivered the _____ day of _____, 20____.

Company _____

By: _____
(Printed Name)

(Signature)

Title: _____

Before me, the undersigned Notary Public in and for the said County and State, personally appeared _____, and acknowledged execution of the foregoing affidavit as his or her voluntary act and deed and further stated that the facts recited are true of his or her personal knowledge.

My Commission Expires: _____

Notary Public

Residence County/State: _____



00681.2 SARP10 Safety Guidelines

Black & Veatch Memphis SARP10 Safety Guidelines

Anyone working for the SARP10 Program must comply with these basic safety requirements, except where their individual employer's safety requirements are more stringent. It is the employer's responsibility to ensure that their employees are informed of the Project safety policies and that they work in compliance with the Program safety policies.

Black & Veatch is committed to the safety and health of all employees, subcontractors, vendors and visitors. In our effort to minimize hazards and provide the safest worksite possible, we expect all workers on the Program to know and practice the following safe work rules as a minimum. The following rules are not all inclusive.

Noncompliance with the Rules We Live By will result in removal from the Program.

Rules We Live By

- **Confined Spaces** - Comply with all requirements of Confined Space Entry permits and DO NOT enter a confined space without a permit.
- **Fall Protection** - Comply with the Fall Protection procedures when working above the applicable working height. Always use 100 percent of the fall protection techniques when tying off. Note: An open manhole is a fall exposure and must be protected.
- **Lock Out Tag Out (LOTO)** - Follow all Lock Out/Tag Out procedures at all times.
- **Trench and Excavation** - Do not start any excavation activities without a Trench & Excavation permit and comply with all requirements. Excavations must be properly sloped, shored or shielded before entering, and proper access/egress must be in place.
- **Drugs and Alcohol** - Drugs and alcohol have NO place in the work environment. Do NOT come to work if you are under the influence of illegal drugs or alcohol.
- **You** - Make a difference today. Don't walk by any unsafe situation and be a Safety Leader.

PPE Requirements

- Safety glasses with side shields, ANSI Z87.1 approved are mandatory on the worksite.
- Hard hats, ANSI Z89.1 approved, with no modifications or deformities are mandatory on the worksite.
- Good quality, over the ankle, work boots with safety toes (steel toe) are required. Sneakers of any kind are prohibited.
- High visibility work vests with reflective markings shall be worn in all construction areas. Must be ANSI Class II specification as and be fluorescent (orange or lime green)
- You are the person most responsible for your safety. Observe and obey all signs and barricades.

General Safety and Health Requirements

- 100% fall protection is required when working on unprotected surfaces at or above 6 feet. Full body harnesses and shock absorbing lanyards with double locking hooks are the only acceptable method of personnel fall protection.
- DO NOT use the top two steps of a step ladder or the top three steps of a straight ladder. Use the 3-point rule (both feet / one hand or two hands / one foot) when using ladders.
- When on site, be aware of moving vehicles and equipment. Before traveling in front of or behind pieces of equipment make eye contact with the operator and wait for an indication to proceed. Spotters are required at all times.
- DO NOT cross a red barricade without permission from the owner of that barricade.
- Immediately correct safety hazards if within your authority. If you cannot make the correction report it to your supervisor. Unresolved hazards or conditions not corrected by the previous methods must be brought to the attention of the Site Project Manager.
- Immediately report injuries, fires, spills, near misses, accidents or unsafe conditions or practices to the Safety Department.
- Pay attention to barricades, signs and announcements.



00681.3 Loss Control Manual

The Loss Control Manual is available for viewing on the SARP10 website:

<http://www.sarp10.com/facts/>

Contact J. Borrero, Safety Manager for additional information:

BorreroJ@bv.com

(913) 458-3928

00681.4 Certificate of Nondiscrimination

As Bidder, Service Contractor, or Subcontractor on Purchaser's Contract, **Phase 8 SSES Project**

The undersigned states that it does not discriminate against any subcontractor, employee, or applicant for employment on the grounds of race, color, national origin or sex and, if awarded a contract for this project, agrees in performance of work:

1. Not to discriminate against any subcontractor, employee, or applicant for employment on the grounds of race, color, national original or sex.
2. To maintain payrolls of laborers and mechanics employed on this contract until seven (7) years after final release and final payment by the City.
3. To require a similar certificate to be executed by each subcontractor at the time a subcontract is executed under the contract with the requirement that such subcontractor agrees to require a similar certificate of requirement on any lower tiers of subcontracts.
4. To conform to federal law, state statutes, executive orders, and local ordinances identified and listed under Non-discrimination.

Service Contractor's Name

Date

Signature

Printed or Typed Name and Title

THIS FORM MUST BE SUBMITTED WITH THE PROPOSAL OR
THE PROPOSAL MAY BE CONSIDERED NON-CONFORMING.

00681.5 Equal Business Opportunity Program Compliance Form (1 page)

This form must be submitted with Bidder's proposal. Failure to execute and submit this document with Bidder's proposal may cause the proposal to be rejected as non-conforming. In addition, each Subcontractor must execute the form.

This Service Contract will be subject to the requirements of the City of Memphis Ordinance #5384, which establishes the Equal Business Opportunity ("EBO") Program. It is up to the Respondent to ensure that all requirements of this ordinance are met. The Ordinance may be accessed on the City's website at www.memphistn.gov under "Business – Contract Compliance". The intent of the EBO Program is to increase participation of locally owned minority and women owned business enterprises ("M/WBE").

SARP10 DBE Participation Goal:

Combined MBE/WBE minimum **21%**
(Vendors from the City of Memphis EBO list only)

Participation Plan

The Participation Plan must include: (1) level and dollar amount of participation your firm anticipates achieving in the performance of contract resulting from this RFP; (2) the type of work to be performed by the M/WBE participation; and (3) the names of the M/WBE and/or DBE firm(s) the Respondent plans to utilize in the performance of the contract resulting from this RFP.

Eligible M/WBE and/or DBE Firms

To qualify as an M/WBE firm, per the requirements of City of Memphis Ordinance #5384, a firm must be included on the City of Memphis EBO list of certified M/WBE firms.

A list of the City's eligible M/WBE firms may be requested from Purchaser as a guide only. If a Bidder desires to utilize an M/WBE firm not included on the list, it is the Bidder's responsibility to confirm that the desired firm is certified by the City of Memphis. Such confirmation must be obtained from the City's Contract Compliance Office, in writing, before the proposal/response due date. Requests for verification must be submitted to the City's Contract Compliance Office listed below:

Requests for verification must be submitted to the City's Contract Compliance Office listed below:

Joann Massey
City of Memphis, Contract Compliance Office
125 North Main Street, Suite 546
Memphis, TN 38103
Phone: (901) 576-6210
Fax: (901) 576-6560
Email: joann.massey@memphistn.gov

MINORITY/WOMEN BUSINESS ENTERPRISE COMPLIANCE FORM

SERVICE CONTRACT TITLE: Phase 8 SSES Project

Project DBE Goal: Combined MBE/WBE minimum **21%**

The following sections must be completed by Bidder. A certified subcontractor or supplier is defined as a firm from the list of certified firms provided with this specification.

Bidder's Name

Section A - If the Bidder is a certified firm, so indicate here with a check mark.

_____ MBE _____ WBE _____ DBE

Section B - Identify below those certified firms that will be employed as subcontractors or suppliers on this Project. By submitting this Proposal, the Bidder commits to the use of the firms listed below.

- \$ = Show the dollar value of the subcontract to be awarded to this firm
- % = Show the percentage this subcontract is of your base Proposal
- M/WBE = Show by inserting an M or W whether the subcontractor is an MBE or WBE

\$	%	M/WBE	DBE	CERTIFIED SUBCONTRACTOR NAME, ADDRESS, TEL #
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

\$ _____ % _____ = **Total M/WBE and/or DBE**

THIS FORM MUST BE SUBMITTED WITH THE PROPOSAL OR THE PROPOSAL MAY BE CONSIDERED NON-CONFORMING



00681.6 Not Used

00681.7 Report of Disadvantaged Business Enterprise Participation Form (1 page)



PROJECT NUMBER: _____

SUBCONTRACTOR'S REPORT OF DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION

Project Name: _____ Month of _____, 2021

General Contractor: _____

Contact Person: _____ Telephone: _____

Address: _____ Email: _____

Amount of Subcontract: \$ _____ MBE %: _____ WBE %: _____

DBE Information: Circle Either MBE or WBE and Complete Form.

MBE / WBE Firm Name: _____ Contact Person: _____

Date of Award: _____ Contract Value: \$ _____

Completed to Date: \$ _____ Paid to Date: \$ _____

Work Description: _____ Telephone: _____

Amount Invoiced This Period: \$ _____ Email: _____

MBE / WBE Firm Name: _____ Contact Person: _____

Date of Award: _____ Contract Value: \$ _____

Completed to Date: \$ _____ Paid to Date: \$ _____

Work Description: _____ Telephone: _____

Amount Invoiced This Period: \$ _____ Email: _____

MBE / WBE Firm Name: _____ Contact Person: _____

Date of Award: _____ Contract Value: \$ _____

Completed to Date: \$ _____ Paid to Date: \$ _____

Work Description: _____ Telephone: _____

Amount Invoiced This Period: \$ _____ Email: _____

MBE / WBE Firm Name: _____ Contact Person: _____

Date of Award: _____ Contract Value: \$ _____

Completed to Date: \$ _____ Paid to Date: \$ _____

Work Description: _____ Telephone: _____

Amount Invoiced This Period: \$ _____ Email: _____

Attach additional pages as required.

General Contractor's Signature: _____ Date: _____

00681.8 Schedule Impact Due to Weather

Program Manager will determine Contractor’s entitlement to an extension of the Contract Time as a result of weather delays, based on the data included in Tables 1 and 2. Extensions of time will be granted at the discretion of the Program Manager for circumstances not covered by the flow chart.

The following rules apply to any analysis for weather related delays to this Project. Weather delay days may be awarded if the first two rules are met. Additional days may be awarded if conditions in Rule 3 are met for unusually heavy precipitation independent of Rules 1 and 2.

Rule 1: The average monthly precipitation amount must have been exceeded.

If the total amount of actual precipitation in a month exceeds the average for that month shown in Table 1, the first test has been met. Go to rule number 2. (Precipitation is defined as the quantity of water deposited by rain, hail, sleet, or snow.)

Rule 2: The number of days in a month with actual precipitation greater than the threshold amount shown in Table 2 has been exceeded.

The numbers of days with actual precipitation greater than the threshold amounts shown in Table 2 are eligible for award as weather delays days. Additional days may be awarded for unusually heavy precipitation independent of meeting the rules above.

Rule 3: Unusually heavy precipitation has occurred.

Precipitation greater than one inch in a single day may be justification for an additional day, time extension for each precipitation day. This rule may be applied singly but not in addition with any other rule.

**National Weather Service Data for
Memphis International Airport – Years 2009-2019**

Table 1

Average Precipitation by Month (In Inches)											
Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
3.66	5.26	5.75	6.30	5.84	4.59	4.74	3.75	2.61	3.85	4.55	5.05

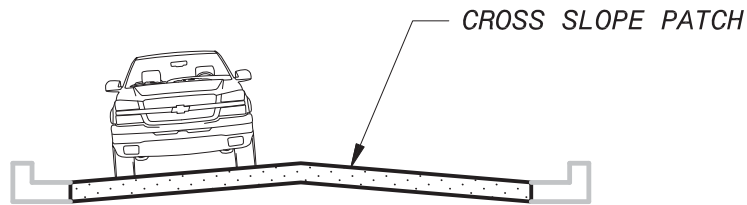
Table 2

Average Number of Days with Precipitation Greater than 0.25 Inches											
Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
4	5	6	6	6	4	4	4	2	4	5	6

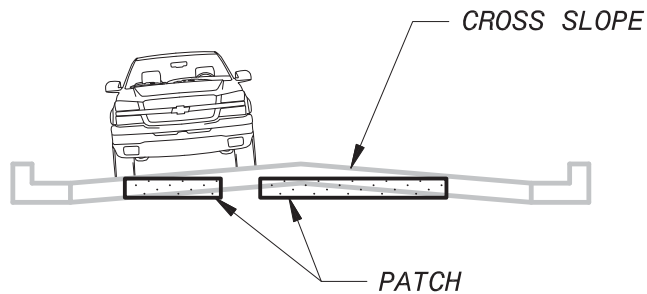
Any weather-related extension of Contract time shall be non-compensable. Efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated weather days is less than expected, shall contribute to the project float and shall not affect the Contract Times. Application for a weather-related extension of time shall be submitted to the Program Manager and shall state the extension requested and be supported by the relevant weather data.

Technical Specifications

PLEASE NOTE: Any maps or drawings in this RFP package have been compressed to reduce the overall PDF file size. Full resolution files will be available for viewing and/or downloading on the SARP10 website.



ACCEPTABLE



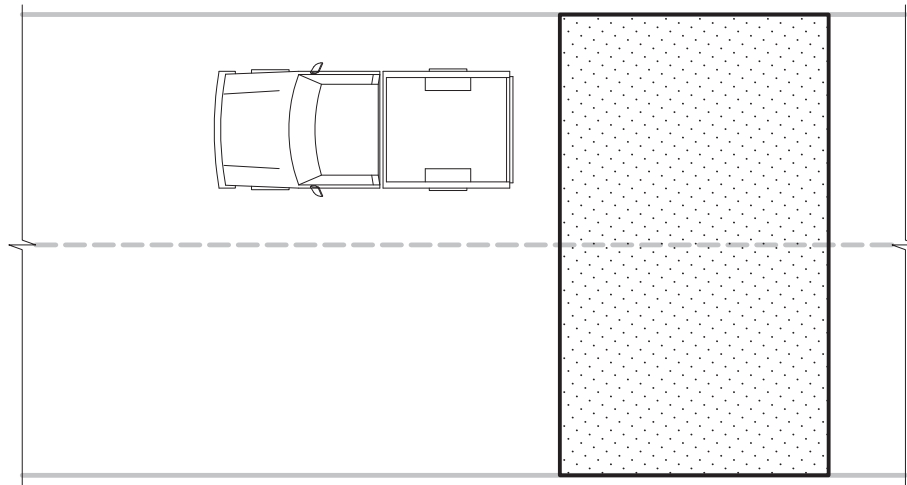
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NOTES

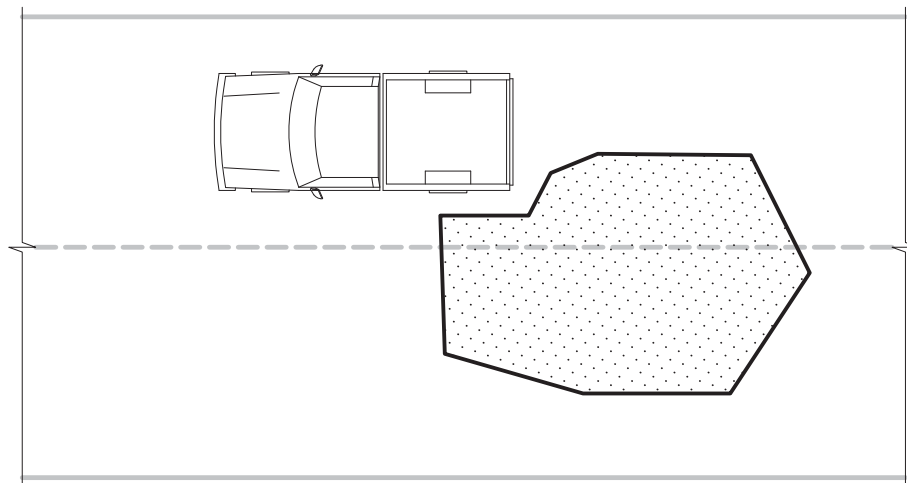
1. EXISTING PAVEMENTS SHALL BE REMOVED TO CLEAN, STRAIGHT LINES PARALLEL AND PERPENDICULAR TO THE FLOW OF TRAFFIC.
2. DO NOT CONSTRUCT PATCHES WITH ANGLED SIDES AND/OR IRREGULAR SHAPES.
3. ALL REPAIRS SHALL BE FULL LANE WIDTH.
4. FOR PATCHES IN ASPHALT, A TACK COAT SHALL BE APPLIED TO ALL EDGES OF THE EXISTING ASPHALT BEFORE PLACING THE NEW PAVEMENT.
5. AFTER PLACING THE NEW ASPHALT, ALL SEAMS (JOINTS) BETWEEN THE NEW AND EXISTING PAVEMENTS SHALL BE SEALED WITH AN ASPHALT TACK COAT OR RUBBERIZED CRACK SEAL MATERIAL.
6. PATCHES SHALL HAVE A SMOOTH LONGITUDINAL GRADE CONSISTENT WITH THE EXISTING ROADWAY.
7. PATCHES SHALL ALSO HAVE A CROSS SLOPE OR CROSS SECTION CONSISTENT WITH THE DESIGN OF THE EXISTING ROADWAY.



SARP10
 PAVEMENT REPAIR
 CROSS SLOPE
 DETAILS



ACCEPTABLE



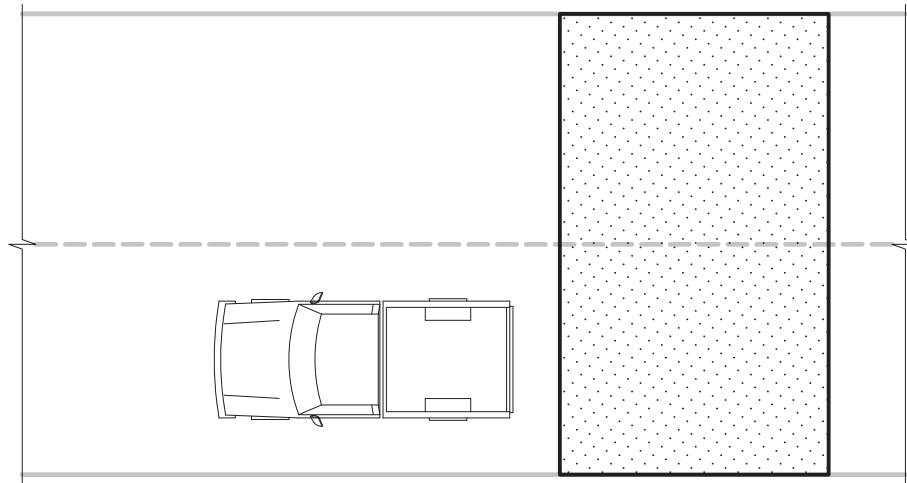
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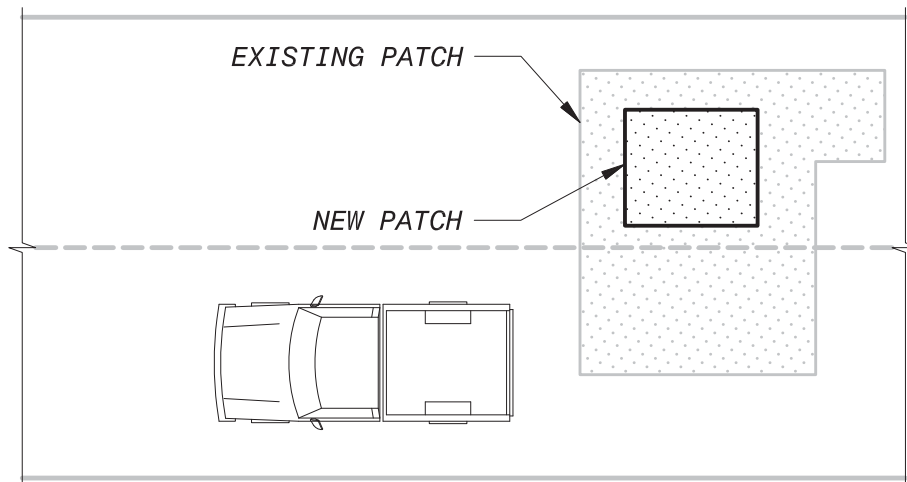
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5. AFTER PLACING THE NEW ASPHALT, ALL SEAMS (JOINTS) BETWEEN THE NEW AND EXISTING PAVEMENTS SHALL BE SEALED WITH AN ASPHALT TACK COAT OR RUBBERIZED CRACK SEAL MATERIAL.



SARP10
 PAVEMENT REPAIR
 MULTI-LANE
 DETAILS



ACCEPTABLE



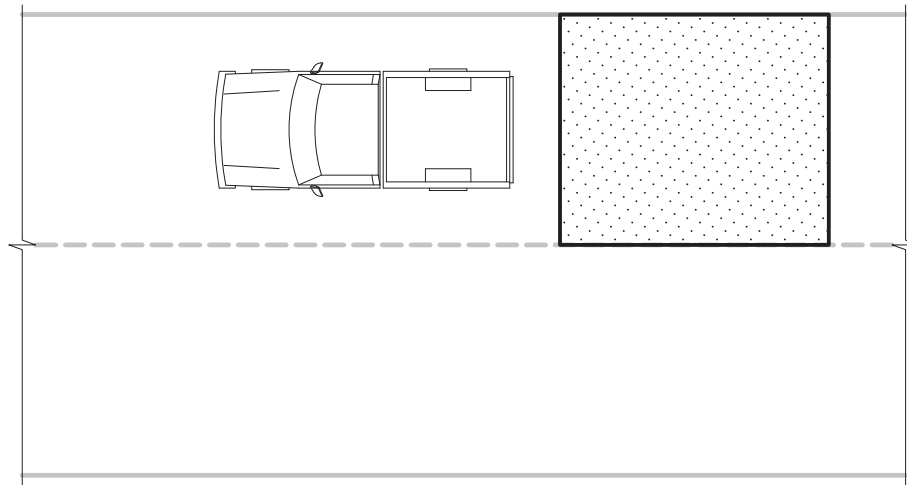
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NOTES

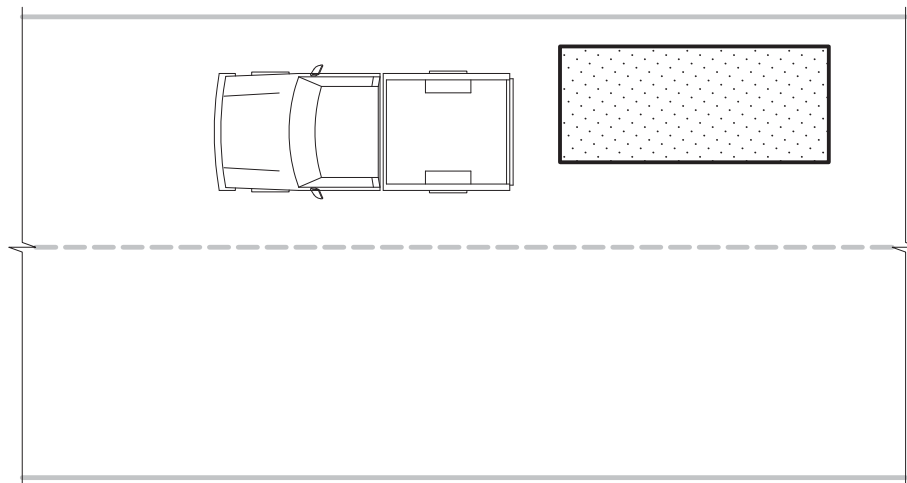
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5. AFTER PLACING THE NEW ASPHALT, ALL SEAMS (JOINTS) BETWEEN THE NEW AND EXISTING PAVEMENTS SHALL BE SEALED WITH AN ASPHALT TACK COAT OR RUBBERIZED CRACK SEAL MATERIAL.
6. AVOID PATCHES WITHIN PATCHES. IF THIS CANNOT BE AVOIDED, MAKE THE BOUNDARIES OF THE PATCHES COINCIDE.



