ADDENDUM NO. 1
TO THE
SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR CONSTRUCTION OF
DOWNTOWN WATERLINE REPLACEMENT
FOR
THE CITY OF MONTGOMERY
IN
MONTGOMERY COUNTY, TEXAS

March 9, 2020

Addendum No. 1 covers the following changes to the contract documents and specifications requirements including replacement of the bid form, an additional bid item, addition of missing sections, and addition of technical specification**:**

BIDDING REQUIREMENTS

1. **Instruction to Bidders**

   Replace the previous Instruction to Bidders Form in its entirety and use the revised "INSTRUCTION TO BIDDERS" form pages A-3 to A-7, provided in Addendum No. 1.

   Section 6.0 (a): The revised Instruction to Bidders Form included revised completion time from "ninety (90) calendar days" to "one hundred sixty (160) calendar days" of construction.

2. **Bid Form**

   Replace the previous Section 3 Bid Form in its entirety and use the revised "Bid Form" pages A-8 to A14, provided in Addendum No. 1.

   - Bid Items were renumbered to account for double items.
   - Bid Item No. 2 – Quantity Updated
   - The revised Bid Form included Bid Item No. 23 for Temporary Waterline 4,643 linear feet (LF).

CONTRACT DOCUMENTS

3. **TABLE OF CONTENTS**

   Replace the previous Table of Contents in its entirety and use the revised "TABLE OF CONTENTS", provided in Addendum No.1. The revised Table of Contents include new Technical Specification, Fusible Polyvinylchloride Pipe – Specification 02556.

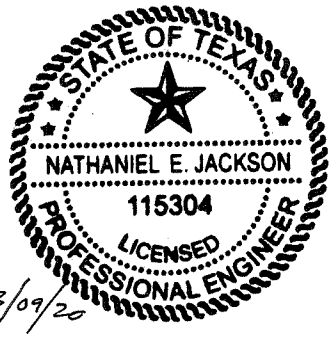
4. **STANDARD FORM OF AGREEMENT**

Replace the previous Standard Form of Agreement in its entirety and use the revised "STANDARD FORM OF AGREEMENT", provided in Addendum No.1. The revised Standard Form of Agreement included revised completion time from "ninety (90) calendar days" to "one hundred sixty (160) calendar days" of construction.

TECHNICAL SPECIFICATIONS

5. **SPECIFICATION 02556 – FUSIBLE POLYVINYLCHLORIDE PIPE**

Include SPECIFICATION 02556 – FUSIBLE POLYVINYLCHLORIDE provided in Addendum No.1. The specification includes information related to waterline material and payment.



Nathaniel E. Jackson, PE
Jones & Carter, Inc.
TBPE Registration No. F-439

END OF ADDENDUM NO. 1

INSTRUCTION TO BIDDERS

1.0 INVITATION

a. The Work. Bids are invited on a general contract for construction of Downtown Waterline Replacement for The City of Montgomery.

b. The Owner.

City of Montgomery
101 Old Plantersville Road
Montgomery, Texas 77316
Telephone: (936) 597-6434

c. The Operator.

Gulf Utility Service, Inc.
12337 Jones Road
Houston, Texas 77070
Attention: Mr. Michael Williams
Telephone: (281) 355-1312

d. The Engineer.

Jones & Carter, Inc.
1575 Sawdust Road, Suite 400
The Woodlands, Texas 77380
Attention: Mr. Nathaniel E. Jackson, PE
Telephone: (281) 363-4039

2.0 RECEIPT OF BIDS

a. Sealed bids, in duplicate, will be received until 10:30am, Monday, March 16, 2020, at the City of Montgomery City Hall, 101 Old Plantersville Road, Montgomery, Texas 77316.

b. Bids received after this time will not be opened and will be delivered to the Owner for its consideration.

c. There will be a pre-bid conference at the City of Montgomery City Hall, 101 Old Plantersville Road, Montgomery, Texas 77316, at 10:30am, Tuesday, February 25, 2020. Attendance is not mandatory.

d. Bid opening will be held immediately after the time for receipt of bids has expired.

e. Bids will be opened publicly and read aloud. All interested parties are invited to attend.

3.0 BIDDING DOCUMENTS

a. Bidding documents include all documents available during the bidding period, including the instruction to bidders, contract forms, conditions of the contract, specifications, drawings and addenda, if any.

b. Bidders may obtain copies of the bidding documents at www.civcastusa.com. Said documents may be examined without charge by appointment in the office of Jones & Carter, Inc. 1575 Sawdust Road, Suite 400, The Woodlands, Texas 77380.

4.0 SEPARATED CONTRACT PROVISIONS

a. Contractor must abide by all state and local laws regulating sales tax exemption for work being performed for tax exempt entities. Provisions are provided in Section 5.03 of the Special Conditions.

b. Contractor is responsible for obtaining all permits required by the work at no additional cost to the Owner, except as may specifically be exempted in the Special Conditions.

5.0 EXAMINATION

a. Bidder shall carefully examine the bidding documents and the site to determine the actual conditions under which work will be done.

b. Data in the bidding documents pertaining to existing conditions is for convenience only and does not supplant obtaining firsthand information at the site.

c. Adjusting payments will not be authorized for work that could have been foreseen by a careful examination of the site.

d. Submission of a bid constitutes acceptance by the bidder of existing site conditions as a part of the requirements of this work.

6.0 COMPLETION TIME

a. The work shall be substantially completed within **160** calendar days from date of Notice to Proceed.

b. Submission of a bid constitutes acceptance by the bidder of the completion time as a part of the requirements of this work.

7.0 QUESTIONS

a. In ample time to permit consideration before reply, submit questions about bidding instruments to the Engineer.

b. Necessary replies will be issued to bidders of record as addenda, which becomes a part of the bidding instruments. Oral instructions do not form a part of the bidding instruments.

c. Bidders should contact the Engineer not less than 72 hours before bid opening to secure any addenda that may affect bidding.

