

PROJECT MANUAL

2026 ANNUAL WATER AND SEWER CONTRACT

**LIMESTONE COUNTY WATER & SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA**

January 2026

TABLE OF CONTENTS

DIVISION	SECTION TITLE	PAGES
DIVISION 0 REQUIREMENTS AND CONTRACT FORMS		
00020	Request for Proposals	2
00100	Instruction to Proposers	7
00300	Cost Proposal Form	11
00510	Notice of Award	1
00520	Agreement	6
00550	Notice to Proceed	1
00610	Performance Bond	4
00615	Payment Bond	4
00700	General Conditions	72
00815	Supplemental General Conditions	8
DIVISION 1 GENERAL REQUIREMENTS		
01000	Special Requirements	2
01010	Project Summary	3
01026	Measurement and Payment	9
01500	Temporary Facilities	4
01620	Storage and Protection	1
01700	Contract Closeout	3
01710	Cleaning	2
DIVISION 2 SITE CONSTRUCTION		
02110	Clearing	2
02222	Classified Excavation for Utilities	9
2.14	Trenching, Backfilling & Compaction for Utilities	5
2.16	Erosion Control	8
2.17	Finish Grading	2
2.18	Seeding	3
2.19	Boring and Casing for Sanitary Sewers and Water Lines	3
2.20	Horizontal Directional Drilling	12
2.21	Pavement Repair	4
3.01	Sanitary Sewers (Gravity)	18
3.02	Sewage Force Main	13
3.03	Precast Manholes and Wet Wells	11
3.05	Sewage Valves	4
3.06	Flow Control of Sewer Lines	8
4.01	Water Lines	21
4.02	Water Valves, Hydrants and Appurtenances	5
4.03	1-Inch Water Service Assemblies	3
DIVISION 3 CONCRETE		
03303	Concrete for Utility Lines	1

APPENDIX

STANDARD CONSTRUCTION DETAILS

SEWER

6.01S	Typical Sanitary Sewer Manhole
6.02S	Manhole Steps Detail
6.03S	Manhole Joint Sealant Detail
6.04S	Manhole Vent Detail
6.05S	Flexible Manhole Pipe Connection Detail
6.06S	Exterior Drop Manhole (Gravity Line Only)
6.07S	Interior Drop Manhole Detail (Force Main Connection Only)
6.08S	Shallow Manhole Detail
6.09S	Traffic Type Manhole Frame & Cover
6.10S	Watertight Manhole Frame & Cover
6.11S	Shallow Type Manhole Frame & Cover
6.12S	Shallow Type Watertight Manhole Frame & Cover
6.13S	Typical Water & Sanitary Sewer Separation
6.14S	Gravity Sanitary Sewer Bedding & Backfill Detail
6.15S	Sanitary Sewer Laterals
6.16S	Sanitary Sewer Service Cleanout Assembly
6.17S	Typical Sewage Air/Vacuum Release Valve Assembly
6.18S	Check Dams for Sanitary Sewer Lines
6.19S	500 Gallon Grease Trap
6.20S	Typical Sewer Line Repair Transition
6.21S	Small Cast Iron Cleanout Box Frame & Cover

WATER

6.01W	Typical Valve Box Setting
6.02W	Typical Full Service Fire Hydrant Setting
6.03W	Omitted
6.04W	Typical Concrete Thrust Blocking
6.05W	1" Service Assembly
6.06W	2" Blow-off Detail
6.07W	1" Manual Air Release Assembly
6.08W	Standard Water Main & Force Main Bedding and Backfilling
6.09W	2" Water Meter Vault Assembly w/Double Check Valve Backflow Preventer
6.10W	2" Water Meter Vault Assembly for Use with RPZ Backflow Preventer
6.11W	3" Water Meter Vault Assembly
6.12W	4" Domestic Water Meter Vault Assembly
6.13W	6" Domestic Water Meter Vault Assembly
6.14W	8" Domestic Water Meter Vault Assembly
6.15W	2" Reduced Pressure Zone Backflow Preventer Assembly
6.16W	3" to 8" Reduces Pressure Zone Backflow Preventer Assembly
6.17W	3" to 8" Double Check Valve Backflow Preventer Assembly