SARP10
 PAVEMENT REPAIR
 PATCH INSIDE A PATCH
 DETAILS



ACCEPTABLE



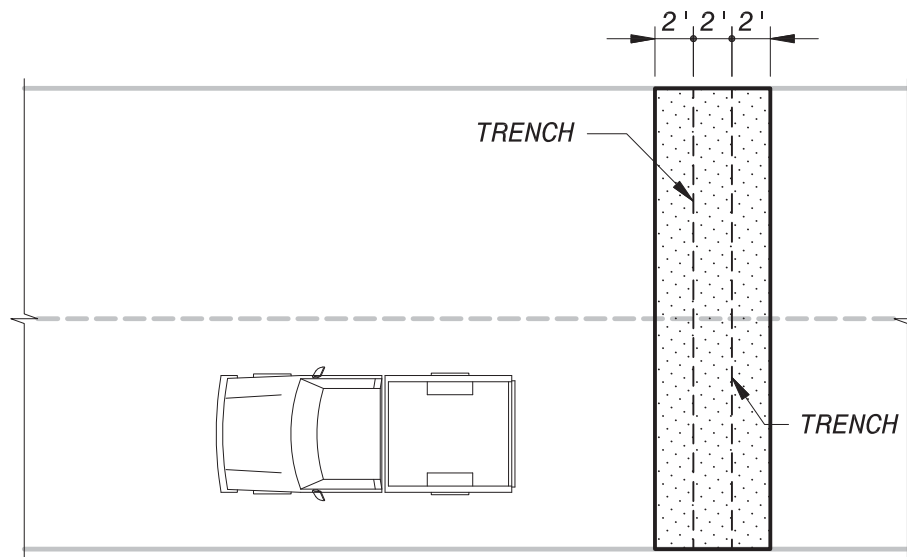
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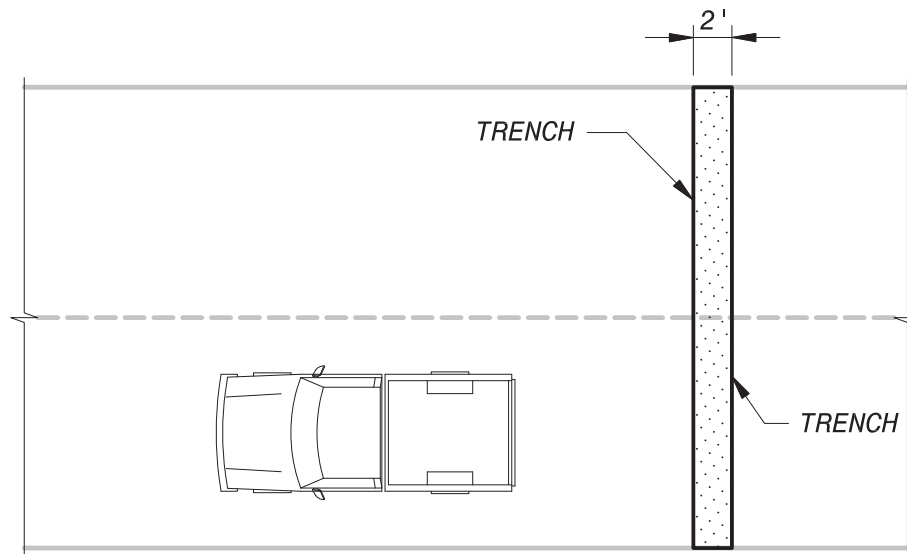
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SARP10
 PAVEMENT REPAIR
 SINGLE LANE
 DETAILS



ACCEPTABLE



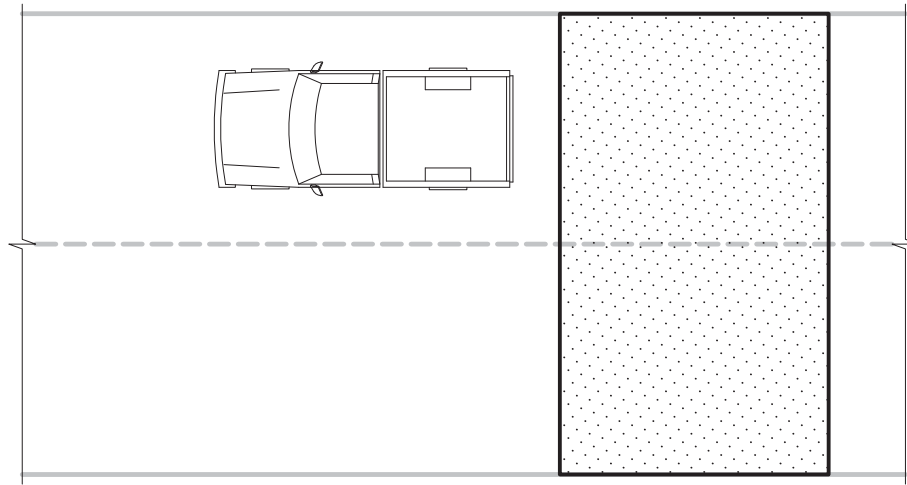
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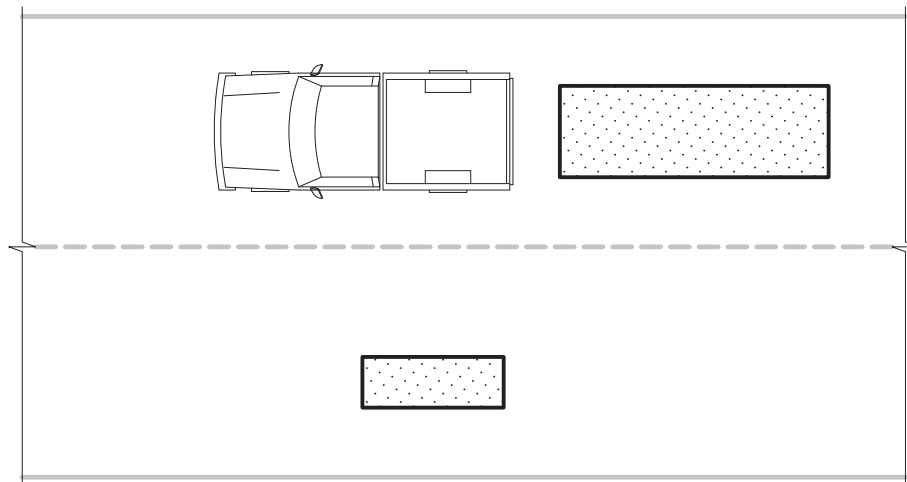
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5. AFTER PLACING THE NEW ASPHALT, ALL SEAMS (JOINTS) BETWEEN THE NEW AND EXISTING PAVEMENTS SHALL BE SEALED WITH AN ASPHALT TACK COAT OR RUBBERIZED CRACK SEAL MATERIAL.
6. TRAVERSE PATCHES SHALL BE OVERLAID ACROSS THE ENTIRE STREET WIDTH FOR A DISTANCE OF TWO (2) FEET MINIMUM ON ALL SIDES OF THE TRENCH.



SARP10
 PAVEMENT REPAIR
 TRAVERSE PATCHES
 DETAILS



ACCEPTABLE



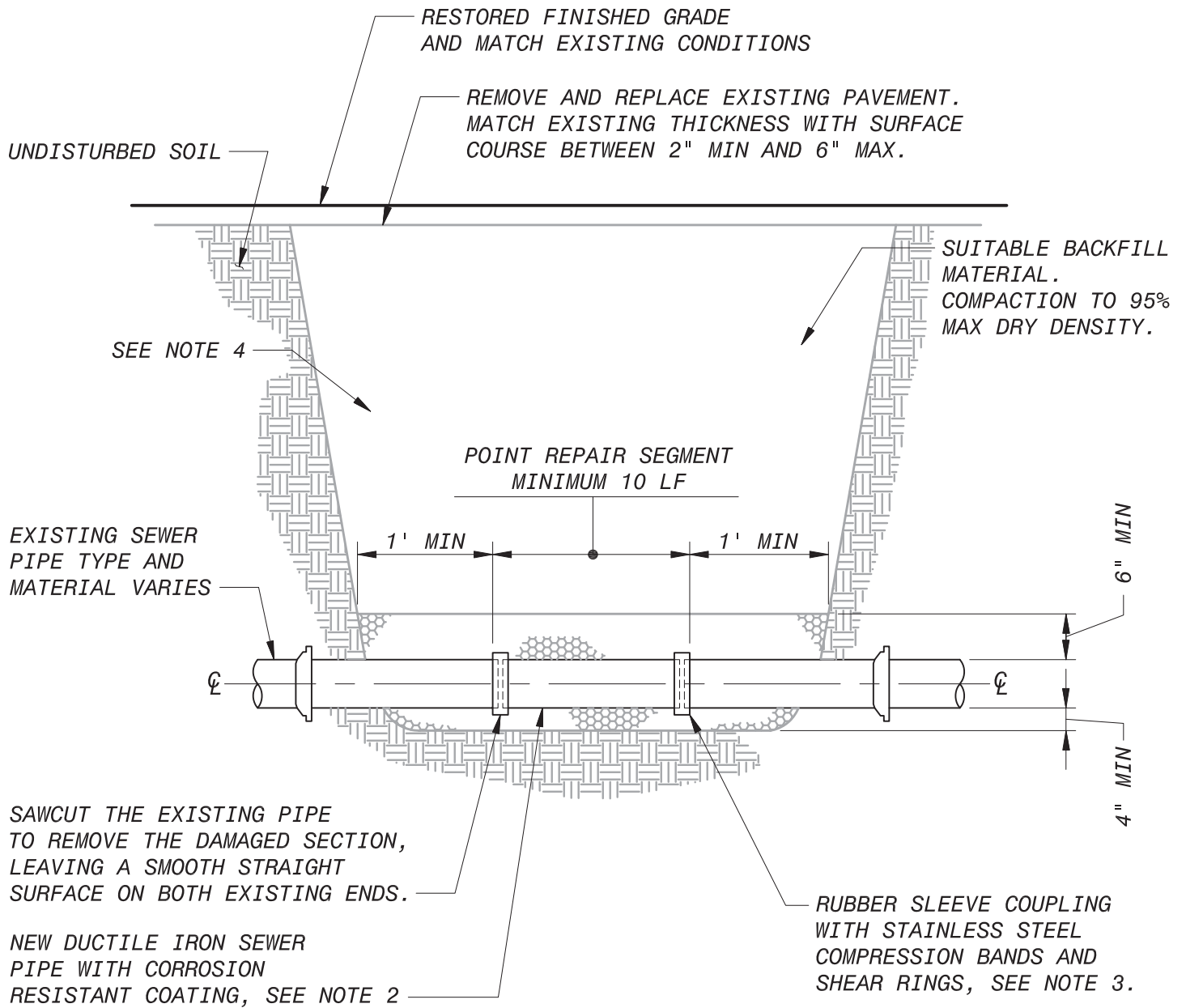
NOT ACCEPTABLE

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6. TRAVERSE PATCHES SHALL BE OVERLAID ACROSS THE ENTIRE STREET WIDTH FOR A DISTANCE OF TWO (2) FEET MINIMUM ON ALL SIDES OF THE TRENCH.
7. DO NOT ALLOW THE EDGES OF PATCHES TO FALL IN EXISTING WHEEL PATHS.
8. THE EDGES OF PATCHES PARALLEL TO THE DIRECTION OF TRAFFIC SHALL BE LIMITED TO THE BOUNDARIES OF LANES OR TO THE CENTERLINE OF TRAVEL LANES.



SARP10
 PAVEMENT REPAIR
 WHEEL PATH
 DETAILS



NOTES

1. CONSULT WITH SARP10 CONSTRUCTION MANAGER BEFORE MAKING REPAIRS REQUIRING MORE THAN 10 LF.
2. INSTALL NEW DUCTILE IRON SEWER PIPE, IN ACCORDANCE WITH CITY OF MEMPHIS STANDARD CONSTRUCTION SPECIFICATION SECTION 02530-SEWER PIPE INSTALLATION.
3. INSTALL FERNCO SERIES 5000RC SHIELDED COUPLINGS WITH NUT AND BOLT CLAMP, MISSION "FLEX-SEAL" ADJUSTABLE SHIELDED REPAIR COUPLINGS, OR APPROVED EQUAL.
4. REMOVE EXCAVATED MATERIAL UNDER PAVED SURFACES AND BACKFILL WITH CRUSHED LIMESTONE OR RECYCLED CRUSHED CONCRETE PER CITY OF MEMPHIS STANDARD SPECIFICATIONS.



SARP10

**SANITARY
SEWER POINT REPAIR**

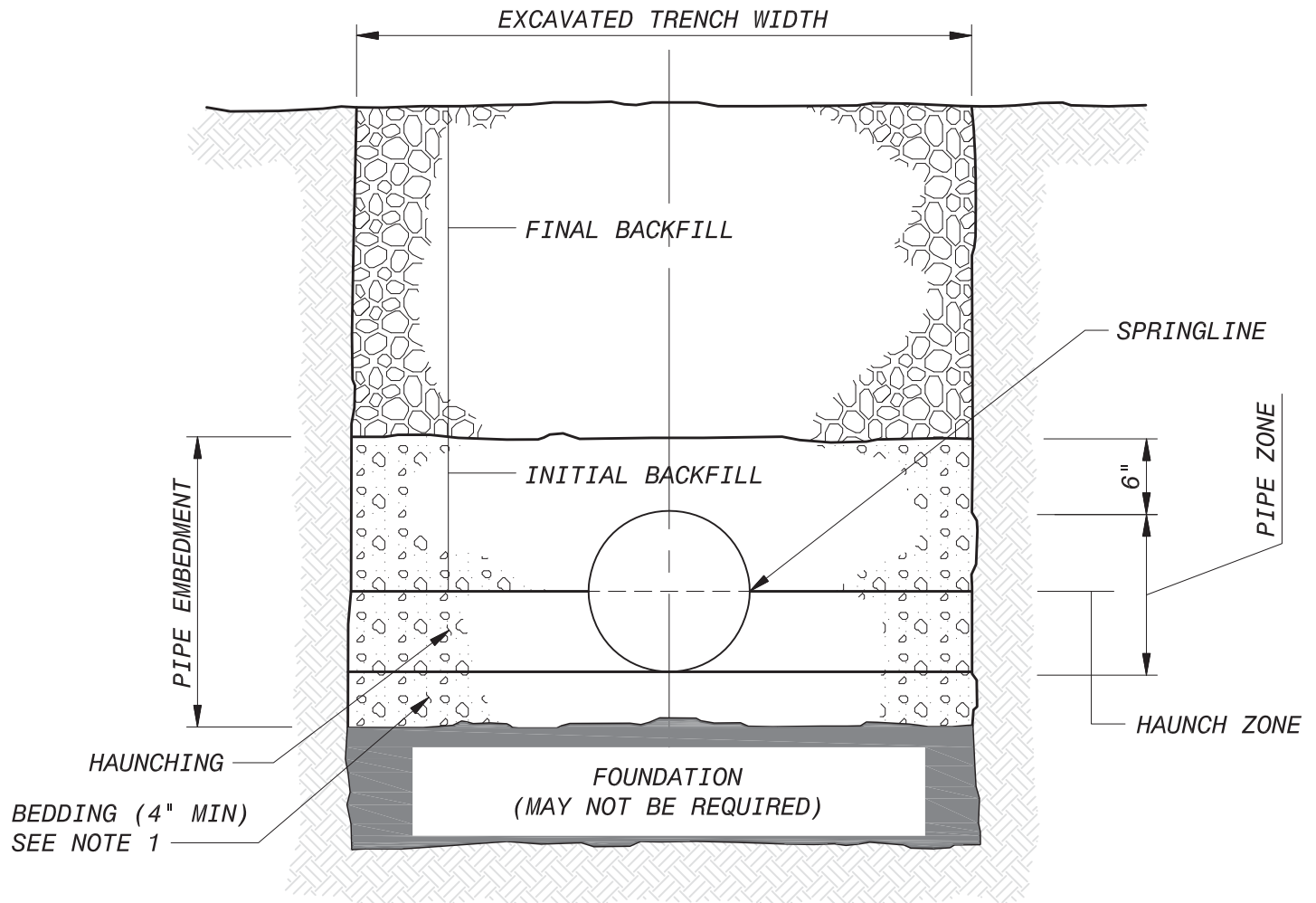


FIGURE 1

TRENCH CROSS SECTION SHOWING TERMINOLOGY

NOTES

1. INSTALL CRUSHED LIMESTONE ASTM D-448-54 TABLE 1, #67 FOR BEDDING AND HAUNCHING MATERIAL. THE QUANTITY OF CRUSHED LIMESTONE FOR BEDDING AND HAUNCHING IS PART OF THE "SEWER POINT REPAIR" LINE ITEM AND NO SEPARATE PAYMENT WILL BE MADE.
2. INSTALL EITHER CRUSHED LIMESTONE OR RECYCLED CRUSHED CONCRETE FOR INITIAL BACKFILL AND FINAL BACKFILL PER CITY OF MEMPHIS SPECIFICATIONS.



SARP10

TRENCH CROSS SECTION
SHOWING TERMINOLOGY

**SECTION 01501
SPECIAL CONDITIONS**

PART 1 GENERAL

1.01 SUBMITTALS

- A. Site Contractor emergency phone numbers.
- B. Schedules of work on a weekly basis that will be delivered no later than 2:00 PM on Thursday for the week following, and daily AM email updates of approximate crew locations each day.
 - 1. Weekly schedule format shall contain the following elements:
 - a. Map format.
 - b. Sufficient streets labeled and identified at a scale to provide clarity.
 - c. Nature and type of crew location by map area.
 - 2. The Contractor shall fax or email its smoke test locations to local Memphis Fire Department station by 7:00 AM on each day of smoke testing. It is the Contractor's responsibility to do its due diligence on communicating with local Memphis Fire Department in the Contractor's daily smoke test work area, as well as establishing the best method of communicating daily smoke test locations with such local Fire Department(s).

1.02 MEETINGS

- A. The Program Team will arrange monthly meetings with the Subcontractor to discuss data management and field issues.

1.03 WASTE DISPOSAL

- A. All debris removed from sanitary sewer lines shall be disposed of in a lawful manner at a landfill. The Subcontractor shall not dispose of debris at a City of Memphis Wastewater Treatment Plant. The Program Manager has a consultant under contract to coordinate with a SSES subcontractor the acquisition of a solid and a liquid sample of sewer cleaning debris removed from the WCTS, including laboratory analysis, and completion of the permit paperwork. The Subcontractor shall coordinate with the consultant to provide a full truckload of debris from which the sample will be pulled. The Subcontractor shall be responsible for providing a location and legal means of storage for the truckload of debris to be stored until the analytical results are processed.

1.04 ACCESS ROADS

- A. For interceptor assessment, the Program Manager will assess and consider constructing access roads in accordance with the dates specified on the maps. Road building will not be covered by this contract.

PART 2 PRODUCTS

2.01 This part not used.

PART 3 EXECUTION

3.01 This part not used.

END OF SECTION 01501

**SECTION 01610
BASIC PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.01 SCOPE

- A. All materials and permanently installed equipment (for example, traffic signalization equipment, sewer pumps, and other such items) furnished by the Subcontractor for the Work shall conform to the requirements of the Plans and Contract Documents, including the applicable City of Memphis Standard Construction Specifications and Design Standards.
- B. Throughout the entire Project, all units of any one item of installed equipment shall be of the same manufacture and model unless otherwise approved by the Purchaser.

PART 2 PRODUCTS

2.01 MATERIALS & EQUIPMENT

A. Equivalent Materials and Equipment

- 1. The General Conditions allows for the substitution of equivalent materials and equipment, with the written approval of the Purchaser.
- 2. Reference to a particular product by manufacturer, trade name, or catalog number establishes the quality standards of materials and equipment required for the Work. It is not intended to exclude products equivalent in quality and similar in design. Whenever any article, material, or equipment is identified by using the name of a manufacturer or vendor, the term “or approved equal” if not inserted shall be implied.
- 3. If the Subcontractor proposes to furnish materials or supplies other than those specified, he shall furnish complete descriptive data, including performance capabilities, specifications, and other data as required in the Contract General Conditions. The provisions of this substitution of materials shall not relieve the Subcontractor of the responsibility of meeting the requirements of the Plans and Contract Documents. All materials must be approved by the Purchaser before any installation will be permitted.

B. List of Major Materials and Equipment

- 1. The Subcontractor shall submit to the Purchaser for approval, with due promptness after award of Contract but in no case later than at the preconstruction conference, a list of major equipment and materials which he proposes to provide. The list shall include in sufficient detail to identify the materials, the name of the manufacturer’s model number of all material that is identified on the Plans or in the Contract Documents, including catalog literature for standard equipment and detailed scale drawings of any nonstandard or special equipment and of any proposed deviation from the Plans. A signed statement shall accompany this list stating that materials and equipment are in exact accordance with Project specifications. No charge shall be made to the Purchaser for any materials or equipment purchased, labor performed, or delay to the Work prior to approval of materials by the Purchaser.

C. Source of Supply

- 1. The source of supply for each material to be supplied by the Subcontractor shall be subject to approval by the Purchaser before delivery is started.

PART 3 EXECUTION

A. Samples and Testing

1. Representative samples of materials included for incorporation in the Work shall be submitted to the Purchaser for his examination and/or testing when so specified or requested.
2. All testing of materials shall be made in accordance with the standard methods of testing of the ASTM, AASHTO, NEMA, ITE, or other applicable standard specifications.

PART 4 MEASUREMENT & PAYMENT

4.01 PROPOSAL QUANTITIES

- A. The quantities appearing in the Proposal Sheet(s) of the Proposal are approximate and are proposed and shown for the comparison of bids and award of a Contract. The Purchaser does not guarantee or assume any responsibility that the quantities indicated on the Plans or in the Proposal will hold true and accurate in the construction of the Project. The Subcontractor shall not plead deception or misunderstanding because of variation from these quantities. Unless otherwise provided in the Contract Documents, payment to the Subcontractor will be made only for the actual quantities of Work performed and accepted, and materials and equipment furnished and placed in accordance with the Contract.

4.02 MEASUREMENT OF QUANTITIES

- A. All Work completed under the Contract will be measured by the Purchaser according to United States standard measure.
- B. The term “ton” will mean the short ton consisting of 2,000 pounds.
- C. The determination of quantities for specific items will be made as set for the in the subsection titled “Measurement” under the applicable Sections of the Standard Construction and Material
- D. Specifications hereof, or of other Specifications provided for the Work.
- E. Longitudinal and transverse measurements for surface area computations will be to the exact dimensions shown in the horizontal plane on the Plans or as ordered in writing by the Purchaser.
- F. Structures will be measured according to the lines and exact dimensions shown on the Plans or as altered to fit field conditions by direction to the Purchaser.
- G. In all cases where measurement of materials is based on certified weights, the Subcontractor shall furnish the Purchaser certified weigh bills showing the net weight of materials received in each shipment. In no instance will the Purchaser pay for materials in excess of the amounts represented by the certified weigh bills.
- H. When certified scale weights are not used for measurement, all materials which are measured or proportioned by weight shall be weighed on accurate, approved scales, by competent, qualified personnel, at locations designated by the Purchaser.
- I. Trucks used to haul material being paid for by weight shall be weighed empty at such times as the Purchaser directs, and each truck shall bear a plainly legible identification mark.