8.0 SUBMITTAL

a. Submit bid and other required data in an opaque, sealed envelope. If submitted by mail, enclose bid envelope in another envelope addressed for mailing. Plainly identify the sealed envelope with the following information:

Do not open before Tuesday, March 3, 2020, 10:30am.
Bid for Construction of **Downtown Waterline Replacement**
Owner: **The City of Montgomery**
Bidder: _____

b. Submit bid on the bid form provided. Fill in all blanks. If no amount is to be included, insert three zeros in the space. Include all unit cost items and all alternatives shown on the bid form; failure to comply may be cause for rejections. No segregated bids or assignments will be considered.

c. Do not alter the bid form with written memoranda or qualifications. Any explanation, alteration, or other statements proposed by the bidder must be written separately, signed independently, and included in the bid envelope. Bids may not be modified after submittal.

d. Sign in longhand below the typed name of the person authorized to bind the bidder to a contract. When the bidder is a corporation, the bid must be signed with the legal name of the corporation followed by the name of the State of Incorporation and the legal signature of a person authorized to bind the corporation to a contract.

e. ATTENTION: Pursuant to Texas Government Code 2252.908, you must be able to provide the City of Montgomery (the "City") with a printed, executed and notarized original of a completed Certificate of Interested Parties form (Form 1295) with the bid. Failure to do so will result in the City's inability to execute the contract. To complete the disclosure of interested parties form, or for further information, please visit the Texas Ethics Commission's website at https://www.ethics.state.tx.us.

f. Contractor to include the City's full name in Box 2 of the TEC form, "**The City of Montgomery**."

g. Contractor to enter "**W5841-0028-00**" into the TEC Box 3.

h. Contractor to submit the following forms with the bid:

1. WRD-255, Bidder's Certifications regarding Equal Employment Opportunity and Non- Segregated Facilities.

2. SRF-404, Certification Regarding Debarment, Suspension and Other Responsibility Matters, (to be completed and submitted by the sub-recipient).

3. Disadvantaged Business Enterprise (DBE) Construction Contract Phase Forms:

Form	Prime Contractor	Submit Form To
TWDB-0216	Required	TWDB
TWDB-0217	Required	TWDB
TWDB-0373	Required	TWDB

9.0 BID SECURITY

a. Each bidder shall furnish a bid guarantee equivalent to five percent (5%) of the bid price (Water Code 17.183). If a bid bond is provided, the Contractor shall utilize a surety company which is authorized to do business in Texas in accordance with Surety Bonds and Related Instruments, Chapter 3503 of the Insurance Code.

b. The bid security will be forfeited to the Owner by the bidder as damages as default if the bidder fails to execute and deliver a contract and bonds as required.

10.0 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

Bidder must be capable of executing a satisfactory performance bond and payment bond for 100 percent (100%) of the contract sum in accord with the conditions of the contract.

11.0 WITHDRAWAL

a. Bids may be withdrawn any time before bid opening but may not be resubmitted.

b. Bids may not be withdrawn or modified after bid opening time unless the award of the contract has been delayed more than 60 days.

12.0 QUALIFICATIONS OF BIDDERS

a. The Owner may make any investigations deemed necessary to determine the bidder's ability to perform the work. When requested, furnish such information and data necessary for this purpose.

b. The Owner reserves the right to reject any bid if evidence submitted by or investigation of the bidder indicate that the bidder is not properly qualified in the opinion of the Owner, to complete the work satisfactorily.

13.0 AWARD OF CONTRACT

The Owner is not obligated to accept the lowest bid or any bid. The Owner reserves the right to reject any or all bids and to waive any informalities in bids or in bidding. The Owner may accept any bid deemed advantageous. The contract award may include full consideration of unit prices, alternates, and time of completion.

This contract is contingent upon release of funds from the Texas Water Development Board. Any contract(s) awarded under this Invitation for Bids is/are expected to be funded in part by a loan or loan with principal forgiveness from the Texas Water Development Board and a grant from the United States Environmental Protection Agency, U.S. EPA. Neither the State of Texas, the U.S. EPA, nor any of its departments, agencies, or employees, are or will be a party to this Invitation for Bids or any resulting contract.

14.0 RETURN OF SIGNED CONTRACTS

By submitting a bid, the Contractor agrees to return signed contracts with proper bonds and insurance certificates within 14 calendar days after the Engineer has given the unsigned contracts to the Contractor. Should the Contractor fail to return properly executed contracts within 14 days, the Engineer may disqualify that Contractor and recommend that the Owner enter into contracts with the next highest bidder.

15.0 DISADVANTAGED BUSINESS ENTERPRISE GOALS

The Texas Water Development Board's (TWDB) Clean Water and Drinking Water State Revolving Fund programs receive federal funds from the U. S. Environmental Protection Agency (EPA). As a condition of federal grant awards, EPA regulations require that loan recipients make a "good faith effort" to award a fair share of work to Disadvantaged Business Enterprises (DBE) who are Minority Business Enterprises (MBE's), and Women-owned Business Enterprises (WBE's) whenever procuring construction, supplies, services and equipment. More information on DBE requirements is available in the Supplemental Contract Conditions section of this guidance No. 14. Disadvantaged Business Enterprises.