- J. Measurements for payment will be made to the nearest fractional units specified below, unless otherwise specified herein or in the Contract Documents for the project.

<u>Unit of Measurement</u>	<u>Nearest Unit</u>
Linear Foot	0.1 LF
Square Foot	0.1 SF
Square Yard	0.1 SY
Ton	0.1 Ton
Cubic Yard	0.01CY
1,000 SF Unit	0.1 Unit

END OF SECTION 01610

**SECTION 02540
SANITARY SEWER POINT REPAIRS**

PART 1 GENERAL

1.01 SCOPE

- A. This work shall consist of the construction of sanitary sewer gravity main point repairs of the kinds and dimensions shown on the Drawings, stipulated in the Contract Documents, or as directed by the Purchaser. The construction will be accomplished by these Specifications and in conformity with the lines, grades, and details shown on the Drawings or established by the Purchaser. The Subcontractor shall perform all work necessary to complete the Contract with the best modern practice. Without specifications that state the quality of any work, the Subcontractor is required to perform such items using first-quality construction. Unless otherwise provided, the Subcontractor will furnish all material, equipment, tools, labor, and incidentals necessary to complete the Work.

1.02 REFERENCES

- A. City of Memphis Standard Construction Specifications.
- B. American Standard for Testing and Materials (ASTM).
- C. American National Standards Institute (ANSI).

1.03 DEFINITIONS

- A. A point repair as used in these Specifications shall mean repair of pipe segments of existing sanitary sewer mains or service lines and connections which require excavation to accurately locate a defect and make the necessary repair.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pipe Materials

- 1. All repairs to existing gravity sewer lines shall be made using ductile iron pipe. Ductile iron pipe for gravity sewer and service connections will conform to ASTM A 746. The pipe thickness design will conform to ANSI A 21.50. If no thickness class is specified on the Plans or Contract Documents, Class 50 or approved equivalent will be used. All ductile iron pipe will be lined with Protecto 401 Ceramic Epoxy, or approved equal. Linings will be applied according to manufacturer's recommendations. Fittings will conform to the requirements of ANSI A 21.10. Unless otherwise specified, joints will be push on gasket type conforming to the requirements of ANSI A 21.11. Mechanical joints will conform to the requirements of ANSI A 21.11. Flanged joints will conform to the requirements of ANSI A 21.15. Steel retainer rings will conform to ASTM A 148 for Grade 90 60.

B. Elastomeric Couplings

- 1. Elastomeric couplings for connecting replacement pipe to existing pipe shall be Fernco Series 5000 RC Shielded Couplings with nut and bolt clamp, Mission "Flex-Seal" adjustable shielded repair coupling or approved equal.

C. Backfill Under Pavement

1. Backfill beneath all paved areas shall be either crushed limestone or recycled crushed concrete.
2. Crushed limestone will be size No. 67 Coarse Aggregate meeting the requirements of the Tennessee DOT Standard Specifications for Road and Bridge Construction and the following gradation:

Total Percent by Dry Weight
 Passing Each Sieve (U.S. Standard)

Size No.	1"	3/4"	3/8"	No. 4	No. 8
67	100	90-100	20-55	0-10	0-5

2.02 EQUIPMENT

- A. The Subcontractor will furnish and maintain in good condition all equipment and facilities as required for the proper execution and inspection of the Work. All equipment and facilities will be on site and approved by the Purchaser before work will be permitted to begin.

PART 3 EXECUTION

3.01 SITE PREPARATION AND RESTORATION

A. Rights-of-Way and Easements

1. The Subcontractor will confine his construction activities to the existing rights-of-way or sanitary sewer easements. The Subcontractor will be responsible for obtaining written agreements for use of private property outside City acquired rights of way/easements for such purposes as storage of material and equipment and access to the construction site. The Subcontractor will immediately provide a copy of all such written agreements to the City upon obtaining the same.

B. Clearing of Rights-of-Way and Easements

1. The Subcontractor will confine his clearing of rights of way and easements to the least area necessary for construction of facilities shown on the Plans. The Subcontractor will protect as many trees and shrubs within the area as possible. Where necessary for construction, the Subcontractor will clear all live and dead vegetation and growth, pole stubs, logs, and other objectionable material. Cleared material will be removed to within 3 inches of existing ground. This work will be done well before excavation operations but only after erosion controls have been placed.

C. Location of Existing Obstructions

1. Locations of obstructions shown on the Plans are approximate and are not intended as an accurate location of such obstructions. Obstructions not shown on the Plans but encountered by the Subcontractor will be removed and replaced in their original state or protected by the Subcontractor at no additional cost to the Purchaser.

D. Removal of Obstructions

1. The Subcontractor will demolish and remove all structures and structure foundations, abandoned vehicles, appliances, and rubbish within the right of way/easement limits necessary for the performance of the work.

E. Protection of Obstructions Outside Easement Limits

1. The Subcontractor will protect and avoid damage to all trees, shrubs, plants, fences, structures, and all other objects outside the right of way/easement limits shown on the Plans and/or Plats due to construction operations. All damage will be repaired or restored at the Subcontractor's expense. Particular attention will be paid to avoid damage to trees, shrubs, bushes, and private property located next to rights of way/easements. No trees, plants, or other objects may be removed out-side such limits without written permission of the property owner.

F. Special Protection of Obstructions Inside Easement Limits

1. Wherever the underground installation of sanitary sewer facilities will go through surface improvements previously made by the City, other governmental bodies, or property owners, the Subcontractor will be responsible for their protection and preservation. This responsibility includes the removal and storage of such improvements to allow replacement and restoration as close as possible to the undisturbed condition.

G. Disposal of Debris

1. All trees, brush, logs, snags, leaves, sawdust, bark, and refuse will be collected and disposed of according to the City Code of Ordinances at the expense of the Subcontractor. There will be no separate pay item for disposal of debris. Debris will be removed from the site when practical and will not be left until the completion of the contract. When material is to be disposed of outside the easement, the Subcontractor will first obtain written permission from the property owner on whose property the disposal is to be made and will file a copy with the Purchaser. Unless otherwise provided in the Subcontract Documents, the Subcontractor will arrange for disposing of such material outside the right of way/easement. No debris will be deposited in wetlands.

H. Replacement of Fences

1. Any fences disturbed inside the right of way/easement limits will be replaced or restored to their original or better condition. Any fences removed will be replaced in their original location. Fences in such poor condition that they cannot be taken down and rebuilt with the same material will be replaced with new fence material similar in original quality, size, and appearance to the removed fence. Exceptions to this requirement will be allowed if written releases are obtained from the property owners by the Subcontractor and submitted to the Purchaser.

I. Disposition of Excavated Material

1. Excavated material suitable for backfill will be stored no closer than 2 feet from the edge of the excavation. Excavated material will not obstruct crosswalks, side-walks, driveways, street intersections, nor interfere unreasonably with travel on streets. Gutters or other surface drainage facilities will not be obstructed. The Subcontractor must provide access to fire hydrants, mail boxes, sewer and conduit manholes and similar utility or municipal service facility as required. Excavated material intended for backfill will be stored in a way that minimizes loss of excavated material due to erosion. The Subcontractor shall comply with all applicable OSHA regulations and City of Memphis Storm Water Ordinances.
2. Unless otherwise directed, all excavated material that will not be used for backfilling or restoration will be removed from the site and disposed of by the Subcontractor. If the Subcontractor proposes to store or place such excess excavated material upon any private property, written consent of the property owner or owners must be obtained by the Subcontractor in advance. A certified copy will be given to the Purchaser. No surplus or

excess material will be deposited in any stream channel nor anywhere that would change preconstruction surface drainage.

J. Control of Water

1. The Subcontractor will keep all excavations free of water. If the trench subgrade consists of good soil in good condition at the time of excavation, it will be the Subcontractor's responsibility to maintain it in suitable condition. Dams, flumes, channels, sumps, or other work and equipment necessary to keep the excavation clear of water will be provided by the Subcontractor. Dewatering of trenches, will be incidental to trench excavation. The Subcontractor will avoid producing mud in the trench bottom by his operations. If necessary or so ordered by the Purchaser, the Subcontractor will remove any soil that becomes unacceptable and replace it with limestone or other approved aggregate at his own expense to maintain a firm, dry base.
2. Pipe embedment, laying, jointing, and the placing of concrete or masonry will be done in a water free trench or excavation. Trenches will be kept clear of water until pipe joints, concrete and masonry have set and are resistant to water damage. The water will be disposed of in a manner acceptable to the Purchaser.
3. All gutters, pipes, drains, conduits, culverts, catch basins, storm water inlets, ditches, creeks, and other storm water facilities will be kept in operation, or their flows will be satisfactorily diverted and provided for during construction. Any facilities disturbed during construction will be restored to the satisfaction of the Purchaser.

K. Excavation Around Obstructions

1. The Subcontractor will perform all excavation by hand where excavation by machinery would endanger trees, structures, or utilities that otherwise might be saved by hand excavation.
2. The Subcontractor will cautiously excavate test holes to find the limits of under-ground obstructions anticipated within the excavation. When a water pipe, gas pipe, other sanitary sewer, storm drain, or similar utility comes within the limits of the trench, such facilities will be properly supported.

L. Special Protection

1. Treacherous Ground:
 - a. When running sand, quicksand, or other treacherous ground is encountered, the work will be carried on with the utmost urgency and will continue day and night should the Purchaser so direct.
2. Sheet piling and Shoring:
 - a. The Subcontractor will furnish, place, and maintain sheet piling and shoring as required to support the sides of any excavation to prevent earth movement that could endanger the workers or public and to prevent damage to the excavation, adjacent utilities or property. The Subcontractor will place this sheet piling and shoring without the Purchaser's instructions.
 - b. Sheet piling will extend below structure invert a sufficient depth to assure adequate support. In the installation of sheet piling, the use of vibratory type pile drivers (as opposed to impact type) will be limited to sheet piling driven no greater than 5 feet below the invert. The sheeted trench width, as measured between those faces of the

sheeting in contact with the earth trench wall, will not exceed the maximum width of a trench per Specification Section 02530. Walers and struts will be designed and installed to present no obstructions to proper placement of the pipe, pipe embedment, cradle or encasement, and they will not interfere with the satisfactory installation of the pipe.

- c. Sheeting, bracing, and shoring will be withdrawn and removed as the backfilling is being done, except where the Purchaser permits the material to be left in place. The Subcontractor will cut off sheeting left in place at least 2 feet below the surface and will remove the cut off material from the excavation.
- d. All sheeting, bracing, and shoring which are not left in place under this provision will be removed in a way that will not endanger the completed work or other structures, utilities, storm drains, sewers, or property. The Subcontractor will be careful to prevent the opening of voids during the extraction process.
- e. If sheeting and shoring are not specifically required on the Plans or in the Specifications, steel drag shields or trench boxes may be used subject to the authorization of the Purchaser. Voids left by the advancement of the shield will be carefully backfilled and compacted following trench backfill requirements.

M. Existing Utilities

1. It will be the Subcontractor's responsibility to arrange for the location of existing utilities prior to excavation. The Subcontractor will also be responsible for coordinating the relocation of any existing utilities with the appropriate utility owner.
2. Protection:
 - a. The Subcontractor will protect any storm drain, sewer, or utility within the limits of the construction. The Subcontractor will proceed with caution and will use every means to establish the exact location of underground structures and facilities before excavating in the vicinity. The City or Purchaser will not be responsible for the cost of protection or repair or replacement of any structure, pipe line, conduit, service connection, or similar facility broken or damaged by the Subcontractor's operations. All water and gas pipes and other conduits near or crossing the excavation will be properly supported and protected by the Subcontractor.
3. If the construction requires the removal and replacement of any overhead wires or poles, underground pipes, conduits, structures or other facilities, the Subcontractor will arrange for such work with the Owner or Owners of the facilities. No additional payment will be made by the City or Purchaser for this work.
4. Service Connections:
 - a. Sewer and utility services between mains and buildings will be maintained and adjusted as necessary by the Subcontractor to provide as nearly a continuous operation as can be expected. This will be accomplished in any way that the Subcontractor chooses, provided the individual service is not interrupted for more than two consecutive hours. The occupants will be notified by the Subcontractor at least six hours before such service interruptions. When a break occurs, the Subcontractor will notify the affected occupant(s) of the probable length of time that the service will be interrupted.
5. If existing underground facilities or utilities require removal and replacement for the performance of this work, all replacements will be made with new material conforming to

the requirements of these Specifications. If not specified, the material will be as approved by the Purchaser.

6. The removal and replacement of water services to adapt to new construction will be the Subcontractor's responsibility within the limits where the new service line grade blends smoothly with the existing service line grade.
7. The removal and replacement of sewer house connections to adapt to new construction will be the Subcontractor's responsibility from the sewer main to a point where the new grade and existing grade can be matched.
8. The Subcontractor will be responsible for any damage to the sewer house connection because of his operations. The Purchaser does not guarantee the number, size, condition, nor length of adjustment necessary to bring a service to a new grade.

N. Maintenance of Flow

1. Where existing sewer lines are being modified, the Subcontractor will arrange his work so that sewage flow will be maintained during the construction period with no discharge of sewage into the open trench, and no back up of sewage in the existing line. The Subcontractor will provide necessary bypass pumping capacity to carry flow downstream of the section to be modified.

O. Removal and Replacement of Vegetated Areas

1. The Subcontractor shall remove the vegetated area around a manhole as needed to adjust the manhole frame and cover. All disturbed areas shall be restored as nearly as practical to their original condition. The disturbed area shall be cleared and raked to the level of the existing turf and then watered. New sod shall be installed over the entire disturbed area. New sod shall consist of live, dense, well rooted growth of Bermuda grass, free from Johnson grass, nutgrass, and other obnoxious grasses or weeds, well suited for the intended purpose and for the soil in which it is to be planted. All sod shall be cleanly cut in strips having a reasonably uniform thickness of not less than 2 inches and cut in 10 to 12 inch squares.

P. Cleanup

1. After the installation work has been completed, the Subcontractor shall cleanup the entire project area. All excess material and debris not incorporated into the permanent installation shall be disposed of by the Subcontractor. The work area shall be left in a condition equal to or better than it was prior to the performance of the Work. Disturbed grassed areas shall be seeded or sod placed as directed by the Purchaser at no additional cost to the Owner. Site restoration shall be performed in accordance with the City of Memphis Standard Construction Specifications.

3.02 BACKFILLING

A. General

1. After sanitary sewer facilities have been bedded and installed according to these Specifications and upon permission of the Purchaser, the backfill may be placed. Backfilling operations will continue following as closely behind pipe installation as practical. All backfill will be placed in uniform horizontal layers. Pushing backfill material down a ramp into excavated areas will not be permitted. No trash will be allowed to accumulate in the space to be backfilled. Particular care will be taken to avoid allowing

wood to be included in the backfill, other than sheeting and shoring that has been approved to be left in place.

2. The Subcontractor will be responsible for the condition of the trenches and filled areas during the contract and warranty period. The Subcontractor will maintain frequent inspection of the same. Anytime during the 12-month warranty period the trenches or filled areas settle and sunken places appear, the Subcontractor will be required to refill these sunken places when they are discovered with suitable material and will replace all damaged curb, gutter, and sidewalk. All soft or dangerous trenches will be marked, barricaded and caution lighted for the protection of the public.
3. Property with an existing dwelling located on it or lots within a developed subdivision or planned development are considered improved property.

B. Street Right of Way and Improved Property

1. Backfill Material:

- a. Backfill for pipe trench excavations through pavements in street or highway right of way or where the Purchaser orders, will be made with pit run gravel or other acceptable material as approved by the Purchaser. The backfill will be from the top of the pipe embedment material or manhole foundation to the subgrade elevation of the pavement. Pea gravel or similar granular material approximately uniform in size and without bonding properties will not be used.
- b. Backfill for pipe trench excavations beyond pavements in street or highway right of way or outside public right of way will be made with select earth from the top level of the pipe embedment material or foundation to the subgrade elevation in paved area, or within 1 inch of the surface in areas to be sodded, or to the surface in all other areas.
- c. Select material will be free from debris, organic matter, perishable compressible material, and will contain no stones or lumps larger than 6 inches. Rocks and lumps smaller than 6 inches will not exceed an amount that will interfere with the consolidating properties of the fill material. Care will be taken that stones and lumps are kept separated and well distributed, and that all voids are completely filled with fine material. No rocks or lumps will come in direct contact with the pipe. The upper 3 feet of backfill in sodded or planted areas will be free of rocks or lumps larger than 1 inch in diameter.

2. Placement and Compaction:

- a. Backfill material will be placed by hand in 6 inch loose layers and tamped to a point 2 feet above the outside top of the pipe. Backfill will be compacted with suitable mechanical tamping equipment with special care being taken not to damage the pipe or joints. Use of compaction equipment directly above semi-rigid and flexible pipe should be avoided until sufficient backfill has been placed to ensure that the equipment will not damage the pipe. A minimum of 36 inches of compacted backfill above the top of semi-rigid and flexible pipe will be in place before wheel loading and a minimum of 48 inches of compacted backfill before use of pneumatic tampers. From these elevations to the subgrade elevation of the pavement, bottom of the sod, or to the original ground surface, suitable backfill will be mechanically placed in 9 inch, maximum, loose layers. All backfill material will be compacted to 95 percent of maximum density at plus or minus 2 percent of optimum moisture content as determined by Laboratory Standard Proctor Test (ASTM D 698).

C. Open Areas and Unimproved Property

1. Backfill of excavations on unimproved property will be made with select material from the top level of pipe embedment material or foundation to the surface. Non-granular select material to be used for backfill will be free from debris, organic matter and perishable compressible material, and will contain no stones or lumps or rock fragments larger than 6 inches. Rocks or lumps smaller than 6 inches in diameter will not exceed an amount that will interfere with the consolidating properties of the fill material. No rocks or lumps will come in direct contact with the pipe. Stones and lumps will be kept separated and well distributed, and all voids will be completely filled with fine material.

3.03 METHOD OF REPAIR

- A. The Subcontractor shall replace a sufficient number of entire pipe joints to ensure that defective pipe is removed and replaced up to 10 feet in length, per repair, at the discretion of the Purchaser, in accordance with the SARP10 Sanitary Sewer Point Repair detail.
- B. If the length of the required replacement segment is not adequate to locate sufficient competent pipe for connection with the new section, the Subcontractor, at the Purchaser's instruction, may be directed to replace additional sections of pipe such that an appropriate connection is possible.
- C. The Subcontractor shall replace service wyes encountered within the point repair. Any defective service lines encountered within the point repair shall be replaced.
- D. Any service line or competent main line pipe broken by the Subcontractor shall be replaced at the Subcontractor's expense.
- E. The Subcontractor shall remove any fences, base materials, storm sewer, etc. that may interfere with the repair made at each specified point. The Subcontractor is responsible for the replacement of said fences, base materials, storm sewer etc., in the same or better condition than found.
- F. The bottom of the trench shall be reshaped so that the grade of the pipe replaced will match that required for the existing sewer line. The pipe embedment material shall be placed and the repair area shall be backfilled in accordance with Section 02530 Sewer Pipe Installation of the City of Memphis Standard Construction Specifications Modified by the SARP10 Program.
- G. If the material in the bottom of the trench is of such consistency that it is not stable, then the Subcontractor shall stabilize the bottom of the trench by placing suitable materials at the direction of the Purchaser in accordance with the 3.02 C. 1. Undercut Excavation of Section 02530 Sewer Pipe Installation of the City of Memphis Standard Construction Specifications Modified by the SARP10 Program.
- H. Prior to backfilling, point repairs shall be inspected by the Purchaser.

3.04 PIPE EMBEDMENT

- A. Pipe embedment will be defined as that material supporting, surrounding and extending to 6 inches above the top of the pipe. Pipe Embedment for sewer pipe will conform to the requirements given below. At the direction of the Purchaser or as shown on the Drawings, sewer pipe and backfill will be encapsulated in geotextile fabric meeting the following requirements:

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATION
 Modified by SARP10 Program

Physical Property	Test Method	Acceptable Test Result
Tensile Strength, wet (lbs)	ASTM D-1682	200 (min)
Elongation, wet (%)	ASTM D-1682	40 (min)
Coefficient of Water Permeability (cm/sec)	Constant Head	0.03 (min)
Puncture Strength (lbs)	ASTM D-751	100 (min)
Pore Size – EOS U.S. Standard Sieve	Corps of Engineers CW-02215	40 (max)

B. Crushed Limestone

1. Pipe embedment material will be Number 67 crushed limestone. Pipe 8 inches to 24 inches in diameter will be bedded on 4-inches of Number 67 crushed limestone Pipe 27 inches to 48 inches in diameter will be bedded on 6-inches of bedding material. Pipe embedment for pipes larger than 48 inches in diameter will be by design based on anticipated soil conditions. After pipe installation, crushed limestone will then be tamped under the haunches and continued in layers not more than 6 inches in loose thickness around and above the pipe to a level 6 inches above the outside top of the pipe. The remainder of the installation will be as outlined in this Specification's Backfill requirements.

3.05 VISUAL INSPECTION

- A. All work will be subject to visual inspection for faults or defects and any such deviation or omission will be corrected at once. All tests will be made by the Subcontractor who will provide necessary equipment for testing and lamping the system in the presence of and under the supervision and instructions of the Purchaser. Lamp tests will be observed first hand by the Purchaser. Each section of sewer line will show a full circle of light when lamped between manholes. All defects located will be corrected before conducting leakage tests
- B. After backfilling and resurfacing, sewer segments containing point repairs shall be internally televised (CCTV) by the Subcontractor in their entirety in accordance with Section 00003 – Closed Circuit Television Inspection of Sewer Mains and Connections for final review and approval by the Purchaser.

3.06 TRAFFIC CONTROL

- A. All traffic control shall be installed and maintained in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). At a minimum, the Subcontractor must have two trucks with flashing yellow lights on the work site. Traffic cones must also be placed downstream of the construction site to divert cars into the adjacent lane(s) per MUTCD requirements. On roads with a heavy traffic volume, a flagman may also be needed to assist with traffic control. For bidding purposes, the Subcontractor should assume that a flagman will be needed on 30 percent of the setups.

3.07 FALL PROTECTION

- A. Subcontractor shall install and maintain all fall protection measures in accordance with the SARP10 Loss Control Manual. The Subcontractor shall construct a controlled access zone around the manhole being adjusted. At a minimum, the fall protection zone shall include traffic cones encircled with pennant tape. The controlled access zone must have one point of access with an entrance log.

PART 4 MEASUREMENT & PAYMENT

ALL WORK UNDER THIS SECTION SHALL BE AT THE SUBCONTRACTORS COST

END OF SECTION 02540

SECTION 02541
CLOSED CIRCUIT TELEVISION INSPECTION OF SEWER MAINS & CONNECTIONS

PART 1 GENERAL

1.01 SCOPE

- A. This Work will consist of cleaning and Pipeline Assessment Certification Program (PACP) internal closed-circuit television (CCTV) surveys to digitally inspect and record conditions of existing sanitary sewer mains and connections. Sewer pipes and connections to be inspected are located in both improved streets, arterial and primary roads, backyards and unimproved easements.
- B. The Work covered by this section includes furnishing all labor, competent PACP certified technicians, equipment, tools, accessories, and materials required to clean and inspect the designated sanitary sewer lines.

1.02 SUBMITTALS

A. PACP Requirements

- 1. PACP compliant inspections, logs, data, and photos shall be delivered to the Program Manager (from hereon Program Manager shall be interpreted as “Program Manager or his designee”) on external hard drive(s) which will become property of the Program Manager. Data files shall be formatted to facilitate upload into a PACP compliant Exchange database or internet uploads formats to an FTP site only when requested by the Program Manager.
- B. Unless otherwise specified all data submittals shall be delivered to the Program Manager within two weeks of the NTP.
- C. For rehabilitation work, only Post-Rehabilitation PACP submittals will be required by the Purchaser. All CCTV done prior to rehabilitation shall be at the expense of the Subcontractor to ensure conformance with the Specifications.

D. Traffic Control

- 1. Traffic Control Plan shall be submitted to the Program Manager, including the following items:
 - a. Outline of permit acquisition procedure for lane closures.
 - b. Methods for proper signing and barricades, which comply with City of Memphis requirements.
 - c. Major streets (e.g. Shelby County Principal Arterial & Minor Arterial) requiring a City approved permit if taking a lane for mobile operations, secured through Traffic Control Plan submittal to the City and signed by a TN P.E. The City requires two-week lead time for permit processing.
 - i. The Subcontractor will be required to deliver a sample primary/arterial road Traffic Control Plan for review by the City.
 - ii. If the City determines that the nature of the work operation or the type of road in which the Subcontractor is working requires a permit, the Subcontractor will be required to modify the sample Traffic Control Plan to obtain a permit from the City.

- d. For everywhere else where a permit is not required, the Subcontractor shall develop, provide, and implement a traffic control plan for all mobile operations in accordance with standard MUTCD specifications.

E. Permits

1. The City of Memphis has secured a Special Waste Recertification from the Division of Solid Waste Management of the Tennessee Department of Environment and Conservation for continued disposal at North and South Shelby landfills as well as separate solid and liquid waste profiles with Republic Services. The Subcontractor will be responsible for using a manifest form provided by the Program Manager and pre-signed by the Subcontractor's authorized representative for every disposal event. The Subcontractor is also responsible for providing a copy of the manifest and invoice from Republic Services after each disposal event.
 2. Railroad Rights of Way: The Subcontractor shall notify the Program Manager when work or access to manholes and sanitary sewers lie within the 25 feet railroad easement as measured by 25 feet outside the nearest rail of the tracks. To access sewer facilities within the 25 feet of the railroad right of way the Subcontractor shall contact the Program Manager 48 hours in advance who will alert the City's Zone Construction Inspector to coordinate individual railroad direction and guidance.
 3. Permit required confined space entry plans in compliance with the Loss Control Manual.
- F. Copies of National Association of Sewer Service Companies (NASSCO) certification for all field staff conducting PACP inspections.
- G. Sample of PACP compliant television survey log in MS Access format.
- H. Sample of PACP compliant video inspection in MP-4 (Web optimized) format.
- I. Cleaning and CCTV vehicle, equipment, and cleaning supplies list.
- J. Disposal site(s) and written e-mail notification to the Program Manager that the provided numbered manifest forms have been received.

1.03 DELIVERABLES

A. Records

1. Pipe Cleaning Record
 - a. The Subcontractor shall provide a dated manifest of the volume or weight of the dewatered sewer cleaning loads taken and dumped at the permitted landfill. The Subcontractor shall use the numbered manifest forms provided by the Program Manager. Each waste load manifest shall include a scanned copy of the landfill invoice. The copy of both the numbered manifest and invoice shall be sent to the Program Manager the same day that dumping occurs.
2. Digital Inspection Record
 - a. In the digital PACP V.6.0.1 compliant format, the Subcontractor shall provide the following information:

- i. Digital CCTV survey inspection which shall be recorded and shall be continuous as the inspection proceeds through the manholes and sewer pipes. Inspection videos should be delivered in an MP-4 (Web optimized) format.
 - ii. Digital Recordings: The digital recording shall document the visual and audio record of the manhole and sewer pipe inspection and shall be the basis of measurement and payment. Digital recording playback shall be at the same speed that it was recorded. Original digital recordings for the Project shall be forwarded to the Program Manager on clearly labeled external hard drive(s) in PACP ACCESS format with final report submittals and shall become the property of the Program Manager. Data for a single facility asset will not be split across multiple hard drives. Digital recordings shall be available to the Program Manager by the close of business on the Monday following a week after data acquisition. File naming must be consistent. Additional instructions, naming conventions, file structures, etc. will be provided after contract award.
 - (1) Picture Quality: The sewer inspection digital record shall be free of steam, fog, vapor, or other headspace distortion that degrades the quality of the picture from the intended purpose of evaluating the sewer for structural and watertight integrity. If necessary, the Subcontractor shall provide positive ventilation or other means through the sewer pipe to draw out steam, fog, and vapor that will degrade the recorded image of the pipe.
- 3. Inspection Documentation Logs
 - a. Observations made during television inspection shall be documented in an unmodified PACP compliant manner within an electronic inspection log form, supported by accompanying audio, digital photographs and MP-4 (Web optimized) format recording written to an external hard drive and submitted to the Program Manager.
- 4. Electronic & Data Deliverable Records
 - a. Daily Production Reports:
 - i. The Subcontractor shall prepare daily inspection log reports for each associated sewer pipes inspected during the actual field inspection activities. These field logs shall then be sent to the Program Manager and Program inspectors in digital format after each day of work.
 - b. Data Deliverables and Reports:
 - i. Digital recordings of the inspections written to an external hard drive and the PACP compliant database of the inspections in ACCESS format shall be submitted in electronic and pdf format.
 - ii. The PACP data for the Subcontractor's working week shall be delivered to the Program Manager by the close of business on the Monday following a week after data acquisition. The Program Manager will have one workweek period to review and accept or reject the PACP data.
- 5. Quality
 - a. Rejection of deliverables will be submitted to the Subcontractor via the Program Team in a written communication discussing issues that must be addressed. The Subcontractor will be required to follow up with a response within three business days upon receipt of the written communication. Subcontractors will have seven (7) calendar

days from the rejection notice date to make the necessary corrections and resubmit the data deliverable in its entirety.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. General

1. All equipment used for PACP compliant CCTV sewer segment inspections of existing sanitary sewer mains and connections shall be specifically designed and manufactured for the purpose intended under this Contract. The software and hardware for the electronic capture of the inspection defects and recorded observations must be Version 6.0.1 NASSCO PACP compliant.
2. The Subcontractor shall submit an equipment list to the Program Manager for approval before the commencement of the Work and shall certify that back-up equipment is available and can be delivered to the worksite within 72 hours.
3. The Subcontractor shall provide equipment to perform inspections of sewer mains located in streets, street rights-of-way, backyards, easements and rights-of way that are off-road.
 - a. Including but not limited to portable CCTV equipment, vehicles capable of transporting TV equipment and accessing remote easements, and adequate cleaning equipment rights of way or easement applications.

B. PACP Compliant Software & Data Logger Requirements

1. Data logger
 - a. Internal inspection logs created and captured electronically during the television inspection through the use of commercially available electronic data loggers in the truck are required. NASSCO PACP protocols Version 6.0.1 shall be used for capturing and recording the observations. Audio commentary made during the inspection and captured on the digital video shall correspond with the PACP observations on the log.
 - b. The data logger equipment and software shall allow the Program Manager access directly to the captured electronic data and provide for a non-proprietary export of the data into MS ACCESS databases in accordance with PACP standards for standalone database review.
2. Software must be compliant with the NASSCO PACP V.6.0.1 standards. Follow PACP protocol for recording of observations and defects for sewer mains.
 - a. All software shall be capable of providing complete survey reports in compliance with PACP, and the software shall be the V.6.0.1 of the PACP compliant software.
 - b. The Program Manager has no intent to specify which software the Subcontractor shall use but requires the software and the submitted database to be fully compliant with PACP V.6.0.1 and capable of being exported to ACCESS databases. No payment will be rendered for improperly formatted data.
 - c. Software and data logger must be capable of capturing sewer main and sewer lateral observations by PACP descriptions, record travel footage along pipeline, and video time stamp the recorded observations to support hyper linking from the digital record to the event point or location within the digital inspection record. The same

requirements apply to still photo images (if provided) which shall follow PACP guidelines and be hyperlinked to the inspection log.

C. Sewer Main CCTV

1. Sewer Main Digital Color Video Camera

- a. All cameras used shall be digital format color CCTV units specifically designed and constructed for use in sewer pipe inspection work. The cameras shall be operable in 100 percent humidity conditions. The camera shall have a high-resolution, 360-degree pan and tilt or rotating head with a wide viewing angle lens and either automatic or remote focus and iris controls. Camera lighting shall be sufficient for use with digital color inspection cameras and for the manhole and pipe diameters identified in the contract.
 - i. Camera, Television Monitor, and Other Components shall be capable of producing a high-resolution color digital inspection record.
 - ii. Video file to be in MP-4 (Web optimized) format
- b. In all cases, the complete digital inspection system (camera, lens, lighting, cables, monitors, and recorders) shall be capable of providing a digital picture and digital video quality acceptable to the Program Manager. Inadequate lighting, image distortions, blurry or murky images, and dirty lenses will be a cause for rejection. No payment will be made for unsatisfactory inspections and the Subcontractor shall perform work until deliverable is of acceptable quality. Digital video cameras/digital recorders not specifically intended for use for internal television inspection of manholes and sewer lines shall not be permitted.
- c. Pan and tilt type camera, capable of turning at right angles to pipe's axis over an entire pipe wall perimeter shall be used.
 - i. The camera lens shall be capable of self-righting itself after a lateral view or connection view with a return view down the pipe with a "home" capability for the lens.
- d. Lighting shall be suitable to allow clear picture of entire inner pipe wall extending at least 10 feet in front, including black High Density Polyethylene (HDPE) pipe.
- e. Document header and observations shall be in accordance with PACP V.6.0.1 protocols.
- f. Subcontractor shall have equipment capable of cleaning and assessing 12" and smaller diameter siphons.

D. Cleaning Equipment

1. Hydraulic sewer pipe cleaners or combination hydraulic/vacuum cleaners shall be specifically designed and constructed for such cleaning.
2. Mechanical sewer pipe cleaners shall be specifically designed and constructed for such cleaning.

3. The Subcontractor shall possess equipment capable of hydraulically ~~or mechanically~~ cleaning a minimum of 1,000 linear feet of pipe from one direction and have a minimum 1,000 linear feet of hose or cable on-site during the cleaning execution.
4. Hydraulic sewer pipe cleaners shall be specifically designed and constructed for such cleaning. The sewer cleaner shall have a minimum usable water capacity of 600 gallons and a pump capable of delivering at least 30 gallons per minute at 1,500 psi at the nozzle.
 - a. The hydraulic cleaning equipment shall have multiple hydraulic cleaner hose nozzles for a variety of sewer cleaning conditions, including grease, roots, debris and granular materials.
 - b. Vacuum equipment shall be capable of lifting debris removed from the segment from the downstream manhole.
5. Mechanical sewer pipe cleaners (cable machines with buckets, brushes, swabs, root cutters, and power rodders with similar capability) shall only be use for cutting roots and protruding lateral service connections and be capable of controlled forward and reverse travel through the sewers without inflicting damage to the existing pipe in removing roots or cutting protruding lateral connections.

PART 3 EXECUTION

3.01 INSPECTIONS

A. CCTV Inspection of Sewer Mains

1. Cleaning
 - a. Sewer pipe cleaners or combination hydraulic-vacuum cleaners must accompany CCTV units at all times. Ideally, sewers lines are to be cleaned and then followed immediately by CCTV inspection. All sewers must be cleaned in advance of CCTV during the same calendar day they are inspected.
 - b. Light Cleaning
 - i. Before CCTV work, the Subcontractor shall light clean the sewer line (three (3) cleaning attempts) from manhole to manhole, from upstream to downstream direction unless an obstruction is encountered, one sewer section at a time and performed as efficiently as possible at the Subcontractor's discretion.
 - ii. Materials shall not be passed from one sewer segment to another but must be trapped and removed from each sewer segment prior to CCTV inspection.
 - c. Heavy Cleaning
 - i. If a camera is inserted and additional debris or impediments to inspection are observed following the required light cleaning, heavy cleaning shall be approved by the Program Manager. Sections of pipe containing significant roots, large areas of debris, and/or several inches of depth of sands and gravels that will require the use of additional hydraulic nozzles, cable/bucket machine, power rodders and root cutters is considered heavy cleaning.
 - ii. Heavy cleaning will be proposed by the Subcontractor immediately after identifying the need for it during work in the field.. The proposed heavy cleaning will be done via email to the Program Manager. All heavy cleaning request must be approved

by the Program Manager. Heavy cleaning requests will not be accepted if the time between the field work and the heavy cleaning request to the Program Manager exceeds 4 hours. The Subcontractor must obtain prior approval for heavy cleaning in each sewer segment in order to receive payment for heavy cleaning

d. Cleaning Execution

- i. No roots, grease or debris from light or heavy cleaning shall be passed from sewer segment to sewer segment during the cleaning operation. All debris flushed from the sewer must be collected, captured, and removed from the sewer at the downstream manhole.
- ii. Roots shall be removed in the sections where root intrusion is a problem. Special precautions shall be exercised during the cleaning operation to assure complete removal of visible roots from the joint area and so as not to incur further damage to the pipe. Any visible roots that may impact rehabilitation efforts shall be removed. Fine roots are allowed if the Subcontractor made a heavy cleaning attempt to remove roots with proper root removal means. Procedures may include the use of mechanical devices such as rodding machines, expanding root cutters and porcupines, and hydraulic procedures such as high-pressure jet cleaners.
- iii. The Subcontractor is responsible for safe, responsible and legal handling of all material and debris removed from the sewers.
- iv. Proper disposal arrangements are the exclusive responsibility of the Subcontractor. The Subcontractor shall provide a dated manifest and a copy of the invoice for the volume and weight of the dewatered sewer cleaning loads taken and dumped at the permitted landfill. The Subcontractor shall not dispose of debris at a City of Memphis Wastewater Treatment Plant. Each waste load manifest shall be associated with a list of corresponding sewer segments from where the waste originated.
- v. Siphons shall be cleaned to remove 95% of the debris from the pipe.

2. Sewer Flow Levels During Inspection Operations

- a. Maintain low sewer flow during inspection by using sandbags or flow-through plugs or by inspecting during low flow times of day, evening, or early morning hours while camera is moving and recording observations in the sewer segment. Any items used to restrict flow shall be removed immediately after intended use.
 - i. Flow-through Plugs: If used, secure the plugs so as to remain in place during inspection. Use a fail-safe device at the downstream pipe connection to ensure the plug is not lost in the downstream sewer segment if it becomes dislodged from the upstream pipe connection.
 - ii. Conduct all cleaning and CCTV operations to prevent building backups and sewer overflows.
 - iii. Subcontractor shall be responsible for cleanup, repair, fines, property damage costs, and claims for any sewage backup, spillage or sanitary sewer overflow during or as a result of the cleaning and inspection operations.
- b. Allowable Depth of Flow for Inspection Operations

- i. For effective inspection, all flow shall be minimized in the segment being inspected. However, the depth of flow at the upstream manhole of the interceptor section being worked shall be within the specified limits provided herein.
 - c. Maximum Allowable Depth of Flow for CCTV Inspection
 - i. 6 - 10-inch diameter Pipe - 20% of pipe diameter
 - ii. 12 - 18-inch diameter Pipe - 25% of pipe diameter
 - iii. 24-inch diameter and Larger Pipe - 30% of pipe diameter
 - iv. Exceptions to these guidelines shall result in rejection, and non-payment, of the CCTV inspection unless approved in advance by the Program Manager.
- 3. Camera Operations
 - a. Using the pan/tilt feature, pan the interior of the manhole for record purposes in accordance with V.6.0.1 PACP protocols and begin and terminate the inspection in the starting and ending manholes.
 - i. Capture the inside of manhole walls, manhole channel, and pipe connection to wall at both upstream and downstream manhole and lateral connections using the digital mainline sewer camera and the pan/tilt feature.
 - b. Place the camera at center of manhole and commence video before entering pipe.
 - i. Start footage counter at manhole wall/pipe connection or at a short pre-measured distance down the pipe for the sewer segment inspection.
 - c. Connections: The digital camera shall be used to look at connections and up laterals from the connection in the main sewer pipe being inspected. The camera shall pause, pan, and record all connections. Conditions noted in these sidelines and laterals shall be noted on the inspection logs.
 - d. Mainline camera operations:
 - i. Move through line at speed no greater than 30 feet per minute stopping for minimum 10 seconds to record lateral connections, mainline connections, defects, and features and points of interest.
 - ii. Do not float camera.
 - iii. Maintain technical quality, sharp focus, and distortion free picture with the camera lens centered in the pipe for the different diameters inspected.
 - (1) Eliminate steam in line for duration of inspection.
 - (2) Utilize blower as needed to defog sewer line.
 - iv. Digitally record a complete sewer segment in its entirety with no breaks, “blink-outs,” or interruptions from manhole to manhole according to PACP V.6.0.1 formats.

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
Modified by SARP10 Program

- v. Pan, tilt, and rotate as necessary to best view and evaluate lateral connections, pipe defects, features, obstructions, and points of interest.
- vi. Use power winches, powered rewinds, self-propelled tractors, or other devices that do not obstruct camera view or interfere with proper documentation of sewer conditions to move camera through sewer.
 - (1) Whenever non-remote powered and controlled winches are used, set up telephones or other suitable means of communication between manholes to insure good communication.
- vii. Use hydraulic jet nozzle pressure and flow to remove standing water from depressions or sags in the sewer, if necessary, for complete inspection of the sag portion of the sewer segment.
- viii. Measurement for location of defects and service laterals:
 - (1) At ground level by means of Program Manager-approved footage counter or metering device.
 - (2) Electronic display measurement meters: Accurate to PACP standards over length of section being televised.
 - (3) Do not pull unnecessary length of slack camera cable if it impacts the footage counter.
- ix. Stop camera at service connections and inspect lateral with pan and tilt camera.
 - (1) Identify building connection in PACP compliant terms as active, capped, or abandoned.
 - (2) If no wastewater flows are being discharged from building, consider steady, clear observed flow as infiltration/inflow.
- x. Identification of Defects
 - (1) If roots, sludge, or sediment material impedes inspection after the light cleaning, withdraw camera and perform heavy cleaning at the direction of the Program Manager.
 - (2) Upon completion of heavy cleaning operation, resume internal inspection.
 - (3) Furnish media confirmation for heavy cleaning (more than three passes with jet cleaner) to Program Manager.
 - (4) If protruding tap impedes inspection trim protruding tap to 1/2 inch.
- xi. If obstructions are not passable and cannot be removed by sewer cleaning, withdraw CCTV equipment and perform a reverse inspection from opposite end of the sewer segment in accordance with PACP protocols.
 - (1) Subcontractor shall be responsible for costs associated for reverse set-ups when an obstruction is encountered that cannot be passed.
 - (2) Subcontractor shall be responsible for all judgments and impacts as to whether an obstruction in the sewer main can be passed. Costs involved in extracting

a stuck camera in the sewer main will be borne by the Subcontractor and at no additional cost to the Program Manager.

- (3) When additional obstructions are encountered after reversal of equipment and no means are available for passing a second obstruction in order to complete the sewer main inspection, remand the segment inspection to the Program Manager for resolution. The portion of the main inspected will be paid for as prescribed.

xii. Undocumented facilities

- (1) If undocumented manholes or sewer mains (facilities not on the field updated GIS sewer maps) are encountered during the inspection, the Subcontractor needs to complete the documentation requirements per PACP requirements and capture on the video the following:
 - (a) Approximate horizontal distance from the upstream or reference manhole.
 - (b) Approximate depth of the undocumented manhole by turning the pan/tilt camera vertically and estimating the height of the cover from the invert.
 - (c) A provisional manhole asset ID number shall be used by the Subcontractor by adding a dash and two-character number to the closest upstream manhole ID.

xiii. Retrieval of Stuck Equipment

- (1) The Subcontractor is responsible for hiring a licensed sub-Subcontractor to retrieve any equipment/foreign objects that get stuck in the sewer system through the execution of the scope of work (fallen cameras, jet nozzles, inflatable plugs, sandbags etc.) at the Subcontractor's own cost. Such retrieval by an appropriately licensed sub-Subcontractor shall be made within 72 hours to avoid interfering with the City of Memphis sewer system operations. Any and all impacts and related costs due to the Subcontractor's equipment in the line shall be the responsibility of the Subcontractor. Subcontractor shall follow SARP10 sewer point repair specifications outlined in "Section 02540 Sanitary Sewer Point Repairs" and "Section 02950 Removal and Replacement of Pavements and Incidentals" during retrieval of equipment. Also, per "00585.2.2 Safety, Health, and Accident Prevention Program," Purchaser must approve sub-tier Subcontractors prior to mobilization to the jobsite.

4. Quality Assurance

- a. With each monthly invoice the Subcontractor shall provide a QA/QC memo documenting that 10% of the previous month's CCTV data has undergone a random, independent review by a PACP certified reviewer using NASSCO standards for Television Inspection of Main Sewer and PACP Quality control as the basis for the QA/QC procedures. The reviewer's NASSCO certification must not be expired at any point during the QA/QC review process. The independent reviewer shall be a Tennessee Professional Engineer (P.E.) or be a P.E. in another state and has a Tennessee P.E. license pending. Each line segment which has been randomly reviewed shall be identified in the QA/QC memo as well as any subsequent findings or recommendations. Internal independent QA/QC is acceptable, as long as the person is a Tennessee P.E. or is a P.E. in another state and has a Tennessee P.E. license pending. The QA/QC memo must be stamped and signed by the Tennessee P.E.

Failure to submit the QA/QC memo shall delay payment of the current month's invoice. The QA/QC memo must contain the following information:

- i. Statement Certifying that 10% of the previous month's CCTV data has undergone a random, independent review by a PACP certified reviewer using NASSCO standards for Television Inspection of Main Sewer and PACP Quality control as the basis for the QA/QC procedures.
 - ii. Reviewer's Tennessee P.E. stamp and signature.
 - iii. Reviewer's non-expired NASSCO PACP certification number.
- b. For all new Subcontractors and Operators who begin PACP coding, an initial review of CCTV data will consist of reviewing, at a minimum, 20 of the first 100 PACP inspection records submitted. Subsequent reviews will be based on the results of the initial reviews as explained below.
- c. Auditing Procedures:
- i. Header Information: As explained in the NASSCO PACP Quality Control Standards each audited inspection record is given an accuracy level for the header information and the detailed observation records. It is expected that the accuracy of the header record exceeds 90% because the majority of the contents are based upon facts and not subject to operator judgment. To assess the accuracy level of the header, record the number of errors as compared to the total number of header fields using the following formula:
 - (1) $100\% - (\text{error count}/\text{total header fields}) * 100\% = \text{Header Accuracy}$
 - ii. Detailed Observations: Determining the accuracy level for the detailed observation records is similar to the method for assessing the header record. The main difference being that a defect observation has multiple data entries that must also be counted towards the total number of entry fields. In the event that a defect is not coded all of the required entries for coding the missed defect are counted towards the total error count. The following formula is used to calculate the accuracy level of the detailed observation records:
 - (1) $100\% - (\text{error count}/\text{total entries}) * 100\% = \text{Detail Accuracy}$
 - iii. Review Scoring and Results
 - (1) Satisfactory Review, no changes required. Accuracy Level of 90% or above for both the Header Record and Observation Detail with no major errors or omissions found.
 - (2) Unsatisfactory Review (below levels of acceptance) will not be accepted by the Program Manager and will not be considered payable items in the Subcontractor's Request for Payment.
5. Deliverable Documentation
- a. Mainline Sewer
 - i. Submit V.6.0.1 PACP compliant records, logs, and electronic inspection data for sewer line inspection to Program Manager by the close of business on the Monday following a week after data acquisition.