The current fair share goals for the State of Texas are as follows:

CATEGORY	MBE	WBE
Construction	19.44%	9.17%
Equipment	16.28%	11.45%
Services	20.41%	13.66%
Supplies	25.34%	8.82%

16.0 DAVIS-BACON WAGE RATE REQUIREMENTS

a) Davis-Bacon prevailing wage requirements apply to the construction, alteration or repair of treatment works carried out, in whole or in part, with assistance made available by the Clean Water State Revolving Fund (CWSRF) or a construction project financed, in whole or in part, from the Drinking Water State Revolving Fund (DWSRF).

b) The Davis-Bacon prevailing wage requirements apply to Contractors and Subcontractors performing on federally funded or assisted contracts in excess of $2,000 for the construction, alteration or repair (including painting) of a treatment works project under the CWSRF or a construction project under the DWSRF.

c) For prime contracts in excess of $100,000, Contractors and Subcontractors must also, under the provisions of the Contract Work Hours and Safety Standards Act, as amended, pay laborers and mechanics, including guards and watchmen, at least one and one-half times their regular rate of pay for all hours worked over 40 in a workweek. The Fair Labor Standards Act may also apply to Davis-Bacon covered contracts.

d) Any contracts in excess of $2,000 must include the provisions of the Davis-Bacon Wage Rate Requirements. If the Owner (sub-recipient) is a governmental entity such as a city or district, it must insert in full the contract clauses found in TWDB Guidance DB-0156, Appendix 1: Section 3, Section 4 if the contract exceeds $100,000, and Section 5. If the Owner (sub-recipient) is a non-governmental entity such as a water supply corporation or a private company, it must insert in full the contract clauses found in TWDB Guidance DB-0156, Appendix 2: Section 3, Section 4 if the contract exceeds $100,000, and Section 5. The Owner (sub-recipient) must ensure all prime contracts require the same full text in any subcontracts. See TWDB Guidance DB-0156 for the text of the contract language that must be included.

Additional information on Davis-Bacon Wage Rate Requirements and its applicability to this contract can be found in TWDB Guidance DB-0156.

17.0 AMERICAN IRON AND STEEL

Any contract(s) awarded under this Invitation for Bids is/are subject to the American Iron and Steel (AIS) requirements of 33 U.S.C §1388 for Clean Water State Revolving Fund projects or Public Law 114-113, Consolidated Appropriations Act, 2016, or subsequent appropriations acts, for Drinking Water State Revolving Fund projects. The Contractor must complete the statement of understanding regarding this requirement, found in Supplemental Contract Conditions, Item No. 9.

18.0 EQUAL EMPLOYMENT OPPORTUNITY AND AFFIRMATIVE ACTION

All qualified applicants will receive consideration for employment without regard to race, color, religion, sex (including pregnancy), sexual orientation, gender identity, national origin, age (40 or older), disability, or genetic information. Bidders on this work will be required to comply with the Department of Labor regulations at 41 CFR Part 60-4, relating to Construction Contractors--Affirmative Action Requirements, which include the President's Executive Order No. 11246, as amended by Executive Order No. 11375 and Executive Order No. 13672, in the award and administration of contracts awarded under TWDB financial assistance agreements. Failure by the Contractor to carry out these requirements is a material breach, which may result in the termination of the awarded financial assistance.

19.0 DEBARMENT AND SUSPENSION CERTIFICATION

This contract is subject to the federal requirements of Subpart C of 2 CFR Part 180 and Part 1532 regarding Debarment and Suspension. The Contractor will comply with the assurances provided with the bid that leads to a contract.

BID FORM

DATE: _____

Bid of _____ an individual proprietorship, a corporation organized and existing under laws of the State of Texas, a partnership of _____

for Construction of Downtown Waterline Replacement for The City of Montgomery.

To: City of Montgomery
101 Old Plantersville Road
Montgomery, Texas 77316
Telephone: (936) 597-6434

Ladies and Gentlemen:

The undersigned bidder has carefully examined the Instructions to Bidders, this Proposal, the General Conditions of Agreement, the Technical Specifications and the drawings for the work herein above described and referred to in the Invitation to Bid and has carefully examined the site of the work and will provide all necessary labor, superintendence, machinery, equipment, tools, materials, services and other means of construction to complete all the work upon which he bids, as called for in the Contract, the Specifications and shown on the drawings, and in the manner prescribed therein and according to the requirements of the Engineer as therein set forth for the amounts below.

Item No.	Description of Item with Unit Bid Price in Written Words.	Unit	Approx. Quantity	Unit Amount	Total Price
1.	Move-in and start-up, including performance and payment bonds for 100 percent (100%) of the contract amount, a certificate of insurance, a completed certificate of interested parties Form 1295, and weekly project schedules as directed by Engineer. @ _____ _____ Per Lump Sum	L.S.	1	$ _____	$ _____
2.	12-inch C-900 AWWA (DR18) Class 235 waterline, including fittings (tees, bends, joints, and flanges), removal and replacement of sidewalk, removal of existing asphalt pavement and installation of stabilized gravel, copper tracer wire, thrust blocks, bedding, backfill and testing, complete in place. @ _____ _____ Per Linear Foot	L.F.	518	$ _____	$ _____

Item No.	Description of Item with Unit Bid Price in Written Words.	Unit	Approx. Quantity	Unit Amount	Total Price
3.	Fusible 12-inch C-900 AWWA (DR18) Class 235 waterline, including fittings (tees, bends, joints, and flanges), removal and replacement of sidewalk, removal of existing asphalt pavement and installation of stabilized gravel, copper tracer wire, thrust blocks, bedding, backfill and testing, complete in place. @ _____ _____ Per Linear Foot	L.F.	3,024	$ _____	$ _____
4.	Additional cost for Trenchless Construction of Fusible 12-inch C-900 AWWA (DR18) Class 235 waterline, including excavation and backfill of bore pits, and fittings (not including pipe), complete in place. @ _____ _____ Per Linear Foot	L.F.	1,702	$ _____	$ _____
5.	Fusible 12-inch C-900 AWWA (DR18) Class 235 waterline by pipebursting, including excavation and backfill of bore pits, and fittings (not including pipe), complete in place. @ _____ _____ Per Linear Foot	L.F.	1,101	$ _____	$ _____
6.	Additional cost for 20-inch steel casing, complete in place. @ _____ _____ Per Linear Foot	L.F.	150	$ _____	$ _____
7.	12-inch Restrained Joint C-900 AWWA (DR18) Class 235 waterline offset, including fittings (tees, bends, and joints), copper tracer wire, thrust blocks, bedding, backfill and testing, complete in place. @ _____ _____ Per Each	EA.	1	$ _____	$ _____

Item No.	Description of Item with Unit Bid Price in Written Words.	Unit	Approx. Quantity	Unit Amount	Total Price
8.	12-inch resilient wedge gate valve (Mueller) including box (counter-clockwise open), concrete base block, riser, and 2'x2' concrete pad, complete in place. @ _____ _____ Per Each	EA.	14	$ _____	$ _____
9.	Connect proposed 12-inch waterline to existing 12-inch waterline, including removal of existing 2-inch blow-off and 12-inch plug, complete in place. @ _____ _____ Per Each	EA.	4	$ _____	$ _____
10.	8-inch resilient wedge gate valve (Mueller) including box (counter-clockwise open), concrete base block, riser, and 2'x2' concrete pad, complete in place. @ _____ _____ Per Each	EA.	1	$ _____	$ _____
11.	Connect proposed 12-inch waterline to existing 8-inch waterline, including removal of existing 2-inch blow-off and 8-inch plug, complete in place. @ _____ _____ Per Each	EA.	3	$ _____	$ _____
12.	Connect proposed 12-inch waterline to existing 6-inch waterline, complete in place. @ _____ _____ Per Each	EA.	3	$ _____	$ _____
13.	Connect proposed 12-inch waterline to existing 3-inch waterline, complete in place. @ _____ _____ Per Each	EA.	1	$ _____	$ _____

Item No.	Description of Item with Unit Bid Price in Written Words.	Unit	Approx. Quantity	Unit Amount	Total Price
14.	Flushing valve, bury as shown, (including lead and gate valve), complete in place. @ _____ _____ Per Each	EA.	10	$ _____	$ _____
15.	12-inch x 6-inch tapping sleeve and valve with Box, complete in place. @ _____ _____ Per Each	EA.	1	$ _____	$ _____
16.	3-inch resilient wedge gate valve (Mueller) including box (counter-clockwise open), concrete base block, riser, and 2'x2' concrete pad, complete in place. @ _____ _____ Per Each	EA.	1	$ _____	$ _____
17.	2-inch Air Release Valve, including precast concrete box, tapped into proposed 12-inch water main, as specified per City of Montgomery Standard Details, complete in place. @ _____ _____ Per Each	EA.	1	$ _____	$ _____
18.	Reconnect existing water meters to new 12-inch waterline, as directed by engineer, complete in place. @ _____ _____ Per Each	EA.	16	$ _____	$ _____
19.	Trench safety system for all pipe sizes and depths. @ _____ _____ Per Linear Foot	L.F.	1,732	$ _____	$ _____

Item No.	Description of Item with Unit Bid Price in Written Words.	Unit	Approx. Quantity	Unit Amount	Total Price
20.	Traffic Control Plan per plans, complete in place. @ _____ _____ Per Lump Sum	L.S.	1	$ _____	$ _____
21.	Placement of reinforced filter fabric fence, per plans and as directed by Engineer (including installation, maintenance, and removal). @ _____ _____ Per Linear Foot	L.F.	4,500	$ _____	$ _____
22.	Hydro-mulch seeding of rights-of-way and adjacent Easements (less pavement area). Contractor to ensure growth of vegetation by whatever means necessary, including re-seeding, over-seeding or watering at no separate pay. @ _____ _____ Per Lump Sum	L.S.	1	$ _____	$ _____
23.	Temporary water service (6") with connection to all existing water meters to all users throughout construction (includes installation, disinfection, connection, and disconnection), as directed by Engineer. @ _____ _____ Per Linear Foot	L.F.	4,643	$ _____	$ _____
				TOTAL BASE BID	$ _____

The total value of the work equals the total of the following items, each of which shall be billed separately by Contractor to Owner:

a.	Incorporated Material	$	_____
b.	Non-Incorporated Material	$	_____
c.	All Other Costs and Fees	$	_____
	TOTAL BASE BID	$	_____
			(Must equal Total Base Bid above)

The amounts set forth above are current estimates by Contractor of the amounts that will be determined during the progress of the Work. The separated progress billings from Contractor to the **Owner/Engineer** shall reflect the actual amounts expended for the items enumerated in (a), (b), and (c), above.

SUBSTITUTIONS: If necessary, attach detailed explanation

1. _____

It is agreed that the contract price may be increased or decreased to cover work added or deleted by order of the Engineer, in accordance with the provisions of the General Conditions of Agreement.

The award may be made on the Base Bid alone or the Base Bid and any or all of the Items listed under Alternates or Substitutions, if any.

The undersigned agrees that the amounts bid in this proposal will not be withdrawn or modified for **60** days following date of bid opening.

It is understood that the bid security accompanying this proposal shall be returned to the undersigned unless, in case of the acceptance of this proposal the undersigned should fail to enter into a construction contract and execute bonds as provided in the specifications. In the event the undersigned should fail to enter into a construction contract and execute bonds as required within 14 calendar days after the Engineer has given unsigned contracts to the Contractor, it is understood and agreed that the bid security shall be forfeited to the Owner and shall be considered as payment for damages due to delay and other inconveniences suffered by the Owner as a result of such failure on the part of the undersigned.

It is understood that the Owner reserves the right to reject any and all bids.

In the event of Award of the Contract to the undersigned, the undersigned agrees to furnish Performance and Payment Bonds as provided in the Specifications.

The undersigned certifies that the bid prices contained in this proposal have been carefully checked and are submitted as correct and final.