- ii. Monthly QA/QC memo submittal listing which segments have been randomly reviewed, as well as any subsequent findings or recommendations.
 - iii. Digital videos, data, and photos shall be delivered to the Program Manager on external hard drives which will become property of the Program Manager.
 - iv. Data files shall be formatted to facilitate upload into a PACP Exchange Database with the approval of the Program Manager.
 - v. Inspections displaying poor digital video/audio quality will be rejected. Quality refers to, but is not limited to, grease or debris on lens, camera under water, image too dark or light, image washed-out, distorted image, out of focus images, lines improperly cleaned, and poor/no audio.
 - vi. Subcontractor will re-televisive rejected inspections and resubmit inspections at no additional cost to the Program Manager.
- b. Map changes/undocumented manholes:
- i. For map changes identifying undocumented manholes and network changes which were found as a result of field inspections or observations, a Map Edit Form shall also be prepared and supplied by the Subcontractor with a drawing or sketch and shall indicate special details, field measurement or distances, or locations about an observed undocumented manhole or a change to the sewer network. The Map Edit Form should also identify buried manholes and siphons that have been encountered.
 - ii. Subcontractor shall indicate all buried manholes identified in the field via CCTV using the provided Buried Manhole Form. Any additional manholes that have not been located or verified via CCTV but are impeding the completion of required CCTV work should be designated as unable to locate (UTL) and be included on the form.
- c. Incident observation and data collection:
- i. The Subcontractor shall report all buried manholes, pipe collapses, large void, utility conflicts, “Unable to Complete” line segments, and heavy cleaning requests to the Program Manager through the program-defined reporting application (Teamworx) and shall fill out all required fields and attach picture documentation as necessary. At least one picture shall be included showing the incident or condition of the sewer line encountered that required it to be recorded. All reported incident observations will be monitored by the Program Manager and inadequate reporting will result in a meeting between the Program Manager and Subcontractor.
 - ii. The Subcontractor shall also submit the proper forms for buried manholes, “Unable to Locate” manholes, and “Unable to Complete” manholes following the procedures described in the SARP10 Data Delivery Guidelines.
6. Easement or Turf Operation
- a. The Subcontractor will restore the work area to its original condition as quickly as possible after the inspection is complete. The Subcontractor will not be allowed to postpone restoration of the site until the end of the project.

PART 4 MEASUREMENT & PAYMENT

4.01 MEASUREMENT

A. Light Cleaning & CCTV Inspection

1. Light cleaning and mainline CCTV inspection shall be measured by linear foot by each diameter of mainline sewer inspected and documented in accordance with the specification.

B. Heavy Cleaning

1. Heavy cleaning shall be measured by crew hour for each diameter of heavy cleaning approved by the Program Manager and documented.

C. Remote Trimming of Protruding Service Lateral

1. Remote trimming of protruding service lateral that prevent a thorough inspection of the pipe will be measured per each.

D. Siphon Cleaning and CCTV Inspection

1. Siphon Cleaning and CCTV inspection shall be measured per linear foot of each diameter 12" and smaller of sewer inspected and documented in accordance with the specifications.

E. Traffic Control at Major Streets due to City Pavement Project

1. Traffic control and plans as required and approved by the City for Light Cleaning and Mainline CCTV due to a City pavement project of a major street shall be measured in a one-time basis.

4.02 PAYMENT

A. Mainline CCTV Inspection

1. Light cleaning and mainline CCTV inspection shall be paid for at the unit price for each linear foot of each diameter inspected and documented in accordance with the specification.
2. The unit price for Light Cleaning and Mainline CCTV inspection shall cover the entire cost of the required light cleaning and CCTV inspection and reporting in accordance with PACP V 6.0.1 format, including but not limited to labor, mobilization and access, CCTV equipment, recording media, traffic control, light cleaning of mainline sewer, documenting results in PACP records and logs, digital format recordings, photo equipment, power supply for equipment, interim and final reports and all other appurtenant work.
3. No additional payment will be made for:
 - a. Re-inspection due to rejected inspection and/or records for any reason.
 - b. Reversals.
 - c. Performing excavation and associated sewer point repair to retrieve a stuck CCTV camera or hydraulic cleaning hose/nozzle.
 - d. Incomplete electronic logs.
 - e. Unapproved duplication of inspections: The Subcontractor is responsible to ensure duplications do not occur.
 - f. Traffic control at major streets (e.g. Shelby County Principal Arterial & Minor Arterial) requiring a City approved permit unless Light cleaning and Mainline CCTV inspection

is assigned at the direction of the Program Manager due to a City pavement project of a major street.

B. Heavy Cleaning

1. Heavy Cleaning shall be paid for at the unit price for each crew hour of each diameter of heavy cleaned sewers at the direction of the Program Manager and in accordance with the specification.
2. The unit price for Heavy Cleaning shall include the entire cost including but not limited to labor, mobilization and access, traffic control, appropriate disposal of sewer debris removed from sewer at permitted site and all other appurtenant work. Payment includes non-hydraulic jet efforts such as porcupines, cutters, power rodding, clam buckets, and other mechanical means, traffic control, and re-cleaning with hydraulic jet, labor, materials, and equipment necessary to clean mainline sufficiently to allow video reviewers a clear picture of pipe conditions.
3. No additional payment will be made for:
 - a. Additional passes of heavy cleaning if the inspection observation reveals roots, grease or other debris remaining in the sewer after the heavy cleaning passes.

C. Remote Trimming of Protruding Service Lateral

1. Remote trimming of protruding service lateral that prevent a thorough inspection of the pipe will be measured per each.

D. Siphon Cleaning and CCTV Inspection

1. Siphon cleaning and CCTV inspection shall be paid for at the unit price for each linear foot of each diameter 12" and smaller inspected and documented in accordance with the specification.
2. The unit price for Light Cleaning and Mainline CCTV inspection shall cover the entire cost of the required light cleaning and CCTV inspection and reporting in accordance with PACP V 6.0.1 format, including but not limited to labor, mobilization and access, CCTV equipment, recording media, traffic control, light cleaning of mainline sewer, documenting results in PACP records and logs, digital format recordings, photo equipment, power supply for equipment, interim and final reports and all other appurtenant work.
3. No additional payment will be made for:
 - a. Re-inspection due to rejected inspection and/or records for any reason.
 - b. Reversals.
 - c. Performing excavation and associated sewer point repair to retrieve a stuck CCTV camera or hydraulic cleaning hose/nozzle.
 - d. Incomplete electronic logs.
 - e. Unapproved duplication of inspections: The Subcontractor is responsible to ensure duplications do not occur.

E. Traffic Control at Major Streets or due to City Pavement Project

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
Modified by SARP10 Program

1. Traffic control and plans as required and approved by the City for Light Cleaning and Mainline CCTV due to a City pavement project of a major street will be paid for on a lump sum basis.

4.03 PAYMENT WILL BE MADE UNDER:

<u>Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02541-4.01.A	LIGHT CLEANING & MAINLINE CCTV INSPECTION FOR EACH DIAMETER	LINEAR FEET
02541-4.01.B	HEAVY CLEANING FOR EACH DIAMETER	CREW HOUR
02541-4.01.C	REMOTE TRIMMING OF PROTRUDING LATERAL	EACH
02541-4.01.D	SIPHON CLEANING AND CCTV INSPECTION FOR EACH DIAMETER	LINEAR FEET
02541-4.01.E	TRAFFIC CONTROL	LUMP SUM

END OF SECTION 02541

SECTION 02542

CLOSED CIRCUIT TELEVISION & SONAR INSPECTION OF LARGER DIAMETER SEWER MAINS

PART 1 GENERAL

1.01 SCOPE

- A. This Work will consist of assessment, Pipeline Assessment Certification Program (PACP) internal closed-circuit television (CCTV), and Sonar surveys to digitally inspect and record conditions of existing sanitary sewer mains and connections in 24-inch and larger diameter sanitary sewer pipes. Larger diameter sewer pipes to be inspected are located in both improved streets, arterial and primary roads, backyards and unimproved easements. Subcontractor shall have appropriate all-terrain vehicles necessary to access the work, in addition to any equipment necessary to access all elevated manholes while remaining in compliance with The Loss Control Manual. No cleaning of the sanitary sewer is required prior to CCTV and Sonar inspection unless otherwise specified by the Program Manager.
- B. The Work covered by this section includes furnishing all labor, competent PACP certified technicians, equipment, tools, accessories, and materials required to CCTV and Sonar inspect the designated 24-inch diameter and larger sanitary sewer lines.

1.02 SUBMITTALS

A. PACP Requirements

- 1. PACP compliant inspections, logs, data, and photos shall be delivered to the Program Manager (from hereon Program Manager shall be interpreted as "Program Manager or his designee") on external hard drives which will become property of the Program Manager. Data files shall be formatted to facilitate upload into a PACP compliant exchange database or internet uploads formats to an FTP site only when approved by the Program Manager.

- B. Unless otherwise specified all sample submittals shall be delivered to the Program Manager within two weeks of the NTP.

C. Traffic Control

- 1. Traffic Control Plan shall be submitted to the Program Manager, including the following items:
 - a. Outline of permit acquisition procedure for lane closures.
 - b. Methods for proper signing and barricades, which comply with City of Memphis requirements.
 - c. Major streets (e.g. Shelby County Principal Arterial & Minor Arterial) requiring a City approved permit if taking a lane for mobile operations, secured through Traffic Control Plan submittal to the City and signed by a TN P.E. The City requires two-week lead time for permit processing.
 - i. The Subcontractor will be required to deliver a sample primary/arterial road Traffic Control Plan for review by the City.
 - ii. If the City determines that the nature of the work operation or the type of road in which the Subcontractor is working requires a permit, the Subcontractor will be required to modify the sample Traffic Control Plan to obtain a permit from the City.

- d. For everywhere else where a permit is not required, the Subcontractor shall develop, provide, and implement a traffic control plan for all mobile operations in accordance with standard MUTCD specifications.

D. Permits

1. The Subcontractor is also responsible for acquiring all necessary disposal and/or landfill site permits as required to perform this work.
 2. Railroad Rights of Way: The Subcontractor shall notify the Program Manager when work or access to manholes and sanitary sewers lie within the 25 feet of railroad easement as measured by 25 feet outside the nearest rail of the tracks. To access sewer facilities within the 25 feet of the railroad right of way the Subcontractor shall contact the Program Manager 48 hours in advance who will alert the City's Zone Construction Inspector to coordinate individual railroad direction and guidance.
 3. Permit required confined space entry plans in compliance with the Loss Control Manual.
- E. Copies of National Association of Sewer Service Companies (NASSCO) certification for all field staff conducting PACP inspections.
- F. Sample of PACP compliant television survey login MS Access format.
- G. Sample of PACP compliant video inspection in MP-4 (Web optimized) format.
- H. Cleaning, CCTV and Sonar inspection vehicle and equipment supplies list.
- I. Sample of combined CCTV & Sonar inspection report.
- J. Disposal site(s) and appropriate landfill permits for appropriate disposal of all waste materials removed from the sewer during the heavy cleaning operations.

1.03 DELIVERABLES

A. Records

1. Digital Inspection Record
 - a. In the digital PACP V.6.0.1 compliant format, the Subcontractor shall provide the following information:
 - i. Digital CCTV survey and Sonar inspection which shall be recorded and shall be continuous as the inspection proceeds through the manholes and sewer pipes.
 - ii. Digital Recordings:
 - (1) The digital recording shall document the visual and audio record of the sewer pipe inspection and shall be the basis of measurement and payment. Digital recording playback shall be at the same speed that it was recorded. Original digital recordings for the Project shall be forwarded to the Program Manager on clearly labeled external hard drive(s) in PACP ACCESS format with final report submittals and shall become the property of the Program Manager. Data for a single facility asset will not be split across multiple hard drives. Digital recordings shall be available to the Program Manager by the close of business on the Monday following a week after data acquisition. File naming

must be consistent. Additional instructions, naming conventions, file structures, etc. will be provided after contract award.

(a) Picture Quality:

- (i) The sewer inspection digital record shall be free of steam, fog, vapor, or other headspace distortion that degrades the quality of the picture from the intended purpose of evaluating the sewer for structural and watertight integrity. If necessary, the Subcontractor shall provide positive ventilation or other means through the sewer pipe to draw out steam, fog, and vapor that will degrade the recorded image of the pipe.

2. Inspection Documentation Logs:

a. CCTV Records:

- i. Observations made during television inspection shall be documented in an unmodified PACP compliant manner within an electronic inspection log form, supported by accompanying audio, digital photographs and MP-4(web optimized) format recording written to an external hard drive and submitted to the Program Manager.

b. Sonar Records:

- i. Where combined CCTV and Sonar inspections are performed, the display in the viewing area shall show the combined CCTV and Sonar images of the sewer being inspected. The Sonar image shall be superimposed on the real CCTV image, and continuously recorded, as a combined operation at the time of the inspection resulting in a single combined video file in MP-4(Web optimized) format for each inspection.
- ii. The Sonar Inspection shall include a comprehensive final report on the findings concerning major defects including fractures, displaced joints, deformation, corrosion, lateral intrusions, dominant surface features, encrustation, and debris/silt depths.

3. Electronic and Data Deliverable Records

a. Daily Production Reports:

- i. The Subcontractor shall prepare daily inspection log reports for each associated sewer pipe inspected during the actual field inspection activities. These field logs shall then be sent to the Program Manager and Program inspectors in digital format after each day of work.

b. Data Deliverable and Reports:

- i. Digital recordings of the inspections written to an external hard drive and the PACP compliant database of the inspections in ACCESS format shall be submitted in electronic and pdf format.
- ii. The PACP Sonar data for the Subcontractor's working week shall be delivered to the Program Manager by the close of business on the Monday following a week

after data acquisition. The Program Manager will have one workweeks period to review and accept or reject the PACP Sonar data.

4. Quality

- a. Rejection of deliverables will be submitted to the Subcontractor via the Program Team in a written communication discussing issues that must be addressed. The Subcontractor will be required to follow up with a response within three business days upon receipt of the written communication. Subcontractors will have seven (7) calendar days from the rejection notice date to make the necessary corrections and resubmit the data deliverable in its entirety.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. General

1. Subcontractor shall have appropriate all-terrain vehicles necessary to access the work. Expected terrain may require the use of four-wheel drive vehicles, ATVs, tracked vehicles, or other appropriate off-road vehicles.
2. All equipment used for PACP compliant CCTV sewer segment inspections of existing larger diameter sanitary sewer mains shall be specifically designed and manufactured for the purpose intended under this Contract. The software and hardware for the electronic capture of the inspection defects and recorded observations must be Version 6.0.1 NASSCO PACP compliant.
3. All CCTV equipment requirements contained in Section 02541 – Closed Circuit Television Inspection of Sewer Mains & Connections, Paragraph 2.01 are applicable, except 2.01.D. Cleaning Equipment since pre-cleaning of the larger diameter sewers is not required.

PART 3 EXECUTION

3.01 CCTV & SONAR INSPECTIONS OF SEWER MAINS

A. Heavy Cleaning

1. Heavy cleaning shall be completed if segment has debris levels high enough to prevent the sonar equipment from passing through segment. Heavy cleaning shall be as contained in Section 02541 - Closed Circuit Television Inspection of Sewer Mains & Connections, Paragraph 3.01.A.1. Cleaning.

B. Sewer Flow Levels During Inspection Operations

1. Maintain low sewer flow during inspection by using sandbags or flow-through plugs or by inspecting during low flow times of day, evening or early morning hours while camera is moving and recording observations in the sewer segment. Any items used to restrict flow shall be removed immediately after intended use.
 - a. Flow-through Plugs: If used, secure the plugs so as to remain in place during inspection. Use a fail-safe device at the downstream pipe connection to ensure the plug is not lost in the downstream sewer segment if it becomes dislodged from the upstream pipe connection.

- b. Conduct all cleaning and CCTV operations to prevent building backups and sewer overflows.
 - c. Contractor shall be responsible for cleanup, repair, fines, property damage costs, and claims for any sewage backup, spillage or sanitary sewer overflow during or as a result of the cleaning and inspection operations.
 2. Allowable Depth of Flow for Inspection Operations:
 - a. For effective inspection, all flow shall be minimized in the segment being inspected. However, the depth of flow at the upstream manhole of the interceptor section being worked shall be within the specified limits provided herein.
 3. Maximum Allowable Depth of Flow for CCTV Inspection
 - a. 24-inch diameter and Larger Pipe - 30% of pipe diameter. Flow in excess of the 30% depth of flow limitation shall include the provision for Sonar inspection for below the water surface level in addition to a raft mounted CCTV inspection for above the water level.
 - b. Exceptions to these guidelines shall result in rejection, and non-payment, of the CCTV inspection unless approved in advance by the Program Manager.
- C. Camera Operations
 1. When flow is in excess of the 30% depth of flow limitation, the Subcontractor shall include the provision for Sonar inspection for below the water surface level in addition to a raft/float mounted CCTV inspection for above the water level.
 2. Raft/float supports shall be collapsible to fit through existing manhole frames associated with 24-inch diameter and larger sewers.
 3. Camera Operations requirements shall be as contained in Section 02541 – Closed Circuit Television Inspection of Sewer Mains & Connections, Paragraph 3.01 are applicable for the execution of the CCTV operations with the camera mounted on a raft or float, except as modified below.
 4. Contractor shall be responsible for all judgments and impacts as to whether an obstruction in the sewer main can be passed. Costs involved in extracting a stuck camera in the sewer main will be borne by the Subcontractor and at no additional cost to the Program Manager.
- D. Camera & Sonar Combined Operations
 1. The combination CCTV and Sonar equipment shall be capable of inspecting a length of sewer up to at least 1,000 linear feet when entry into the sewer may be obtained at each end and up to 750 feet where a self-propelled unit is used and where entry is possible from one end only.
 2. Each inspection unit shall contain a means of transporting the CCTV camera or Sonar equipment in a stable condition through the sewer under inspection. Such equipment shall ensure the maintained location of the CCTV camera and Sonar equipment when used independently on or near to the central axis of a circular shaped sewer. The maximum allowable flow depth that is permissible for the combination Sonar/CCTV is equal to 75% of the pipe diameter. A Sonar only unit shall be used when flow is greater than 75% of the pipe diameter.

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
Modified by SARP10 Program

3. Where the CCTV camera or Sonar head are towed through the sewer, all winches shall be stable with either lockable or ratcheted drums. All connection shall be steel or of an equally non-elastic material to ensure the smooth and steady progress of the CCTV camera or Sonar equipment through the surcharged sewer. All winches shall be inherently stable under loaded conditions.
4. Each inspection unit shall carry sufficient numbers of guides and rollers such that, when inspecting, all connecting materials are supported away from pipe and manhole structures and all CCTV & Sonar lines used to measure the CCTV camera and the Sonar head location within the sewer are maintained in a taut manner and set a right angles where possible, to run through or over the measuring equipment.
5. The CCTV Camera and Sonar head shall be positioned to reduce the risk of picture distortion. In circular sewers the CCTV camera lens and/or Sonar head shall be positioned, when possible, centrally within the “dry” area for the CCTV and centrally within the “wet” area for the Sonar head. In non-circular sewers, picture/sonar image orientation shall be taken at mid-height, unless otherwise agreed, and centered horizontally. In all instances the camera/sonar lens shall be positioned looking along the axis of the sewer. A positioning tolerance of + 10% of the vertical sewer dimension shall be allowed.
6. When the scanning Sonar is deployed, either stand alone or combined with CCTV, the speed or travel shall be limited to 4 inches per second or 20 feet per minute.
7. A General Condition 360° CCTV rotational scan must be implemented at every 50 feet interval (min) along sewers, and at all manholes and all salient, specified, defect features. More frequent scans must be made should the condition of the pipe differ from the previous scan. The tilt must not be less than 225°.
8. The color palette shall have a minimum of 16 colors with text. The Sonar image, inside the viewing area shall be in color.
9. The picture update speed shall not result in unsatisfactory picture resolution. The range of resolution shall be 1/10 inch.
10. The maximum beam width of Sonar energy pulse shall be no greater than two degrees from the center of the transducer.
11. The transducer shall be of the continuous scanning type, the speed of which shall be 1 second per 360° scan.
12. The Subcontractor is responsible for hiring a licensed sub-contractor to retrieve any equipment/foreign objects that get stuck in the sewer system through the execution of the scope of work (fallen cameras, jet nozzles, inflatable plugs, sandbags etc.) at the Subcontractor’s own cost. Such retrieval by an appropriately licensed sub-contractor shall be made within 72 hours to avoid interfering with the City of Memphis sewer system operations. Any and all impacts and related costs due to the Subcontractor’s equipment in the line shall be the responsibility of the Subcontractor. Subcontractor shall follow SARP10 sewer point repair specifications outlined in “Section 02540 Sanitary Sewer Point Repairs” and “Section 02950 Removal and Replacement of Pavements and Incidentals” during retrieval of equipment. Also, per “00585.2.2 Safety, Health, and Accident Prevention Program”, Purchaser must approve sub-tier Subcontractors prior to mobilization to the jobsite.

E. Coordination with Other Subcontractors

1. The Program Manager has an existing contract with a construction subcontractor to handle all clearing, grubbing, access road building, and easement coordination and acquisition. The SSES Subcontractor shall be responsible for notifying the Program Manager of access needs in a timely manner to allow the construction subcontractor to perform the work without impacting the SSES Subcontractor's schedule. SSES Subcontractor shall also coordinate directly with the construction subcontractor in instances where both entities must work on the same site simultaneously.

F. Quality Assurance

1. QA/QC shall be as contained in Section 02541 - Closed Circuit Television Inspection of Sewer Mains & Connections, Paragraph 3.01.A.4. Quality Assurance.