Date _____ Signed _____
(Company)

By _____
(Title)

_____

_____
(Address)

_____
(Telephone Number)

_____
(Witness)
SEAL (if Bidder is a Corporations)

Acknowledge receipt of Addenda Below:

Addendum No. _____ _____ _____ _____ _____

Date Received _____ _____ _____ _____ _____

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SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR CONSTRUCTION OF
DOWNTOWN WATERLINE REPLACEMENT
FOR
THE CITY OF MONTGOMERY
IN
MONTGOMERY COUNTY, TEXAS

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DIVISION 2 - SITE WORK

DIVISION 3 – CONCRETE

STANDARD FORM OF AGREEMENT

STATE OF TEXAS §

COUNTY OF MONTGOMERY §

THIS AGREEMENT, made and entered into this day of_____, A.D. 20___, by and between _____of the County of_____and State of Texas, acting through _____thereunto duly authorized so to do, Party of the First Part, hereinafter termed OWNER, and_____of the City of_____, County of_____and State of _____ _____, Party of the Second Part, hereinafter termed CONTRACTOR.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the Party of the First Part (OWNER), and under the conditions expressed in the bond bearing even date herewith, the said Party of the Second Part (CONTRACTOR), hereby agrees with the said Party of the First Part (OWNER) to commence and complete the construction of certain improvements described as follows:

CONSTRUCTION OF
DOWNTOWN WATERLINE REPLACEMENT
FOR
THE CITY OF MONTGOMERY
IN
MONTGOMERY COUNTY, TEXAS

and all extra work in connection therewith, under the terms as stated in the General Conditions of the Agreement and at his (or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said construction, in accordance with the conditions and prices stated in the Proposal attached hereto, and in accordance with the Notice to Contractors, General and Special Conditions of Agreement, Plans and other drawings and printed or written explanatory matter thereof, and the Specifications and addenda therefore, as prepared by Jones & Carter, Inc., 1575 Sawdust Road, Suite 400, The Woodlands, Texas 77380, herein entitled ENGINEER, each of which has been identified by the CONTRACTOR and the ENGINEER, together with the CONTRACTOR'S written Proposal, the General Conditions of the Agreement, and the Performance and Payment Bonds hereto attached; all of which are made a part hereof and collectively evidence and constitute the entire contract.

The CONTRACTOR hereby agrees to commence work within ten (10) days after the date written notice to do so shall have been given to him, and to substantially complete the same within **one hundred sixty (160)** calendar days after the date of the written notice to commence work, subject to such extensions of time as are provided by the General and Special Conditions.

The OWNER agrees to pay the CONTRACTOR in current funds the price or prices shown in the proposal, which forms a part of this contract, such payments to be subject to the General and Special Conditions of the contract.

IN WITNESS WHEREOF, the parties of these presents have executed this Agreement in the year and day first above written.

Party of the First Part (OWNER)	Party of the Second Part (CONTRACTOR)
By:_____	By:_____
ATTEST:_____	ATTEST:_____

STATE OF TEXAS §

COUNTY OF _____ §

BEFORE ME, the undersigned authority, on this day personally appeared _____, known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they executed the same for the purposes and considerations therein expressed and in the capacity therein and herein stated, and as the act and deed of said corporation.

GIVEN UNDER MY HAND and seal of office, this _____ day of_____, 20____.

_____

Notary Public - Signature

STATE OF TEXAS §

COUNTY OF _________ §

BEFORE ME, the undersigned authority, on this day personally appeared ___________________, known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they executed the same for the purposes and considerations therein expressed and in the capacity therein and herein stated, and as the act and deed of said corporation.

GIVEN UNDER MY HAND and seal of office, this ______ day of_____________________, 20_____.

____
Notary Public - Signature

STATE OF TEXAS §

COUNTY OF _________ §

BEFORE ME, the undersigned authority, on this day personally appeared ___________________, known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they executed the same for the purposes and considerations therein expressed and in the capacity therein and herein stated, and as the act and deed of said corporation.

GIVEN UNDER MY HAND and seal of office, this ______ day of_____________________, 20_____.

____
Notary Public - Signature

STATE OF TEXAS §

COUNTY OF _________ §

BEFORE ME, the undersigned authority, on this day personally appeared ___________________, known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they executed the same for the purposes and considerations therein expressed and in the capacity therein and herein stated, and as the act and deed of said corporation.

GIVEN UNDER MY HAND and seal of office, this ______ day of_____________________, 20_____.

____
Notary Public - Signature

1.0 GENERAL

1.1 SCOPE

This section fusible polyvinylchloride pipe, including standards for dimensionality, testing, quality, acceptable fusion practice, safe handling and storage.

1.2 DESCRIPTION

a. Pipe suppler shall furnish fusible polyvinylchloride pipe conforming to all standards and procedures and meeting all testing and material properties as described in this specification.

b. Pipe shall conform to the following dimensionality and general characteristics table:

Pipe Description	Nominal Diameter (in.)	DR	Pressure Class (psi)	Required Inner Diameter
FPVC	12”	DR-18	235	11.6

1.3 QUALITY

a. References

(1) This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

(2) Unless otherwise specified, references to documents shall mean the documents in effect at the time of design, bid, or construction, whichever is earliest. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued.

(3) Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ANSI/AWWA C110/A21.10	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
ANSI/AWWA C111/A21.11	American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
ANSI/AWWA C153/A21.53	AWWA Standard for Ductile-Iron Compact Fittings for Water Service

AWWA C605	Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C651	Standard for Disinfecting Water Mains
AWWA C900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (100mm Through 300mm), for Water Distribution
AWWA C905	Standard for Polyvinyl Chloride (PVC Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (350mm Through 1200mm), for Water Distribution and Transmission
AWWA M23	AWWA Manual of Supply Practices PVC Pipe—Design and Installation, Second Edition
ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM D1784	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D2152	Test Method for Degree of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
ASTM D2241	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
ASTM D2665	Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D3034	Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F679	Standard Specification for Poly(Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F1057	Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique

Reference	Title
ASTM F1417	Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air
UNI-B-6	Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe
UNI-PUB-08	Tapping Guide for PVC Pressure Pipe
NSF-14	Plastics Piping System Components and Related Materials
NSF-61	Drinking Water System Components--Health Effects
PPI TR-2	PVC Range Composition Listing of Qualified Ingredients

b. Manufacturer Requirements. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.

c. Fusion Technician Requirements. Fusion Technician shall be fully qualified by the pipe supplier to install fusible polyvinylchloride pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.

d. Specified Pipe Suppliers. Fusible polyvinylchloride pipe shall be used as manufactured under the trade names Fusible C-900®, Fusible C-905®, and FPVC®, for Underground Solutions, Inc., Poway, CA, (858) 679-9551. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051. Owner and engineer are aware of no other supplier of fusible polyvinylchloride pipe that is an equal to this specified pipe supplier and products.

e. Warranty.

(1) The pipe shall be warranted for one year per the pipe supplier's standard terms.

(2) In addition to the standard pipe warranty, the fusion services shall be warranted for one year per the fusion service provider's standard terms.

f. Pre-Construction Submittals. The following product data is required from pipe supplier and/or fusion provider:

(1) Pipe Size
(2) Dimensionality
(3) Pressure Class per applicable standard
(4) Color
(5) Recommended Minimum Bending Radius
(6) Recommended Maximum Safe Pull Force
(7) Fusion technician qualification indicating conformance with this specification

g. Post-Construction Submittals. The following as-recorded data is required from the contractor and/or fusion provider to the owner or pipe supplier on request:

(1) Approved datalogger device reports
(2) Fusion joint documentation containing the following information:
a. Pipe Size and Thickness
b. Machine Size
c. Fusion Technician Identification

d. Job Identification
e. Fusion Joint Number
f. Fusion, Heating, and Drag Pressure Settings
g. Heat Plate Temperature
h. Time Stamp
i. Heating and Cool Down Time of Fusion
j. Ambient Temperature

2.0 PRODUCTS

2.1 FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR POTABLE WATER

a. Fusible polyvinylchloride pipe shall conform to AWWA C900, AWWA C905, ASTM D2241 or ASTM D1785 for standard dimensions, as applicable. Testing shall be in accordance with the referenced AWWA standards for all pipe types.

b. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

c. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

d. Fusible polyvinylchloride pipe shall be blue in color for potable water use.

e. Pipe shall be marked as follows:

(1) Nominal pipe size
(2) PVC
(3) Dimension Ratio, Standard Dimension Ratio, or Schedule
(4) AWWA pressure class, or standard pressure rating for non-AWWA pipe, as applicable
(5) AWWA standard designation number, or pipe type for non-AWWA pipe, as applicable
(6) NSF-61 mark verifying suitability for potable water service
(7) Extrusion production-record code
(8) Trademark or trade name
(9) Cell Classification 12454 and/or PVC material code 1120 may also be included

f. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.2 FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR NON-POTABLE WATER NOT CONFORMING TO AWWA C905 DIMENSIONALITY

a. Fusible polyvinylchloride pipe shall conform to AWWA C900, ASTM D2241 or ASTM D1785 for standard dimensionality, as applicable. Testing shall be in accordance with the referenced AWWA standard.

b. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

c. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

d. Fusible polyvinylchloride pipe shall be purple in color for reclaim, reuse, or other non-potable water distribution or conveyance.

e. Pipe shall be marked as follows:

(1) Nominal pipe size
(2) PVC
(3) Dimension Ratio, Standard Dimension Ratio, or Schedule
(4) AWWA pressure class, or standard pressure rating for non-AWWA pipe, as applicable
(5) AWWA standard designation number, or pipe type for non-AWWA pipe, as applicable
(6) Extrusion production-record code
(7) Trademark or trade name
(8) Cell Classification 12454 and/or PVC material code 1120 may also be included
(9) For reclaimed water service, the wording: "Reclaimed Water, NOT for Potable Use"

f. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.3 **FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR NON-POTABLE WATER CONFORMING TO AWWA C905 DIMENSIONALITY**

a. Fusible polyvinylchloride pipe shall conform to AWWA C905 standard.

b. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

c. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

d. Fusible polyvinylchloride pipe shall be purple in color for reclaim, reuse, or other non-potable water distribution or conveyance.

e. Pipe shall be marked as follows:

(1) Nominal pipe size
(2) PVC
(3) Dimension Ratio, Standard Dimension Ratio, or Schedule
(4) AWWA pressure class
(5) AWWA standard designation number
(6) Extrusion production-record code
(7) Trademark or trade name
(8) Cell Classification 12454 and/or PVC material code 1120 may also be included
(9) For reclaim water service, the wording: "Reclaimed Water, NOT for Potable Use"

f. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.4 FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR WASTEWATER NOT CONFORMING TO AWWA C905 DIMENSIONALITY

a. Fusible polyvinylchloride pipe shall conform to AWWA C900, ASTM D2241 or ASTM D1785 for standard dimensionality, as applicable. Testing shall be in accordance with the referenced AWWA standard.

b. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

c. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

d. Fusible polyvinylchloride pipe shall be green in color for wastewater use.

e. Pipe shall be marked as follows:

(1) Nominal pipe size
(2) PVC
(3) Dimension Ratio, Standard Dimension Ratio, or Schedule
(4) AWWA pressure class, or standard pressure rating for non-AWWA pipe, as applicable
(5) AWWA standard designation number, or pipe type for non-AWWA pipe, as applicable
(6) Extrusion production-record code
(7) Trademark or trade name
(8) Cell Classification 12454 and/or PVC material code 1120 may also be included

f. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.5 **FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR WASTEWATER CONFORMING TO AWWA C905 DIMENSIONALITY**

a. Fusible polyvinylchloride pipe shall conform to AWWA C905 standard.

b. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

c. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

d. Fusible polyvinylchloride pipe shall be green in color for wastewater use.

e. Pipe shall be marked as follows:

(1) Nominal pipe size
(2) PVC
(3) Dimension Ratio, Standard Dimension Ratio, or Schedule
(4) AWWA pressure class
(5) AWWA standard designation number
(6) Extrusion production-record code
(7) Trademark or trade name
(8) Cell Classification 12454 and/or PVC material code 1120 may also be included

f. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.6 **FUSIBLE POLYVINYLCHLORIDE NON-PRESSURE PIPE FOR WASTEWATER OR SURFACE WATER**

a. Fusible polyvinylchloride pipe shall conform to ASTM D3034 or ASTM F679.

b. Fusible polyvinylchloride pipe may instead conform to AWWA C900 or AWWA C905, ASTM D2241 or ASTM D1785 for standard dimensionality, as applicable.

c. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

d. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

e. Fusible polyvinylchloride pipe shall be green in color for wastewater use. Fusible polyvinylchloride pipe shall be white in color for surface or storm water use.

f. Pipe shall be marked as follows:

(1) Nominal pipe size
(2) PVC
(3) Dimension Ratio, Standard Dimension Ratio, or Schedule
(4) Pressure class or standard pressure rating
(5) Standard designation number or pipe type
(6) Extrusion production-record code
(7) Trademark or trade name
(8) Cell Classification 12454 and/or PVC material code 1120 may also be included

f. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.7 FUSION JOINTS

Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed as described in this specification.