G. Deliverable Documentation

1. Mainline Sewer:
 - a. Submit V.6.0.1 PACP compliant records, logs, and electronic inspection data for sewer line inspection to Program Manager by the close of business on the Monday following a week after data acquisition.
 - b. Digital videos, data, and photos shall be delivered to the Program Manager on external hard drives which will become property of the Program Manager.
 - c. Data files shall be formatted to facilitate upload into a PACP Database with the approval of the Program Manager.
 - d. Inspections displaying poor digital video/audio quality will be rejected. Quality refers to, but is not limited to, grease or debris on lens, camera under water, image too dark, image washed-out, distorted image, or out of focus images, lines improperly cleaned, and poor/no audio.
 - i. Contractor will re-televiser rejected inspections and resubmit inspections at no additional cost to the Program Manager.
2. Map changes/undocumented manholes:
 - a. For map changes identifying undocumented manholes and network changes which were found as a result of field inspections or observations, a Map Edit Form shall also be prepared and supplied by the Subcontractor with a drawing or sketch and shall indicate special details, field measurement or distances, or locations about an observed undocumented manhole or a change to the sewer network. The Map Edit Form should also identify buried manholes and siphons that have been encountered.
 - b. Contractor shall indicate all buried manholes identified in the field via Sonar/CCTV using the provided Buried Manhole Form. Any additional manholes that have not been located or verified via Sonar/CCTV but are impeding the completion of required Sonar/CCTV work should be designated as unable to locate (UTL) and be included on the form.
3. Incident observation and data collection:
 - a. The Subcontractor shall report all buried manholes, pipe collapses, large void, utility conflicts, Unable to Complete line segments, and heavy cleaning requests to the Program Manager through the program-defined reporting application (Teamworx) and

shall fill out all required fields and attach picture documentation as necessary. At least one picture shall be included showing the incident or condition of the sewer line encountered that required it to be recorded. All reported incident observations will be monitored by the Program Manager and inadequate reporting will result in a meeting between the Program Manager and Subcontractor.

- b. The Subcontractor shall also submit the proper forms for buried manholes, “Unable to Locate” manholes, and “Unable to Complete” manholes following the procedures described in the SARP10 Data Delivery Guidelines.

4. Sonar Reports:

- a. The Subcontractor shall submit two hard copies of all details, i.e. a typed “Full Detail” report for each inspection, showing the position and full text of each defect encountered and their grades. The Subcontractor shall also supply an overall Summary Report detailing major defects and those inspections that require attention along with a statistical report showing lengths of sewers inspected and a breakdown of sizes and lengths inspected.
- b. The Subcontractor shall supply a MS ACCESS database and free issue software for both the viewing of the media files and the Sonar images from within the database.
- c. The Sonar Inspection shall include complete structural and service assessment to the equivalent PACP standard as that obtained through conventional CCTV imagery.
- d. The Sonar inspection shall include measurement of flow depth and debris/silt depth.
- e. A Color High Resolution Sonar image of cross sections of the sewer must be taken (saved) every 50 feet or more frequently should the internal profile or debris/silt depth of the sewer change from the previously saved image.
- f. These images are to be cross-referenced to the reports and database(s) for ease of retrieval.

PART 4 MEASUREMENT & PAYMENT

4.01 MEASUREMENT

A. CCTV & Sonar Inspection

1. CCTV & Sonar inspection shall be measured by linear foot by each diameter of mainline sewer inspected and documented in accordance with the specification.

4.02 PAYMENT

A. CCTV & Sonar Inspection

1. CCTV & Sonar inspection shall be paid for at the unit price for each linear foot of each diameter inspected and documented in accordance with the specification.
2. The unit price for CCTV & Sonar inspection shall cover the entire cost of the required CCTV & Sonar inspection and reporting in accordance with PACP V 6.0.1 format, including but not limited to labor, mobilization and access, CCTV equipment, recording media, traffic control, light cleaning of mainline sewer, documenting results in PACP records and logs, digital format recordings, photo equipment, power supply for equipment, interim and final reports, and all other appurtenant work.

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
Modified by SARP10 Program

3. No additional payment will be made for:
 - a. Re-inspection due to rejected inspection and/or records for any reason
 - b. Incomplete electronic logs for either CCTV or Sonar digital records
 - c. Traffic control at major streets (e.g. Shelby County Principal Arterial & Minor Arterial) requiring a City approved permit unless CCTV and Sonar inspection is assigned at the direction of the Program Manager.

4.03 PAYMENT WILL BE MADE UNDER:

<u>Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02542-4.01.A	CCTV & SONAR INSPECTION	LINEAR FEET

END OF SECTION 02542

SECTION 02544
MANHOLE GPS & MACP INSPECTION

PART 1 GENERAL

1.01 SCOPE

- A. This Work shall consist of locating sanitary sewer system facilities, gathering sub-meter grade GPS coordinates of manhole (including lamphole) covers, Manhole Assessment Certification Program (MACP) protocol Level 1 and Level 2 manhole inspections using the National Association of Sewer Service Companies (NASSCO) MACP Version 6.0.1 protocols, associated photographs, camera inspection of manholes and the associated pipe connections, and documentation of manholes not found, not on grade and/or not showing. The work shall also consist of completing an internal 3D manhole scan for each manhole with a depth greater than 25 feet or associated with large-diameter sanitary sewer interceptors (36-inch diameter and larger). Manholes to be located, documented and inspected are in both improved streets, arterial and primary roads, backyards and unimproved easements. Manholes may be elevated significantly above the existing ground level. Subcontractor shall have appropriate all-terrain vehicles necessary to access the work, in addition to any equipment necessary to access all elevated manholes while remaining in compliance with The Loss Control Manual. Once new manhole coordinates are obtained, the updated source GIS map data shall be delivered to Program Manager in order to reflect the actual sewer system network.
- B. The Work covered by this section includes furnishing all labor, competent MACP certified technicians/crew leads, equipment, tools, accessories, and materials required to GPS, perform MACP Level 1 and Level 2 inspections, conduct 3D scan camera inspections where applicable and document the specified manholes.
- C. Selected Subcontractor(s) will be provided two Geo-databases; one will have supporting records (aerial photo overlays, outfall and block maps and as-builts, as available), and a maiden database which will include the asset ID for each manhole.

1.02 SUBMITTALS

- A. GPS Requirements
 - 1. Sub-meter GPS coordinates, ESRI Shapefile (.shp), Levels 1 and 2 MACP data and records, and camera inspection photos and 3D scan of the manholes shall be delivered to the Program Manager on clearly labeled external hard drive(s) which will become property of the Program Manager. Inspection data for any one asset shall not be delivered on multiple drives. MACP data files shall be formatted to facilitate upload into a MACP Exchange Database.
- B. Unless otherwise specified, all sample submittals shall be delivered to the Program Manager within two weeks of the NTP.
- C. For rehabilitation jobs, only Post-Rehabilitation MACP submittals will be required by the Purchaser.
- D. Traffic Control
 - 1. A Traffic Control Plan shall be submitted to the Program Manager, including the following items:
 - a. Outline of permit acquisition procedure for lane closures.

- b. Methods for proper signing and barricades, which comply with local requirements and the City.
- c. Major streets (e.g. Shelby County Principal Arterial & Minor Arterial) requiring a City approved permit if taking a lane for mobile operations, secured through Traffic Control Plan submittal to the City and signed by a TN P.E. The City requires a two-week lead time for permit processing.
 - i. The Subcontractor will be required to deliver a sample primary/arterial road Traffic Control Plan for review by the City.
 - ii. If the City determines that the nature of the work operation or the type of road in which the Subcontractor is working requires a permit, the Subcontractor will be required to modify the sample Traffic Control Plan to obtain a permit from the City.
- d. For everywhere else where a permit is not required, the Subcontractor shall develop, provide, and implement a Traffic Control Plan for all mobile operations in accordance with standard MUTCD specifications.

E. Permits

- 1. The Subcontractor is also responsible for acquiring all necessary disposal and/or landfill site permits required to perform this work.
 - 2. Railroad Rights of Way: The Subcontractor shall notify the Program Manager when work or access to manholes and sanitary sewers lie within the 25 feet railroad easement, as measured by 25 feet outside the nearest rail of the tracks. To access sewer facilities within the 25 feet of the railroad right of way, the Subcontractor shall contact 48 hours in advance the Program Manager, who will alert the City's Zone Construction Inspector to coordinate individual railroad direction and guidance.
 - 3. Permit required confined space entry plans in compliance with the Loss Control Manual.
- F. GPS calibration standards, including frequency, are to be followed in the field; specify which available base stations will be used for the work.
- G. Sample of sub-meter GPS coordinates delivered in electronic and pdf format.
- H. Copies of NASSCO certifications for all field staff conducting MACP Levels 1 and 2 inspections.
- I. Sample of MACP Level 1 and Level 2 documentation logs (with photo documentation comments and photos properly referenced) in MACP formats, in both electronic and pdf format.
- J. Equipment list, including GPS and 3D camera manufacturer and model equipment to be used.
- K. Sample of the GPS coordinate delivery in an ESRI Shapefile (.shp) file format.
- L. Sample of the digital inspection data delivery in MS ACCESS database format.
- M. Sample of 3D manhole inspection and all software necessary to view inspections.

1.03 DELIVERABLES

A. Records

- 1. GPS Manhole Cover Coordinates

- a. Subcontractor's Level 1 Lamphole and Level 2 Manhole GPS coordinate delivery to the Program Manager shall be in an ESRI Shapefile (.shp) file format. Inspection data is to be delivered to the Program Manager by the close of business on the Monday following a week after data acquisition. Subsequent data will not be accepted if GPS data is not obtained and delivered at the same time as inspection is conducted. The requested GPS control check file (MS EXCEL) shall also be delivered at this time.
2. Level 1 and Level 2 Inspection Documentation
 - a. Deliver complete MACP Level 1 for lampholes and Level 2 inspections for manholes in MACP electronic database and pdf electronic formats on an external hard drive. Delivery will be in MS ACCESS database format unless otherwise preapproved by the Program Manager. Inspection data is to be delivered to the Program Manager by the close of business on the Monday following a week after data acquisition.
3. 3D Camera Inspection
 - a. For manholes greater than 25-feet in depth or associated with lines 36-inches or greater in diameter, the Subcontractor shall provide the Program Team with the software required to view the digital film file in the way the Subcontractor can view it, including full control of the virtual pan and tilt. The digital files must include the following:
 - i. An unfolded view of the manhole with a minimum of 3,000 lines of vertical resolution.
 - ii. The capability to produce three-dimensional representation of the manhole structure.
 - iii. A distortion-free virtual pan and tilt allowing the review of the manhole structure from any angle at any depth. The virtual pan and tilt must consist of view from the bottom and top camera, any virtual pan and tilt that artificially creates this view from a single camera will be deemed unacceptable due to distorted images on the direct side view.
2. Camera Inspection Documentation
 - a. Include specified camera photo documentation of defects, leaks and pipe connections in the MACP Image reference field as appropriate, for the Level 2 documentation. Inspection data is to be delivered to the Program Manager by the close of business on the Monday following a week after data acquisition.
3. Manhole Reports
 - a. Deliver a summary report in PDF format of each manhole inspected. The report will include all MACP Level 1 & Level 2 data collected for the manhole. The report shall include the surface view photo of the manhole with the outlet pipe facing 6 o'clock as well as a downhole photo of the channel with the outlet pipe at 6 o'clock. Any defects noted in the manhole and any pipe connections shall also have an accompanying photo in the report.
4. Data Deliverables and Reports
 - a. In addition to the electronic database and pdf format reports, each MACP report will include photographs of manhole defects and pipe connection photographs. The MACP

compliant database of the inspections in ACCESS format shall also be submitted to the Program Manager electronically on an external hard drive.

- b. The MACP data for the Subcontractor's working week shall be delivered to Program Manager by the close of business on the Monday following a week after data acquisition. The Program Manager will have one workweek period to review and accept or reject the MACP data.

5. Quality

- a. Rejection of deliverables will be submitted to the Subcontractor via the Program Team in a written communication discussing issues that must be addressed. The Subcontractor will be required to follow up with a response within three business days upon receipt of the written communication. Subcontractors will have seven (7) calendar days from the rejection notice date to make the necessary corrections and resubmit the data deliverable in its entirety.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Subcontractor shall have appropriate all-terrain vehicles necessary to access the work. Expected terrain may require the use of four-wheel drive vehicles, ATVs, tracked vehicles, or other appropriate off-road vehicles. Additionally, the Subcontractor shall have all equipment necessary to access elevated manholes in accordance with the Loss Control Manual.
- B. All equipment used for the gathering of GPS coordinates, collection of condition assessment information, and digital 3D camera inspection of manholes shall be specifically designed and manufactured for the purpose intended under this Contract. The software and hardware for the electronic capture of the inspection defect observations must be consistent with NASSCO's MACP Level 1 and Level 2 requirements for the collection of data. GPS equipment is required to be sub-meter grade for data collection and GIS map updates for manhole / lamphole facility locations. Export of the electronic inspection data to an MACP format Microsoft ACCESS database for analysis is required.
- C. The Subcontractor shall submit an equipment list to the Program Manager for approval before the commencement of the Work and shall certify that back-up equipment is available and can be delivered to the worksite in 72 hours.
 1. Minimum Required GPS Equipment
 - a. At a minimum the GPS Equipment shall be sub-meter grade, GPS coordinates to be real-time or post-processed to achieve sub-meter accuracy.
 2. Camera
 - a. All camera systems used shall be digital format. The camera must have two independently or simultaneously controlled digital cameras, one facing in the downward direction and one facing in the upward direction. Each camera must have a minimum of 185-degree field of view. The inspection camera system must illuminate the interior of the manhole using a xenon strobe light. The light shall be positioned 360 degrees around the camera lens to distribute the light evenly onto the structure walls. The lighting must be able to illuminate manholes up to 120" in diameter without the need of any auxiliary lighting.

- b. A camera must also be able to obtain still images of the following specified pictures: Photo 1- surface view photos taken of the manhole should include a whiteboard (or similar) with the manhole ID number identified on it. The photographer should be standing with the outlet pipe facing their 6 o'clock position. Photo 2 - the downhole photo of the manhole channel should be taken with the outlet pipe facing their 6 o'clock position. Additional photos as specified by MACP guidance. The camera used for these images must be minimum 5 megapixel .jpg format for sufficient clarity and detail in the photos, and photos of at least 2 MB shall be submitted. If the 3D scan camera system cannot obtain photos of sufficient quality, a pole-mounted digital camera with lighting shall be used for the specified pictures in this paragraph.
 - c. The 3D camera system shall produce individual images or frames with no more than 0.1 inches of movement during image or frame exposure to produce crisp, clear images. The inspection camera must provide a minimum of 3,000 lines of vertical resolution in the side view and a minimum of 500 lines in the perspective view.
 - d. Inadequate lighting, image distortions, blurry or murky images, low resolution, dirty lens and/or other quality issues will be a cause for rejection. If unsatisfactory, Subcontractor shall perform work until deliverable is of acceptable quality. No payment will be made for unsatisfactory inspections or until submittal is accepted.
3. Data Logger and Software
- a. MACP inspections and logs created and captured electronically during the MACP inspection of the manhole through the use of commercially available electronic data loggers are required. Paper records for data collection in the field shall not be used. NASSCO MACP protocols shall be used for capturing and recording the observations.
 - b. The data logger equipment and software shall allow Program Manager direct access to the captured electronic data and provide for export of the data in accordance with MACP formats and standards.
4. Retrieval of Stuck Equipment
- a. The Subcontractor is responsible for hiring a licensed sub-Subcontractor to retrieve any equipment that becomes lodged in the sewer system through the execution of the scope of work (fallen cameras, jet nozzles, inflatable plugs, sandbags etc.) at the Subcontractor's own cost. Such retrieval by an appropriately licensed sub-Subcontractor shall be made within 72 hours to avoid interfering with the City of Memphis sewer system operations. Any and all impacts and related costs due to the Subcontractor's equipment in the line shall be the responsibility of the Subcontractor.

PART 3 EXECUTION

3.01 INSPECTION

A. GPS Coordinates of Manhole Cover

1. Program Manager will provide Subcontractor with a digital copy of the original GIS source map indicating the sewer system network compiled from existing City records.
2. The Subcontractor shall capture and record sub-meter grade x, y and z coordinates of each manhole cover identified in the original GIS maiden data map provided with a unique asset identification (ID) number. Additional sanitary sewer lamphole and manholes found in the field in the course of the inspection work that are not provided in current mapping nor identified with a current unique asset ID shall be documented and GPS coordinates shall

be recorded. A provisional manhole asset ID number shall be used by the Subcontractor by adding a period and a two-character number to the closest upstream manhole ID.

3. Record sub-meter GPS coordinates in NAD83 TN State Plane Coordinates horizontal, NAVD88 vertical in US Survey feet using properly-calibrated GPS equipment. If GPS coordinates cannot be obtained due to buildings, trees or cloud cover, Subcontractor shall note this on the inspection form and return at least one additional time at a different time of day or under different sky cover. If both attempts fail at securing the sub-meter coordinates, this is to be documented and reported in the submittal. Land surveying shall not be required where GPS is not available.
4. The Subcontractor shall be expected to use all reasonable means to locate the lampholes and manholes in the field. This includes walking the pipeline alignment, using measuring tapes or wheels from the last found manhole, using metal detectors, or other means. If manholes are not able to be found and documented or unknown manholes are found, record the reasons for not locating or not opening the manhole or the specifics of the new manhole found, and submit with supporting MACP documentation to the Program Manager daily.
5. Once GPS coordinates are obtained for known and newly discovered facilities, a ESRI shapefile (.shp) shall be delivered to the program Manager with the associated inspection data to reflect the actual sewer systems network spatial location for the assigned inspection area-.
6. The Subcontractor shall revisit predefined GPS control locations near project area at least one time per day per each GPS unit used as a quality control check on GPS accuracy. Subcontractor is to document these checks on a single log, which shall be kept on file for the duration of the project and shall be released to Program Manager on a weekly basis.

B. MACP MH Inspection

1. The Subcontractor shall document and record each sanitary sewer manhole inspection in MACP Level 1 format for lampholes and Level 2 format for manholes with supporting completed MACP format database. The complete NASSCO MACP Levels 1 and Level 2 protocols must be utilized for the lamphole and manhole inspections respectively and must be associated in the electronic database and pdf documentation with the unique asset ID provided.
2. The Subcontractor shall mark the direction of wastewater flow (one arrow per pipe) in and out of the manhole around the perimeter of the manhole cover on the street with discrete green arrows spray painted onto the road surface using a guide or template for the arrows. The arrows shall be a minimum of 12 inches and a maximum of 18 inches in length.
3. The Subcontractor shall follow the prescribed MACP Level 1 and Level 2 procedures and use the required nomenclature and formats to document the manhole interior and exterior conditions and defects.
4. Subcontractor shall be responsible for cleanup, repair, fines, property damage costs, and claims for any sewage backup, spillage or sanitary sewer overflow during or as a result of the field operations.

C. Camera Inspection of Manholes and Associated Pipe Connections

1. For manholes greater than 25-feet in depth and manholes associated with lines 36-inches and larger in diameter, a 3D manhole scan shall be completed in conjunction with Level 2 manhole inspections of defects and include each sewer pipe connection in the manhole. The photo record of the inspection shall document defects and leaks and shall include a

photo record of the connecting pipes in each manhole with an accurate measuring . Abbreviations, naming conventions, and numbering conventions shall be documented in MACP formats.

2. File naming must be consistent. Additional instructions, naming conventions, file structures, etc. will be provided after contract award.

D. Incident Observation and Data Collection

1. The Subcontractor shall report all “Unable to Complete” and surcharged manholes to the Program Manager through the program-defined reporting application (Teamworx) and shall fill out all required fields and attach picture documentation as necessary. For a surcharged manhole, at least one picture shall be included to document the level of surcharge. All reported incident observations will be monitored by the Program Manager and inadequate reporting will result in a meeting between the Program Manager and Subcontractor.
2. The Subcontractor shall also submit the proper forms for buried manholes, “Unable to Locate” manholes, and “Unable to Complete” manholes following the procedures described in the SARP10 Data Delivery Guidelines.

PART 4 MEASUREMENT and PAYMENT

4.01 MEASUREMENT

A. GPS Coordinates of Manhole Cover

1. The capture and associated documentation of sub-meter GPS x, y and z coordinates for each lamphole and manhole cover will be measured for payment per each lamphole and manhole located by GPS and its coordinates recorded in accordance with the specification, provided that documentation meets QA/QC standards.

B. MACP Level 1 for Lamphole Inspections

1. The inspection and recording of all lamphole observations in a MACP compliant fashion will be measured for payment per each lamphole inspected in accordance with the specification.

C. MACP Level 2 for Manhole Inspections

1. The inspection and recording of all manhole observations in a MACP compliant fashion will be measured for payment per each manhole inspected in accordance with the specification. For manholes greater than 25-feet in depth or associated with lines 36-inches in diameter or greater, a 3D manhole scan shall be included as part of the MACP Level 2 inspection.

4.02 PAYMENT

A. GPS Coordinates of Manhole Cover

1. The capture and associated documentation of sub-meter GPS x, y and z coordinates for each manhole cover shall be paid for at the unit price bid for each lamphole and manhole cover coordinates documented and recorded in accordance with the specification provided that QA/QC standards are met.
2. The unit price for each manhole cover GPS set of coordinates shall cover the entire cost of the GPS equipment and time necessary to gather the coordinates, including but not

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
 Modified by SARP10 Program

limited to calibrating the equipment; setup and access; traffic control; documenting results in prescribed MACP electronic formats, records and logs; power supply for equipment; interim and final reports; and all other appurtenant work.

3. No additional payment will be made for:
 - a. Location or re-inspection due to cars parked over manholes or other impediments to on grade and showing manhole covers.
 - b. Additional visit(s) to secure the proper GPS coordinates due to lack of adequate satellite coverage or reception.

B. MACP Level 1 for Lamphole Inspections

1. The inspection and recording of all lamphole observations in a MACP format shall be paid for at the unit price bid per each MACP Level 1 inspection performed in accordance with the specification, provided that QA/QC standards are met.
2. The unit price for each MACP lamphole inspection shall cover the entire cost of the inspection and reporting, including but not limited to setup and access, documenting results in records and logs, power supply for equipment, interim and final reports and all other appurtenant work.

C. MACP Level 2 for Manhole Inspections

1. The inspection and recording of all manhole observations in a MACP format shall be paid for at the unit price bid per each MACP Level 2 inspection performed in accordance with the specification, provided that QA/QC standards are met.
2. The unit price for each MACP manhole inspection shall cover the entire cost of the inspection and reporting, including but not limited to setup and access, documenting results in records and logs, digital photos, power supply for equipment, interim and final reports, and all other appurtenant work. This also includes the materials and labor to complete 3D scan of the manhole with all associated deliverables where applicable.

4.03 PAYMENT WILL BE MADE UNDER

<u>Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02544-4.01.A	GPS COORDINATES OF MANHOLE COVER	EACH
02544-4.01.B	MACP LEVEL 1 LAMPHOLE INSPECTIONS	EACH
02544-4.01.C.1	MACP LEVEL 2 MANHOLE INSPECTIONS - NO 3D SCAN	EACH
02544-4.01.C.2	MACP LEVEL 2 MANHOLE INSPECTIONS WITH 3D SCAN	EACH

END OF SECTION 02544

SECTION 02546
SMOKE TESTING AND DYE WATER TRACING

PART 1 GENERAL

1.01 SCOPE

- A. This Work will consist of smoke testing of sanitary sewer manholes, sewer pipes, sewer laterals and interceptors and confirming dyed water flooding of specified defects to identify and confirm sources of infiltration and inflow, including necessary public notices to areas affected by the smoke test and dye testing operations, notifications to individual buildings and residences, police, and fire, providing necessary barriers around access points to prevent injury to the public, securing the access to the sewer pipes to be tested, providing and operating blowers and smoke generators for performing the smoke test, and furnishing of all inspection documentation of observations concerning smoke test results.
- B. The Work covered by this section includes furnishing all labor, competent technicians/crew leads, equipment, tools, accessories, and materials required to execute the smoke testing, sub-meter GPS of smoke defect sources and directed dye tracing of the identified sewer segments and associated sewer laterals. Work is included on public and private property. Dye testing of specified defects associated with the manhole or sewer asset shall be performed in conjunction with CCTV of the same asset.
- C. Subcontractor will be provided two Geo-databases; one will have supporting records (aerial photo overlays, outfall and block maps, as-builts as available), and the second will be a maiden database which will include the asset ID for each manhole.