2.8 CONNECTIONS AND FITTINGS FOR PRESSURE APPLICATIONS

a. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie-ins to other piping systems.

b. <u>Ductile Iron Mechanical and Flanged Fittings.</u>

Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10, or AWWA/ANSI C153/A21.53 and AWWA/ANSI C111/A21.11.

(1) Connections to fusible polyvinylchloride pipe may be made using a restrained or non-restrained retainer gland product for PVC pipe, as well as for MJ or flanged fittings.
(2) Bends, tees and other ductile iron fittings shall be restrained with the use of thrust blocking or other means as indicated in the construction documents.
(3) Ductile iron fittings and glands must be installed per the manufacturer's guidelines.
(4) If required, linings for Ductile Iron fittings shall meet the following requirements for the following service environments:
    (1) Wastewater:
        a. Ceramic Epoxy shall be Tnemec Perma-Shield 431.
        b. Polyurethane shall be DuraShield 210 or 310.
    (2) Potable Water:
        a. Liquid Epoxy shall be 100% solids liquid epoxy, Tnemec Epoxyline Series FC22.
        b. Polyurethane shall be DuraShield 210-61 or 310-61.

(5) If required, coatings for Ductile Iron fittings shall meet the following requirements for buried and/or immersion service duty:
   a. Polyurethane shall be DuraShield 210 or 310.
   b. Liquid Epoxy shall be 100% solids liquid epoxy, Tnemec Epoxyline Series FC22.
   c. Coal tar epoxy shall be Sherwin Williams Targuard.

c. PVC Gasketed. Push-On Fittings

Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard PVC pressure fittings conforming to AWWA C900 or AWWA C905.

(1) Acceptable fittings for use joining fusible polyvinylchloride pipe other sections of fusible polyvinylchloride pipe or other sections of PVC pipe shall include gasketed PVC, push-on type couplings and fittings, including bends, tees, and couplings as shown in the drawings.
(2) Bends, tees and other PVC fittings shall be restrained with the use of thrust blocking or other restraint products as indicated in the construction documents.
(3) PVC gasketed, push-on fittings and mechanical restraints, if used, must be installed per the manufacturer's guidelines.

d. Fusible Polyvinyl Chloride Sweeps or Bends

(1) Fusible polyvinyl chloride sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe being joined using the sweep or bend.
(2) Fusible polyvinyl chloride sweeps or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the installation, and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation. There shall be no gasketed connections utilized with a fusible polyvinyl chloride sweep.
(3) Standard fusible polyvinyl chloride sweep or bend angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.

e. Sleeve-type Couplings

(1) Sleeve-type mechanical couplings shall be manufactured for use with PVC pressure pipe, and may be restrained or unrestrained as indicated in the construction documents.
(2) Sleeve-type couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

f. Expansion and Flexible Couplings

(1) Expansion-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.
(2) Expansion-type mechanical couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

g. Connection Hardware

Bolts and nuts for buried service shall be made of non-corrosive, high-strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

2.9 CONNECTIONS FOR GRAVITY SANITARY SEWER AND NON-PRESSURE APPLICATIONS

a. The following connections are to be used in conjunction with tie-ins to other non- pressure, gravity sewer piping and/or structures, and shall be as indicated in the construction documents.

b. PVC Gasketed, Push-On Couplings

(1) Acceptable couplings for joining fusible polyvinylchloride pipe to other sections of fusible polyvinylchloride pipe or other sections of PVC pipe shall include gasketed PVC, push-on type couplings as indicated in the construction documents.
(2) PVC gasketed, push-on fittings and/or restraint hardware must be installed per the manufacturer's guidelines.

c. Fusible Polyvinyl Chloride Sweeps or Bends

(1) Fusible polyvinyl chloride sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe being joined using the sweep or bend.
(2) Fusible polyvinyl chloride sweeps or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the installation, and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation. There shall be no gasketed connections utilized with a fusible polyvinyl chloride sweep.
(3) Standard fusible polyvinyl chloride sweep or bend angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.

d. Sleeve-Type Couplings

(1) Sleeve-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

e. Expansion and Flexible Couplings

(1) Expansion-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

f. Connection Hardware

(1) Bolts and nuts for buried service shall be made of non-corrosive, high- strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

g. Connection to Sanitary Sewer Manholes and Structures

(1) Fusible polyvinylchloride pipe shall be connected to manholes and other structures to provide a leak-free, properly graded flow into or out of the manhole or structure.
(2) Connections to existing manholes and structures shall be as indicated in the construction documents.
    a. For a cored or drilled opening provide a flexible, watertight connection that meets and/or exceeds ASTM C923.
    b. For a knock out opening, provide a watertight connection (waterstop or other method) meeting the material requirements of ASTM C923 that is securely attached to the pipe with stainless steel bands or other means.
    c. Grout opening in manhole wall with non-shrink grout. Pour concrete collar around pipe and outside manhole opening. Provide flexible pipe joint or flexible connector within 2 feet of the collar.

(3) Connections to a new manhole or structure shall be as indicated in the construction documents.
   a. A flexible, watertight gasket per ASTM C 923 shall be cast integrally with riser section(s) for all precast manhole and structures.
   b. Drop connections shall be required where shown on drawings.
   c. Grout internal joint space with non-shrink grout.

3.0 EXECUTION

3.1 DELIVERY AND OFF-LOADING

a. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the owner or engineer.

b. Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify owner or engineer immediately if more than immaterial damage is found. Each pipe shipment should be checked for quantity and proper pipe size, color, and type.

c. Pipe should be loaded, off-loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier's guidelines shall be followed.

d. Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

e. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

f. If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to insure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

3.2 HANDLING AND STORAGE

a. Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the owner or engineer.

b. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the owner or engineer.

c. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.

d. Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.

e. If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

f. Pipe shall be stored and stacked per the pipe supplier's guidelines.

3.3 FUSION PROCESS

a. General.

(1) Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

(2) Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

(3) Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.

(4) Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following elements:

a. HEAT PLATE - Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

b. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

c. GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

d. DATA LOGGING DEVICE – An approved datalogging device with the current version of the pipe supplier's recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

(5) Other equipment specifically required for the fusion process shall include the following:

a. Pipe rollers shall be used for support of pipe to either side of the machine

b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and /or windy weather, per the pipe supplier's recommendations.

c. An infrared (IR) pyrometer for checking pipe and heat plate temperatures.

d. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.

e. acing blades specifically designed for cutting fusible polyvinylchloride pipe shall be used.

b. Joint Recording

Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of fusible polyvinyl chloride pipe. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

3.4 GENERAL INSTALLATION

a. Installation guidelines from the pipe supplier shall be followed for all installations.

b. The fusible polyvinylchloride pipe will be installed in a manner so as not to exceed the recommended bending radius.

c. Where fusible polyvinylchloride pipe is installed by pulling in tension, the recommended Safe Pulling Force established by the pipe supplier shall not be exceeded.

3.5 PREPARATION PRIOR TO MAKING CONNECTIONS INTO EXISTING PIPING SYSTEMS

a. Approximate locations for existing piping systems are shown in the construction documents. Prior to making connections into existing piping systems, the contractor shall:

(1) Field verify location, size, piping material, and piping system of the existing pipe.
(2) Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or others as shown in the construction documents.
(3) Have installed all temporary pumps and/or pipes in accordance with established connection plans.

b. Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

3.6 PIPE SYSTEM CONNECTIONS

Pipe connections shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines and as indicated in the construction documents. Pipe connections to structures shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines.

3.7 TAPPING FOR POTABLE AND NON-POTABLE WATER APPLICATIONS

a. Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. NO DIRECT TAPPING WILL BE PERMITTED. Tapping shall be performed in accordance with the applicable sections for Saddle Tapping per Uni-Pub-8.

b. All connections requiring a larger diameter than that recommended by the pipe supplier, shall be made with a pipe connection as specified and indicated on the drawings.

c. Equipment used for tapping shall be made specifically for tapping PVC pipe:

(1) Tapping bits shall be slotted "shell" style cutters, specifically made for PVC pipe. 'Hole saws' made for cutting wood, steel, ductile iron, or other materials are strictly prohibited.
(2) Manually operated or power operated drilling machines may be used.

d. Taps may be performed while the pipeline is filled with water and under pressure ('wet' tap,) or when the pipeline is not filled with water and not under pressure ('dry' tap).

3.7 TESTING

a. Testing shall comply with all applicable jurisdictional building codes, statutes, standards, regulations, and laws.

b. <u>Hydrostatic Testing and Leakage Testing for Pressure Piping</u>

(1) Hydrostatic and leakage testing for piping systems that contain mechanical jointing as well as fused PVC jointing shall comply with AWWA C605.

(2) Unless agreed to or otherwise designated by the owner or engineer, for a simultaneous hydrostatic and leakage test following installation, a pressure equal to 150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation shall be applied. The duration of the pressure test shall be for two (2) hours.

(3) If hydrostatic testing and leakage testing are performed at separate times, follow procedures as outlined in AWWA C605.

(4) In preparation for pressure testing the following parameters must be followed:

a. All air must be vented from the pipeline prior to pressurization. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points. Venting may also be accomplished by 'flushing' the pipeline in accordance with the parameters and procedures as described in AWWA C605.

b. The pipeline must be fully restrained prior to pressurization. This includes complete installation of all mechanical restraints per the restraint manufacturer's guidelines, whether permanent or temporary to the final installation. This also includes the installation and curing of any and all required thrust blocking. All appurtenances included in the pressure test, including valves, blow-offs, and air-relief valves shall be checked for proper installation and restraint prior to beginning the test.

c. Temporary pipeline alignments that are being tested, such as those that are partially installed in their permanent location shall be configured to minimize the amount of potentially trapped air in the pipeline.

c. Leakage Testing for Non-Pressure Piping

(1) Gravity sanitary sewers that contain mechanical jointing in addition to fused PVC joints may need to be tested for excessive leakage.

(2) Gravity sanitary sewer leakage testing may include appropriate water or low pressure air testing. The leakage outward or inward (exfiltration or infiltration) shall not exceed 25 gallons per inch of pipe diameter per mile per day for any section of the system. An exfiltration or infiltration test shall be performed with a minimum positive head of two feet. The air test, if used, shall be conducted in accordance with one of the following Standards:

a. ASTM F1417

b. UNI-B-6

(3) The testing method selected shall properly consider the existing groundwater elevations during the test.

d. Deflection Testing for Non-Pressure Piping

(1) After completion of the backfill, the engineer or owner may require that a deflection test be performed.

(2) Deflection tests should be conducted using a go/no-go mandrel. The mandrel's outside dimension shall be sized to permit no more than 7.5 percent deflection. The percent deflection shall be established from the base inside diameter of the pipe. If the internal beading of the fused joints for the pipe is not required to be removed, the mandrel shall account for this clearance as well. The mandrel shall be approved by the owner or engineer prior to use. Lines that permit safe entry may allow other deflection test options, such as direct measurements.

e. Disinfection of the Pipeline for Potable Water Piping

(1) After installation, the pipeline, having passed all required testing, shall be disinfected prior to being put into service. Unless otherwise directed by the owner or engineer, the pipeline will be disinfected per AWWA C651.

f. Partial Testing

(1) Segments of the pipe may be tested separately in accordance with standard testing procedure, as approved by the owner and engineer.

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