1.02 SUBMITTALS

- A. GPS Requirements
 - 1. GPS coordinates of the smoke located defects, photo records of the smoking defects, and associated record data shall be delivered to the Program Manager (from hereon Program Manager shall be interpreted as "Program Manager or his designee") on external hard drive(s) which will become property of the Program Manager. Data files and photos shall be formatted to facilitate upload into a compatible Exchange ACCESS database or internet upload to an FTP site only when requested by the Program Manager.
- B. Unless otherwise specified all sample submittals shall be delivered to the Program Manager within two weeks of the NTP.
- C. Traffic Control
 - 1. A Traffic Control Plan shall be submitted to the Program Manager, including the following items:
 - a. Outline of permit acquisition procedure for lane closures.
 - b. Methods for proper signing and barricades, which comply with local requirements and the City.
 - c. Major streets (e.g. Shelby County Principal Arterial & Minor Arterial) requiring a City approved permit if taking a lane for mobile operations, secured through Traffic Control Plan submittal to the City and signed by a TN PE. The City requires 2-week lead time for permit processing.

- i. The Subcontractor will be required to deliver a sample primary/arterial road Traffic Control Plan for review by the City.
 - ii. If the City determines that the nature of the work operation or the type of road in which the Subcontractor is working requires a permit, the Subcontractor will be required to modify the sample Traffic Control Plan to obtain a permit from the City.
- d. For everywhere else where a permit is not required, the Subcontractor shall develop, provide, and implement a Traffic Control Plan for all mobile operations in accordance with standard MUTCD specifications.

D. Permits

1. The Subcontractor is also responsible for acquiring all necessary disposal and/or landfill site permits required to perform this work.
 2. Railroad Rights of Way: The Subcontractor shall notify the Program Manager when work or access to manholes and sanitary sewers lie within 25 feet of the railroad easement as measured by 25 feet outside the nearest rail of the tracks. To access sewer facilities within the 25 feet of the railroad right of way the Subcontractor shall contact the Program Manager 48 hours in advance who will alert the City's Zone Construction Inspector to coordinate individual railroad direction and guidance.
- E. Proposed electronic field documentation format, including provisions for capture and recording of GPS coordinates of smoke sources and photo records of sources.
- F. GPS calibration standards, including frequency, are to be followed in the field; specify which available base stations will be used for the work.
- G. Sample of sub-meter GPS coordinates delivered in electronic and pdf format.
- H. Equipment list, including GPS and camera manufacturer and model equipment to be used.
- I. Sample of the digital inspection data delivery in MS ACCESS database format.
- J. Manufacturer specification sheets and any associated material safety data sheets (SDS) for the smoke source and dye source to be used.
- K. Proposed public notification process including daily police and fire contacts, neighborhood door hanger canvassing, and other project and public contacts. All public notification shall be coordinated with the Program Manager.
- L. Proposed rapid response to smoke in buildings including the Subcontractor's use of whole house fans and other mechanisms to clear smoke form affected properties.
- M. Digital inspection data delivery will be in MS ACCESS database format.

1.03 DELIVERABLES

A. Records

1. Smoke Testing Logs, and Digital Photo Documentation
 - a. Smoke testing records shall be submitted to the Program Manager by the close of business on the Monday following a week after data acquisition.

B. Cameras

1. All cameras used shall be digital format color cameras specifically designed or modified for use in sewer manhole inspection work. All cameras used during inspections shall have a minimum of 5 mega-pixels .jpg format for sufficient clarity and detail in the photos, and photos of at least 2 MB shall be submitted.

C. Sewer Plugs

1. Inflatable sewer plugs, sandbags, or other air flow restrictors or baffles shall be used to isolate individual sewer pipe segments for smoke testing. Any items used to restrict flow shall be removed immediately after intended use.

D. Ventilation Blower

1. The Subcontractor shall maintain a high capacity, whole house ventilation fan onsite during the smoke testing should any customer's building inadvertently fill with the smoke from the testing. The Subcontractor must be immediately responsive to any customer's smoke concerns or problems.

E. Dye Water Injectors

1. For localized courses of smoke to be confirmed by dyed water, the Subcontractor shall provide dye water injectors. These may be modified tree root fertilizer feeders or apparatuses developed by the Subcontractor. The injector shall be fitted with a garden hose, and a feed cup shall be capable of dispensing or dosing dye to the tip of the injector. The shaft of the dye water injector shall be a minimum of four feet long to enable injection directly into the soil adjacent to the smoke source.

F. Minimum Required GPS Equipment

1. At a minimum the GPS equipment shall be sub-meter grade, GPS coordinates are to be real-time or post-processed to achieve sub-meter accuracy. GPS coordinates must be in NAD83 TN State Plane Coordinates horizontal, NAVD88 vertical in US Survey feet using properly-calibrated GPS equipment.

G. Retrieval of Stuck Equipment

1. The Subcontractor is responsible for hiring a licensed sub-contractor to retrieve any equipment/foreign objects that get stuck in the sewer system through the execution of the scope of work (fallen cameras, jet nozzles, inflatable plugs, sandbags etc.) at the Subcontractor's own cost. Such retrieval by an appropriately licensed sub-contractor shall be made within 72 hours to avoid interfering with the City of Memphis sewer system operations. Any and all impacts and related costs due to the Subcontractor's equipment in the line shall be the responsibility of the Subcontractor.

2.02 MATERIALS

A. Smoke

1. The smoke used in smoke testing shall be acceptable for both indoor and outdoor use, shall be non-contaminating, and shall leave no residue to stain clothing, drapes, carpeting or other fabrics in building interiors. Smoke shall be non-hazardous to humans and pets and shall be generated from liquid smoke (Hurco's LiquiSmoke™, or equal), as approved by Program Manager. The liquid smoke product shall be accompanied by Material Safety Data Sheets (MSDS) for both the liquid used to generate the smoke and the smoke itself that demonstrates these product qualities. If two MSDS's are not available for the

Subcontractor's proposed liquid smoke product, the Subcontractor shall use Hurco's LiquiSmoke™.

B. Dye

1. Tracer dyes may be in tablet, powder or liquid form. The Subcontractor shall secure several colors to distinguish multiple tracings within the same sewer pipe segment. Fluorescent yellow/green, fluorescent red, and/or fluorescent orange are preferred indicator colors.

PART 3 EXECUTION

3.01 NOTIFICATIONS

A. Public

1. Prior to conducting smoke testing field work, the Subcontractor shall provide notification to every residence and business that may be affected. The Subcontractor shall distribute the Program Manager approved door hangers between 48 and 72 hours prior to the start of the smoke testing effort. Door hangers shall be double-sided with the notification information in the English language on one side and in the Spanish language on the reverse side. The local fire department shall be notified of the smoke testing at least seven days in advance.
2. At a minimum, the notifications shall advise residents of what to expect during the smoke testing, to run water into all drains to ensure traps are not dry, and to alert them that they will observe smoke escaping from the roof plumbing vent. The notice shall also describe what to do should smoke escape to the interior of the house. The notice shall also describe any side effects of the smoke (e.g. potential for residual odor) and make SDS information available.
3. Door hanger notifications shall use a fluorescent color for visibility and incorporate any City-specific logo (if available and agreed upon by the Program Manager) to link the smoke testing to the City's sewer improvement effort.
4. One week (seven calendar days) prior to the scheduled smoke testing of public and health facilities such as schools, daycares, hospitals, and nursing homes, the Subcontractor and Program Manager shall meet in person and advise in writing the responsible person in charge of the facility of the expected activities and potential impacts to the facility. 24-hours before the test, the Subcontractor must advise the responsible person in charge by telephone of the scheduled tests the following day. At the conclusion of the test, a representative of the Subcontractor shall advise the responsible person in charge of the facility that testing has concluded and there will not be further impact. Records of the meetings with these facilities shall be maintained and shall include the date and time of the contact and the person contacted and shall be available for inspection at the Program Manager's request.

B. Program Manager

1. The Subcontractor shall provide daily morning updates prior to beginning daily field operations to the Program Manager, fire, police, or other agencies as directed by the Program Manager. List of entities and individuals requiring notification will be distributed prior to work commencing.

3.02 SMOKE TESTING

A. Field Operations

1. Testing shall not be done during rainy weather, and testing shall be closely monitored on windy days. If smoke coming out of the ground is blown away so quickly as to escape accurate detection, testing shall cease until such time that conditions permit.
 - a. Precipitation that creates active runoff along the curb and gutter shall be sufficient to suspend active smoke testing. The Subcontractor shall wait 24 hours after a rain event of ½ inch or greater before beginning smoke testing.
 - b. Should precipitation interrupt scheduled testing and cause a delay, the public notification procedures must be repeated.
2. The sewer pipe segments to be tested shall be isolated by means of air flow restrictors, sewer plugs, sandbags, or other devices in the upstream and downstream manholes that limit the smoke travel to only the segment being tested. Bypass pumping is not required but flow-through plugs can be utilized. Subcontractor shall exercise care in the restricting of flow so as not to create backups into private property or overflow of wastewater. The blowers and the smoke addition shall begin simultaneously and be continuous for the entire time of the field inspection for determining sources of smoke. The Subcontractor shall be responsible for cleanup, repair, fines, property damage costs, and claims for any sewage backup, spillage, or sanitary sewer overflow during or as a result of the smoke testing operations
3. The maximum length of sewer pipe segment(s) to be tested shall be 500 linear feet at a time. Adjacent sewers with a combined length of 500 linear feet or less may be tested together. Any adjustments to the length of testing shall be approved by the Program Manager. Subcontractor shall monitor the air volume used, particularly on shorter segments tested so as not to blow water from the private property plumbing traps.
4. The minimum smoke blowing duration shall be 5 minutes to enable full coverage of the properties and backyards adjacent to sewer and to enable sufficient time for the smoke to filter out of the sewer defects and reach the surface.

B. Smoke Observations and GPS Source Documentation

1. The area near each manhole and along the length of the isolated test segment shall be visually checked for the appearance of smoke. Sufficient staff shall be onsite to enable the inspection of the entire perimeter around each building connected to the sewer pipe while the blowers and smoke are continuously operating in the segment being tested. Storm drain inlets, curb boxes, cleanouts, building laterals, downspouts, areaway drains, foundation drains, and other potential sources of smoke shall be visually checked. The blowers and smoke injection shall continue until all suspect sources have been evaluated, but for no less than 5 minutes.
2. The Subcontractor shall document observations regarding each leak identified. The locations where smoke is observed shall be recorded using handheld, sub-meter accuracy GPS data collectors. Information regarding the characteristics of the defect and its surrounding tributary area shall also be recorded. The information shall include the smoke source location (street, curb, swale, sidewalk, driveway, front yard, side yard, backyard, field, parking lot, downspout, etc.), the unique asset identification of manhole or sewer segment, the house address that is nearest to the discharge point of the smoke, type of property (public or private), surface cover (asphalt, concrete, grass, paver, or other), date, mini-basin number, test number, date, crew, weather condition, wind condition, smoke intensity, susceptibility to ponding, and other comments. Specific data fields and allowable values (as applicable) will be provided to Subcontractor by the Program Manager.

C. Digital Photographs

1. The Subcontractor shall take two date and time stamped pictures of each defect. Photo 1 shall be taken to identify the general area of the defect, and Photo 2 shall be a close-up picture of the defect. The precise location of the defect shall be identified using GPS equipment. The digital image files shall be linked to the field data gathering and observation form.
2. All cameras used shall be digital format color cameras specifically designed or modified for use in sewer manhole inspection work. All cameras used during inspections shall have a minimum of 5 mega pixels .jpg format for sufficient clarity and detail in the photos, and photos of at least 2MB shall be submitted.
3. File naming must be consistent. Additional instructions, naming conventions, file structures, etc. will be provided after contract award.

3.03 DYE TESTING

A. Field Operations

1. Suspected sources identified by smoke testing and directed by the Program Manager shall be confirmed through dyed water tracing or flooding during this portion of the project for Type 1 sources or during the CCTV portion of the investigations for Type 2 or 3 sources. Verification of the suspect source is achieved when dyed water is introduced at the suspect source and observed at the downstream manhole. The dye mixing, pouring, or flooding procedure will be governed by the type of source to be tested. The Subcontractor shall immediately notify the Program Manager of any dye that reaches a receiving stream. The Program Manager reserves the right to direct water flooding with no dye to minimize the impact to the receiving water body.
2. Subcontractor shall be responsible for cleanup, repair, fines, property damage costs, and claims for any sewage backup, spillage or sanitary sewer overflow during or as a result of the field operations.

B. Type 1 Sources

1. Type 1 sources generally will be able to be dye traced by mixing limited quantities of dye colored water (e.g. maximum of five gallons) and pouring the water in the immediate vicinity of the suspect source, either in private or public space. Examples of Type 1 smoke sources generally are direct cross-connections to the sanitary sewer and include the following:
 - a. Driveway drain
 - b. Stairwell or areaway drain
 - c. Window well drain
 - d. Downspout connection
 - e. Sanitary sewer manhole:
 - i. With soil or grass surface cover
 - ii. With cracked or deteriorated paving
2. Dye will generally be poured into the source where smoke was observed. A positive confirmation results when the wastewater flow observed in the downstream manhole contains the transferred dye color.

C. Type 2 Sources

1. Type 2 Sources generally include injecting dye water for a minimum of 5 minutes duration into soil to affect the transfer of the dyed water to underground sewer defect, either in private or public space. The injection is achieved by using a root fertilizing type spike attached to a garden hose with a fertilizer cup filled with dye to affect the transfer of color, and pressure injecting the dyed solution into the ground at the source of the smoke. The Subcontractor must comply with all appropriate backflow prevention requirements if the hose is connected to the public water supply.
2. Examples of Type 2 sources include the following:
 - a. Drainage swales.
 - b. Public/private lateral connection transitions (generally at the property line).
 - c. Building lateral (public or private).
 - d. Sanitary sewer manhole:
 - i. With soil or grass surface cover.
 - ii. With cracked or deteriorated paving.
3. Dye will be injected into the soil at the location where smoke was observed. A positive confirmation results when the wastewater flow observed in the downstream manhole contains the transferred dye color.

D. Type 3 Sources

1. Type 3 Sources are generally public sector sources which require the plugging of storm sewers. The downstream storm sewer pipe, which includes the catch basin or storm sewer pipe segment which smoked, is plugged and filled with dyed water. The downstream sanitary manhole is observed for dye. If dye is observed, the parallel or adjacent sanitary sewer is televised concurrently to identify the specific sources of dye transfer.
2. The Subcontractor is responsible for meeting all requirements for dechlorinating the water used for dye flooding in accordance with local regulatory requirements so as not to create a problem with chlorinated water in receiving streams.
3. Examples of Type 3 sources include the following:
 - a. Catch basins.
 - b. Storm sewer pipes.

PART 4 MEASUREMENT & PAYMENT

4.01 MEASUREMENT

A. Smoke Testing

1. Smoke testing shall be measured by the linear foot of smoke testing performed along the centerline of the sanitary sewer pipe from center to center of manholes. For dead-end sewers, the length will be the CCTV inspected length.

B. Dye Tracing Per Type

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
 Modified by SARP10 Program

1. Dye tracing shall be measured per each Type 1, Type 2, or Type 3 source tested

C. Dye Tracing Per Hour (Alternative Measurement to Section 5.02)

1. Alternatively, Dye Tracing may be measured at the Program Manager’s direction per man-hour supplied by the Subcontractor to perform Type 1, Type 2, or Type 3 source testing.

4.02 PAYMENT

A. Smoke Testing

1. Smoke testing shall be paid by the linear foot of sanitary sewer pipe actually tested and include all labor, equipment and materials. Payment shall be made at the contract unit price without regard to the size of sewer pipe inspected. Separate measurement and payment shall not be made for any incidental work including, but not limited to, gaining access to the sewer; jobsite preparation; traffic control; safety provisions; blowers; liquid smoke; and providing of records, documentation, and photos, which shall be subsidiary to the bid price. No Payment shall be made for any smoke testing without receipt of the corresponding records, logs, and photographs.

B. Dye Tracing

1. Dye Tracing shall be paid by the unit actually tested as Type 1, Type 2, or Type 3 and will include all labor, equipment and material. Separate measurement and payment shall not be made for any incidental work including, but not limited to, gaining access to the sewer; jobsite preparation; traffic control; safety provisions; dye, injectors; and providing of records, documentation, and photos, which shall be subsidiary to the bid price. Concurrent CCTV inspection (in accordance with Section 02542 CCTV) required for Type 2 (if necessary) or Type 3 dye tracing shall be measured separately for payment. No Payment shall be made for any dye tracing without receipt of the corresponding records, logs and photographs.

C. Dye Tracing Per Hour (Alternative Measurement to Section 4.02)

1. Alternately, Dye Tracing shall be paid at the Program Manager’s direction by the man-hour for the Type 1, Type 2, or Type 3 testing and will include all associated equipment and material to perform the tests. Separate measurement and payment shall not be made for any incidental work including, but not limited to, gaining access to the sewer; jobsite preparation; traffic control; safety provisions; dye, injectors; and providing of records, documentation, and photos, which shall be subsidiary to the bid price. Concurrent CCTV inspection (in accordance with Section 02542 CCTV) required for Type 2 (if necessary) or Type 3 dye tracing shall be measured separately for payment. No Payment shall be made for any dye tracing without receipt of the corresponding records, logs and photographs.

4.03 PAYMENT WILL BE MADE UNDER:

Item No.	Pay Item	Pay Unit
02546-4.01.A	SMOKE TESTING	LINEAR FEET
02546-4.01.B.1	DYE TRACING TYPE 1	EACH
02546-4.01.B.2	DYE TRACING TYPE 2	EACH
02546-4.01.B.3	DYE TRACING TYPE 3	EACH

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
Modified by SARP10 Program

02546-4.01.C-1	DYE TRACING TYPE 1	CREW HOUR
02546-4.01.C.2	DYE TRACING TYPE 2	CREW HOUR
02546-4.01.C.3	DYE TRACING TYPE 3	CREW HOUR

END OF SECTION 02546

SECTION 02547
SITE SPECIFIC SEWER INTERCEPTOR & MANHOLE CLEANING

PART 1 GENERAL

1.01 SCOPE

- A. This Work will consist of cleaning selected segments of sewer interceptor lines, as needed.
- B. The Work covered by this section includes furnishing all labor, equipment, tools, accessories, and materials required to clean specified sewer interceptor segments.
- C. Cleaning shall only be required in manholes and sewer segments as necessary to facilitate and complete the inspection of the referenced manholes and sewer segments.

1.02 SUBMITTALS

- A. Unless otherwise specified all submittals specified herein shall be delivered to the Program Manager within 7 calendar days of NTP.
- B. Interceptor Cleaning Plan, including proposed method of cleaning, description of all equipment, means and methods of cleaning, management and maintenance of interceptor flows. Cleaning plan shall also include odor mitigation procedures during the cleaning operation.
- C. At a minimum, the Interceptor Cleaning Plan shall be submitted to the Program Manager and include the following elements:
 - 1. Wastewater Spill Prevention Plan to mitigate the potential for wastewater from the interceptor, water from the jetting operation or water from any decant procedures to be splashed or spilled within the work area. The Subcontractor shall have all of the equipment listed in the Spill Prevention Plan on site and in operable condition prior to commencing work.
 - 2. Waste Management Plan, which describes the proposed waste management, transportation and disposal of all solid and liquid wastes generated during the interceptor cleaning activities.
 - 3. Work Area Cleaning Plan, which describes the proposed method of cleanup of each working area at the end of each day and at the end of the operational need for that site.
 - 4. Layout Area Plan describing the equipment and access required for each working location.
 - 5. Easement Access and Clearing Plan describing how the temporary access will be maintained, secured and restored at the end of the project.
 - 6. Site Security Plan describing how the equipment and site will be secured at the end of each working shift or day.
- D. Traffic Control
 - 1. Traffic Control Plan shall be prepared and submitted to the Program Manager as required and include the following items:

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
Modified By SARP10 Program

- a. Applications for all local and state permits for lane closures which may be required for working sites.
- b. Major streets requiring a City approved permit if taking a lane for mobile operations, secured through Traffic Control Plan submittal to the City and signed by a TN P.E. The City requires two-week lead time for permit processing.
 - i. The Subcontractor will be required to deliver a sample primary/arterial road Traffic Control Plan for review by the City.
 - ii. If the City determines that the nature of the work operation or the type of road in which the Subcontractor will be working requires a permit, the Subcontractor will be required to modify the sample Traffic Control Plan to obtain a permit from the City.
- c. Methods for proper signing and barricades, which comply with City of Memphis requirements.
- d. For everywhere else where a permit is not required, the Subcontractor shall develop, provide, and implement a traffic control plan for all mobile operations in accordance with standard MUTCD specifications.

E. Permits

1. The Subcontractor shall also be responsible for acquiring all necessary disposal and/or landfill site permits as required to perform this work.
2. Railroad Rights of Way: The Subcontractor shall notify the Purchaser when work or access to manholes and sanitary sewers lie within the 25 feet railroad easement as measured by 25 feet outside the nearest rail of the tracks. To access sewer facilities within the 25 feet of the railroad right of way the Subcontractor shall contact the Program Manager 48 hours in advance who will alert the City's Zone Construction Inspector to coordinate individual railroad direction and guidance.

F. Confined Space Entry Requirements and Certification Requirements.

1. All confined space entry in this project shall be considered a "Permit – Required Confined Space Entry", and as such each confined space entry requires the appropriate planning to be developed for a Permit-Required Entry. There will be no exceptions to this requirement.
2. If the equipment proposed requires confined entry by any Subcontractor crew; the crew personnel must show confined space entry certification that has been validated within one year from the date of the work being performed. All Confined Entry Certification must be current for the duration of the project. Workers shall not be allowed on site unless they meet this requirement. There will be no exceptions to this requirement.

G. Equipment List Cleaning shall be provided including vehicles, cleaning equipment, tools, and cleaning supplies.

H. Disposal site(s) shall be identified and appropriate landfill permits for appropriate disposal of all waste materials removed from the sewer during the cleaning operation shall be secured and copies furnished.

I. Subcontractor shall follow Standard Construction Specifications Section 02630 - Site Preparation and Restoration for easement access and final restoration.

1.03 DELIVERABLES

A. Records

1. Interceptor Cleaning Record
 - a. The Subcontractor shall provide a dated manifest of the volume or weight of the dewatered sewer cleaning loads taken and dumped at the permitted landfill. Each waste load manifest shall be associated with a list of corresponding sewer segments from where the waste originated.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. General

1. The Subcontractor's supervisors and operators shall have a minimum of five (5) years' experience in the field of sewer cleaning and internal inspection of sewers. Supervisor shall be on-site for the duration of the project. All equipment shall be operated only by personnel of the cleaning Subcontractor with the required experience.
2. The Subcontractor shall submit an equipment list to the Purchaser for approval before the commencement of the Work and shall certify that back-up equipment is available and can be delivered to the worksite within 48 hours.
3. The Subcontractor shall provide equipment to perform cleaning, as needed, required by this scope of work, including where applicable, sewer mains located in streets, street rights-of-way, backyards, easements and rights-of way that are off-road.

B. Cleaning Equipment

1. Subcontractor shall select cleaning equipment and methods based on the conditions of the sewer segments. More than one method or type of equipment may be required on the interceptor, at any single location.
2. The Subcontractor shall possess equipment capable of hydraulically or mechanically cleaning a minimum of 1,800 linear feet of pipe from one direction and shall be capable of a minimum 1,800 linear feet of hose or cable reach in the interceptor sewer on-site during the cleaning execution.
3. Hydraulic cleaners or combination hydraulic/vacuum cleaners shall be specifically designed and constructed for such cleaning.
 - a. Large diameter cleaning equipment includes high velocity type or hydraulically propelled material extraction devices that do not release particulate matter or odors to the atmosphere and are capable of cleaning pipes 18 inch in diameter and larger.
 - b. Prior to commencing the work, the Subcontractor shall identify the water source that the Subcontractor intends to use. If potable water is used, the Subcontractor is responsible for making the necessary arrangements with Memphis Light, Gas and Water (MLGW) for securing and paying for the metered water and source and will

- submit a plan which addresses backflow prevention when using that source and include freeze prevention and appropriate protection during winter conditions.
- i. Subcontractor shall make own arrangements for hydrant service with MLGW.
 - (1) Subcontractor shall provide and install hydrant meter.
 - (2) Subcontractor shall remain responsible for supplying all equipment, tools, and labor necessary to connect to water sources, meter the water used, and safeguard the City's water supply against backflow into the system.
 - (3) In the event of a fire emergency, that emergency shall take precedence over all sewer cleaning operations. Subcontractor shall cease all water consumption on a temporary basis if directed to do so by City or local Fire Department officials. Delays due to fire emergencies shall be dealt with in the same manner as weather delays.
 - ii. Alternately, the Subcontractor may truck water or recycle water by filtering wastewater and using it to clean the Interceptor.
 - iii. Subcontractor shall track water consumption from all cleaning operations.
 - iv. The Subcontractor shall be required to make restitution for any damages resulting from the improper use of the water supply system and pay any and all fines and costs that may result. Connections to the water system shall not be left unattended for any period of time, and shall be disassembled and removed during non-work hours.
- c. Hydraulic pipe cleaners shall be specifically designed and constructed for such cleaning. For high velocity pipe cleaners, the proposed equipment shall utilize a high velocity jetter accompanied by a debris collection system that is a closed loop non-odor emitting system. The jetter shall be capable of a minimum volume of 130 gpm with a rated pressure of 2,000 psi at the pump. The hose reel shall have capacity of reaching a minimum of 1,000 ft. The hydraulic cleaning equipment shall be capable of cleaning around bends (up to 90 degrees) without repositioning or cleaning against flow.
 - d. Subcontractor shall use a nozzle that directs the cleaning force to the bottom of the pipe and lower sides of the pipe. When cleaning around bends, Subcontractor shall use a nozzle that directs the cleaning force to avoid any buildup of debris at the inside radius. Conduct multiple passes as required to fully remove debris for bends.
 - e. The hydraulic cleaning equipment shall have multiple hydraulic cleaner hose nozzles for a variety of sewer cleaning conditions, including grease, roots, debris and granular materials.
 - f. Vacuum equipment shall be capable of lifting debris removed from the segment from the downstream manhole.
 - g. These are general guidelines for hydraulic cleaning equipment. Subcontractor shall provide in the submittal a list of equipment it deems the most appropriate and effective for executing the Scope of Work and include equipment model, capacity, capabilities, reliability any other relevant information from equipment manufacturers.
- 4. Mechanical sewer pipe cleaners shall be specifically designed and constructed for such cleaning.

- a. Mechanical cleaning equipment includes buckets, scrapers, scooters, porcupines, kites, heavy duty brushes, metal pigs, and other debris removing equipment and accessories used in conjunction with approved power winching machines.
- b. Mechanical pipe cleaners shall be specifically designed and constructed for such cleaning. Mechanical sewer pipe cleaners (cable machines with buckets, brushes, swabs, root cutters, and power rodders) shall be capable of controlled forward and reverse travel through the sewers without inflicting damage to the existing pipe in removing debris.

PART 3 EXECUTION

3.01 INTERCEPTOR CLEANING

A. General

1. Cleaning shall only be required in manholes and sewer segments as necessary to facilitate and complete the inspection, assessment and monitoring of the referenced manholes and sewer segments as approved by the Program Manager. Prior to any interceptor cleaning, the Subcontractor must propose all cleaning to the Resident Project Representative and Program Manager. The Subcontractor must obtain prior permission for cleaning in each sewer segment in order to receive payment.
2. The work within this contract is intended to be completed while sewer interceptors are in full service. The Subcontractor will assume full responsibility for any isolation or bypass pumping of the Interceptor if required. The Subcontractor may propose a wastewater bypass plan to isolate pipe sections; however, the details of the proposed plan must be provided in a work plan requiring the approval of the Program Manager and the City of Memphis. The Program Manager and the City of Memphis reserve the right to not allow the interceptor or portions of the interceptor to be taken out of service.
3. Interceptor sewer dewatering and/or by-pass pumping, if allowed, shall be for the convenience of the Subcontractor and does not have a separate item for payment on the Bid Form. All associated labor, equipment, materials and incidentals shall be distributed within related item in the Bid Form. Cleaning against the flow is not permitted unless otherwise specified or directed by the Program Manager.
4. The Subcontractor shall clean the interceptor line from manhole to manhole, starting in the last downstream segment, cleaning from the higher segment manhole in a downstream direction to the lower manhole; and move to clean the next segment upstream, from the highest manhole in a downstream direction, one sewer section at a time and performed as efficiently as possible at the Subcontractor's discretion. The total number of segments cleaned shall be coordinated with the Program Manager.
5. Debris shall not be passed from one sewer segment to another but must be trapped and removed from each sewer segments.

B. Cleaning Execution

1. No roots, grease or debris from cleaning shall be passed from sewer segment to sewer segment during the cleaning operation. All debris flushed from the Interceptor must be collected, captured, and removed from the sewer at the downstream manhole.
2. Roots shall be removed in the sections where root intrusion is a problem. Special precautions shall be exercised during the cleaning operation to assure complete removal

of visible roots from the joint area and so as not to incur further damage to the pipe. Any visible roots that may impact rehabilitation efforts shall be removed. Procedures may include the use of mechanical devices such as rodding machines, expanding root cutters and porcupines, and hydraulic procedures such as high-pressure jet cleaners.

3. The Subcontractor is responsible for safe, responsible and legal handling and disposal of all material and debris removed from the Interceptor. The Subcontractor is responsible for all permits and landfill fees associated with the disposal of debris collected and removed from the Interceptor.
4. Waste Disposal Manifest
 - a. Proper disposal arrangements are the exclusive responsibility of the Subcontractor. The Subcontractor shall provide a dated manifest of the volume and weight of the dewatered sewer cleaning loads taken and dumped at the permitted landfill. The Subcontractor shall not dispose of debris at a City of Memphis Wastewater Treatment Plant. Each waste load manifest shall be associated with a list of corresponding sewer segments from where the waste originated.
5. Conduct all cleaning operations to prevent building backups and sewer overflows.
6. Subcontractor shall be responsible for cleanup, repair, fines, property damage costs, and claims for any sewage backup, spillage or sanitary sewer overflow during or as a result of the cleaning and inspection operations.
7. The Subcontractor is responsible for hiring a licensed sub-contractor to retrieve any equipment that gets stuck in the sewer system through the execution of the scope of work (fallen mechanical equipment, jet nozzles, inflatable plugs, sandbags etc.) at the Subcontractor's own cost. Such retrieval by an appropriately licensed sub-contractor shall be made within 48 hours to avoid interfering with the City of Memphis sewer system operations. Any and all impacts and related costs due to the Subcontractor's equipment in the interceptor shall be the responsibility of the Subcontractor.

C. Easement or Turf Operation

1. The Subcontractor will gain access to manholes for cleaning operations in accordance with Technical Specification 02630 Site Preparation and Restoration.
2. The Subcontractor will restore the work area to its original condition as quickly as possible after the inspection is complete based on Technical Specification Section 02630 Site Preparation and Restoration. The Subcontractor shall complete ongoing restoration of sites where work operations are complete and postpone the restoration of each site until the end of the project.

PART 4 MEASUREMENT & PAYMENT

4.01 MEASUREMENT

A. Interceptor Cleaning

1. Interceptor & Manhole Cleaning of selected segments shall be measured by crew-hour expended and documented in accordance with the specification.

4.02 PAYMENT

A. Interceptor and Manhole Cleaning

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
Modified By SARP10 Program

1. Interceptor & Manhole Cleaning shall be paid by hourly crew rate as needed.
 2. The unit price for Interceptor & Manhole Cleaning shall cover the entire cost of the required Interceptor & Manhole Cleaning in accordance with the specification, including but not limited to labor, mobilization, cleaning equipment, traffic control, securing required water, transportation and disposal of all solid and liquid waste, power supply for equipment, interim and final reports, and all other appurtenant work.
- B. No additional payment will be made for:
1. Securing water for required cleaning.
 2. Interceptor sewer dewatering and/or by-pass pumping
 3. Waste management, transportation and disposal of solid and liquid waste.
 4. Securing of easements, clearing, site preparation or rehabilitation

4.03 PAYMENT WILL BE MADE UNDER:

Item No.	Pay Item	Pay Unit
02547-4.02.A	HOURLY CREW RATE	CREW-HOUR

END OF SECTION 02547

**SECTION 02950
 REMOVAL AND REPLACEMENT OF PAVEMENTS AND INCIDENTALS**

PART 1 GENERAL

1.01 SCOPE

- A. This Work shall consist of the removal and replacement of pavements, sidewalks, driveway aprons, curbs and gutters, driveways, paved areas, and curbs made necessary by the improvement of sanitary sewer infrastructure, and other items of construction that require temporary cuts. Such replacement shall be to a condition at least equal to the condition existing prior to removal and of in-kind material and shall be compliance with the Drawings, these Specifications, or as directed by the Purchaser. The Work which will be included in the Subcontract and for which the Subcontractor shall be compensated therefore is limited to that area within the rights-of-way and construction easements for the Project. The Subcontractor will not be compensated for the removal and replacement of facilities outside the rights-of-way, easements, and limits of construction of the Project.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete:

1. Portland cement concrete shall be in accordance with Section 03050 Portland Cement Concrete.

B. Asphaltic Concrete Pavement:

1. Asphaltic concrete surface courses shall meet the requirements of Mix No. 1 and bases courses shall meet the requirements of Mix No. 2 as described below.
2. The composition of the mixes shall be as follows:

Total Percent Passing by Weight

Sieve Size	Mix No. 1	Mix No. 2
2"	100	100
1-1/2"	100	100
3/4"	100	100
3/8"	76-96	65-95
No. 4	51-76	45-70
No. 8	36-60	25-50
No. 30	16-40	12-30
No. 100	3-12	2-12
No. 200	2-8	1-6

3. The proportions of the total mixture, in percent by weight, shall be as follows:

Courses	Combined Mineral Aggregate	Asphalt Cement
Mix No. 1, Surface	92.0 – 96.0	4.0 – 8.0
Mix No. 2, Binder	93.0 – 97.5	2.5 – 7.0

4. It is the intent of this Section of the Specifications that the above described mixes shall conform to the following mixtures specified in the Tennessee Department of Transportation Standard Specifications for Road and Bridge construction.
 - a. Mix No. 1 – Section 411, Asphaltic Concrete Surface (Hot Mix), Grading E.
 - b. Mix No. 2 – Section 307, Bituminous Plant Mix Base (Hot Mix), Aggregate Grading C.
5. For multiple layer construction, succeeding layers shall not be laid until the previous layer has cooled sufficiently to support the construction equipment
6. When Mix No. 1 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. When Mix No. 1 is used for surfacing of shoulders or other non-traffic lane construction, the mineral aggregate may be composed entirely of limestone, including screening and manufactured sand, but in no case shall the mineral aggregate for this construction consist of less than 50 percent limestone. The natural sand shall be so graded that not more than 5 percent will be retained on the No. 4 sieve.

C. Temporary Cold Patch Asphalt

1. Temporary cold patch asphalt shall meet the requirements of TDOT Standard Specifications for Road and Bridge Construction Section 410.

D. Expansion Joint Filler:

1. Preformed expansion joint filler shall be of the bituminous type, shall conform to the requirements of AASHTO M 213 and shall not be more than 1 inch or less than 1/2 inch in thickness. The filler shall be cut to the full depth of pavement, curb and gutter, sidewalk, or driveway being replaced.

E. Gravel Pavement or Base:

1. Crushed limestone with such material as manufactured sand or other fine materials naturally contained or added thereto as needed to match existing conditions and conform to the gradations shown below:

Grading Table for Graded Aggregate Base Course
 Total Percent, by Dry Weight, Passing Each Sieve (U.S. Standard)

Size No.	2 1/2 "	2"	1 1/2"	1"	3/8"	No. 40
1	100	95-100			35-65	10-30

2.02 EQUIPMENT

- A. Equipment and tools necessary for cutting, removal, and hauling of existing items; handling and placement of new material; and all equipment necessary to perform all parts of the Work shall be at the job site sufficiently ahead of the start of construction operations to be examined and approved by the Purchaser.
- B. When saws are used to cut pavement, the Subcontractor shall provide sawing equipment adequate in power to complete the sawing to a minimum of 1-1/2 inches below the pavement

surface in one pass. An ample supply of saw blades shall be maintained at the site of the Work at all times during sawing operations.

- C. Other types of pavement cutting equipment shall be capable of cutting the pavement to a neat straight line of 1-1/2 inch minimum depth below the pavement surface in one pass.
- D. The Subcontractor shall provide equipment capable of removal of pavements, sidewalks, driveway aprons, curbs and gutters, driveways, paved areas, and curbs without disturbance of adjacent items to remain in place.

PART 3 EXECUTION

3.01 REMOVAL OF ASPHALT PAVEMENT

- A. Asphalt pavement shall be removed to a clean straight line as shown on the drawing details. Pavement shall be cut by saw or other equipment approved by the Purchaser in advance. Edges of existing asphalt pavement adjacent to trenches, where damaged, shall be recut in a clean straight line within the limits of damaged pavement only. Such recuts shall be parallel to the original cuts and perpendicular to the pavement surface.

3.02 REMOVAL OF CONCRETE PAVEMENT

- A. Concrete pavement shall be removed to a neat straight line as shown on the drawing details. Care shall be used to avoid damage to pavements and to the pavement base remaining in place.

3.03 REMOVAL OF CONCRETE SIDEWALK, CURB AND GUTTER, AND DRIVEWAY

- A. Concrete sidewalks, curbs and gutters, and driveways shall be removed to the nearest contraction or expansion joint. Care shall be used to avoid damage to sidewalks, curbs and gutters, and driveways remaining in place.

3.04 REMOVAL OF GRAVEL PAVEMENT

- A. Gravel surfaces encountered in construction shall be removed as needed to allow for the adjustment of the manhole frame and cover.

3.05 REPLACEMENT OF PAVEMENT

A. Asphalt Pavements

1. Replace asphalt paving courses to match existing thickness. The minimum surface course thickness shall be 2 inches. Asphalt pavement and base replacement shall be constructed for the entire cross-section of pavement removal area including all areas where pavement was re-cut subsequent to the initial pavement removal.

B. Concrete Pavements

1. Concrete pavement shall be replaced with Class A concrete pavement equal in thickness to the pavement removed but not less than 4 inches thick. Concrete pavement and base replacement shall be constructed for the entire cross-section of pavement removal area including all areas where pavement was re-cut subsequent to the initial pavement removal.
2. Reasonable efforts shall be made to avoid contrast in the color and texture of existing and restored surfaces.

C. Placing, Curing, and Protection of Concrete

1. After the backfill in the trench has been brought to the appropriate subgrade elevation shown on the Plans, compacted to the specified density, and permission has been given by the Purchaser, a concrete slab of the appropriate thickness shall be placed within the entire disturbed area.
2. Any loose or disturbed pavement or base shall be removed prior to placement of the concrete. Concrete shall be placed only on a moist subgrade and shall not be placed unless the ambient temperature is 35°F and rising. In no case shall concrete be placed on a frozen or frosty subgrade. After the concrete is placed, it shall be struck off in an approved manner to the appropriate grade as shown on the Plans and shall be finished with floats and straight edges until the required surface texture has been obtained.
3. No vehicles or loads shall be permitted on any concrete until the Purchaser has determined that the concrete has obtained sufficient strength for such loads. The Subcontractor shall construct and place such barricades and protection devices as are necessary to protect the concrete.

D. Installation and Replacement of Temporary Cold Patch Paving

1. With the approval of the Purchaser, during times when permanent hot mix asphalt is not available, pavement surfaces shall be restored with temporary cold patch asphalt. Once the permanent asphalt is available, the Subcontractor shall remove and replace the temporary cold patch asphalt with permanent asphalt in accordance with Section 3.05.A Asphalt Pavements.

3.06 REPLACEMENT OF SIDEWALKS, DRIVEWAY APRONS, CURBS AND GUTTERS, DRIVEWAYS AND OTHER PAVED AREAS, AND CURBS

- A. Concrete sidewalks and driveway aprons shall be replaced in accordance with the City of Memphis Standard Construction Specifications.
- B. Unless otherwise directed, curb and gutter shall be replaced with new concrete curb and gutter of the same cross-section and at the same top of curb elevation and flow line as that removed. Where curb and gutter of a different type than existing is to be used for replacement, the replacement flow line shall match existing and a transitions section provided between the existing and replacement cross-sections. Curb heights shall be transitioned at a rate of 1 inch in 5 feet. Granite curb shall be replaced with new concrete curb whose height matches existing adjacent curb top elevations. Any expansion joint material removed shall be replaced at the original locations. Existing concrete edges shall be cleaned prior to placement of concrete. The finished curb and gutter cross-section, elevations, texture, and color shall conform to the adjacent concrete surfaces.
- C. Replacement of paved areas other than street pavement; concrete, asphalt, or gravel driveways; and asphalt or concrete curb within the right-of-way or construction easement limits shall be in kind for those cross-sections removed, unless directed otherwise by the Purchaser.

3.07 DAMAGE DUE TO SETTLEMENT

- A. The Subcontractor shall be responsible for any damage caused by settlement of backfill placed beneath pavements, sidewalks, driveway aprons, curbs, curbs and gutters, driveways, paved areas other than street pavement, and asphalt or concrete curb within the right-of-way or construction easement limits. This includes any damage which may occur at any time prior to, and during a period of one year from the date of Final Completion of the Work covered by the Subcontract.

- B. During such period, the Subcontractor shall at his own cost and expense refill all excavations where settlement damage has occurred and replace damaged pavements, sidewalks, driveway aprons, curbs, curbs and gutters, paved areas, driveways, and all other damaged items to the satisfaction of the Purchaser. Should the Subcontractor fail to repair settlement damage which may occur as described above within 5 days after being given notice thereof, the Purchaser shall have the right to repair such settlement and charge the cost of such repairs to the Subcontractor.

3.08 DAMAGE OUTSIDE CONSTRUCTION EASEMENT LIMITS

- A. The Subcontractor will be held responsible for all damage to roads, highways, shoulders, curbs and gutters, ditches, embankments, bridges, culverts, and other property, caused by him or any of this Sub-subcontractors in hauling or otherwise transporting materials to and from the several sites of Work, regardless of the location of such damage. The Subcontractor shall make arrangements relative to the payment for, or repair or replacement of, such damage or damaged surfaces or structures which are satisfactory and acceptable to the Purchaser, at the Subcontractor's cost and expense.

PART 4 MEASUREMENT & PAYMENT

4.01 MEASUREMENT

A. Pavement Removal and Replacement

- 1. Pavement removal and replacement shall be measured for payment by the square yard, complete in place.

B. Concrete Sidewalk Removal and Replacement

- 1. Sidewalk removal and replacement shall be measured for payment by the square foot, complete in place.

C. Concrete Curb and Gutter Removal and Replacement

- 1. Curb and gutter removal and replacement shall be measured for payment by the linear foot, complete in place.

D. Gravel Driveway and Gravel Area Removal and Replacement

- 1. Gravel driveways and gravel area removal and replacement shall be measured for payment by the ton of crushed limestone, complete in place.

4.02 PAYMENT

A. Pavement Removal and Replacement

- 1. The accepted quantities of pavement removal and replacement shall be paid for at the Subcontract unit price per square yard for the type specified, which price will be full compensation for cutting and recutting pavement; removal and disposal of pavement and base; preparing the subgrade; placing, finishing, curing, and protection of concrete; and placing and compacting asphaltic concrete wearing surfaces, complete in place.

CITY OF MEMPHIS – STANDARD CONSTRUCTION SPECIFICATIONS
 Modified by SARP10 Program

2. The accepted quantities of temporary pavement removal and replacement shall be paid for at the Subcontract unit price per square yard for the type specified, which price will be full compensation for installation; maintenance; removal and disposal of pavement; preparing the subgrade; and placing and compacting temporary asphaltic concrete wearing surfaces, complete in place.

B. Concrete Sidewalk Removal and Replacement

1. The accepted quantities of sidewalk removal and replacement shall be paid for at the contract unit price per square foot, which price will be full compensation for removal and disposal of sidewalk; preparing the subgrade; and placing, finishing, curing and protection of concrete, complete in place.

C. Concrete Curb and Gutter Removal and Replacement

1. The accepted quantities of curb and gutter removal and replacement shall be paid for at the Subcontract unit price per linear foot for the type specified, which price will be full compensation for removal and disposal of curb and gutter; preparing the subgrade; and placing, finishing, curing and protection of concrete, complete in place.

D. Gravel Driveway and Gravel Area Removal and Replacement

1. The accepted quantities of gravel driveway and gravel area removal and replacement shall be paid for at the Subcontract unit price per ton of crushed limestone, which price will be full compensation for preparing the subgrade and replacing the gravel, complete in place.

4.03 PAYMENT WILL BE MADE UNDER:

Item No.	Pay Item	Pay Unit
02950-4.02.A.1	ASPHALTIC CONCRETE PAVEMENT REMOVAL AND REPLACEMENT	SQUARE YARD
02950-4.02.A.2	CONCRETE PAVEMENT REMOVAL AND REPLACEMENT	SQUARE YARD
02950-4.02.A.3	TEMPORARY ASPHALT REMOVAL AND REPLACEMENT	SQUARE YARD
02950-4.02.B	CONCRETE SIDEWALK REMOVAL AND REPLACEMENT	SQUARE YARD
02950-4.02.C	CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	SQUARE YARD
02950-4.02.D	GRAVEL DRIVEWAY AND GRAVEL AREA REMOVAL AND REPLACEMENT WITH CRUSHED STONE	TON

END OF SECTION 02950