- 6.18W 6" & 8" Detector Reduced Pressure Zone Backflow Preventer Assembly (For Fire Protection Service Only)
- 6.19W 6" & 8" Detector Double Check Valve Backflow Preventer Assembly (For Fire Protection Service Only)

MISCELLANEOUS

- 6.01M Temporary Silt Fence
- 6.02M Straw Bale Barrier
- 6.03M Temporary Construction Entrance
- 6.04M Creek Crossing
- 6.05M Concrete Protection for Utility Lines
- 6.06M Bore and Jack for Highways
- 6.07M Casing Spacer and End Seal Details
- 6.08M Standard Chain Link Fence Detail

SECTION 00020

REQUEST FOR PROPOSAL

2026 Annual Water and Sewer Contract

In accordance with Act 97-225 (the Alabama Public Works Act), notice is hereby given that the Limestone County Water and Sewer Authority (Awarding Authority) will receive proposals, under seal, from Contractors licensed in the State of Alabama to perform water lines, sewer lines and related appurtenances installation under Annual Contract.

Proposal packages may be obtained at the office of the Limestone County Water and Sewer Authority located at 17218 Highway 72, Athens, Alabama 35611.

Sealed proposals to the Limestone County Water and Sewer Authority will be received at the operations building located at 17218 Highway 72, Athens, Alabama 35611. The sealed proposal packages are due no later than **12:00 p.m. CST, on Thursday, February 12, 2026**. The proposals will be evaluated by LCWSA staff for administrative and technical completeness. The proposals will then be presented to the Limestone County Water and Sewer Authority Board of Directors and CEO for final consideration.

Proposals should be addressed to Alan Lash, Chief Operating Officer, in sealed packages with the words "**2026 Annual Water and Sewer Contract**" appearing on the outside of the envelope or package. Any disclosure in advance of the terms of a proposal in response to this invitation shall render the proceedings void and require advertisement and award anew.

The award shall be made to the firm who best meets the requirements of the proposal, unless the Awarding Authority finds that all the proposals are unreasonable or that it is not in the interest of the Awarding Authority to accept any of the proposals. A responsible proposal is one that has the qualities determined necessary for performance, is competent, experienced, and financially able to perform the Contract. A responsive proposal is one who submits a proposal that complies with the terms and conditions of this Request for Proposal. All applicable taxes must be included in the request for costs. The Contractor who is awarded the Contract must comply with provisions of the Alabama Public Works Act.

According to the Alabama Public Works Act, the Awarding Authority shall give preference to resident bidders. A nonresident bidder shall be awarded Alabama public contracts only on the same basis as the nonresident bidder's state awards contracts to Alabama bidders under similar circumstances. Nonresident bidders must accompany any written Proposal Documents with a written opinion of an attorney-at-law licensed to practice in such nonresident bidder's state of domicile, as to the preferences, if any or

none, granted by the law of that state to its own resident businesses in the letting of any or all public contracts.

Proposals for the Work shall remain firm for a period of sixty (60) calendar days from the date of the receipt of Proposal. The Request for Proposal, which contains instructions for the submission of qualifications and costs proposal, a proposed Contract, and the Specifications for the **2026 Annual Water and Sewer Contract**, is on file for inspection at the Limestone County Water and Sewer Authority's main office, located at 17218 Highway 72, Athens, Alabama 35611.

Daryl Williamson
CEO
Limestone County
Water & Sewer Authority

SECTION 00100

INSTRUCTIONS TO PROPOSERS

1.01 SECURING DOCUMENTS

Proposers may obtain sets of Request for Proposal from the Owner.

1.02 PROPOSAL REQUIREMENTS FOR SUBMITTAL

- A. To receive consideration, submit all parts of the proposal in strict accordance with the following:
1. Complete Cost Proposal Form (Section 00300) upon the form provided therefor, properly executed and with all items filled out.
 2. Do not change the wording of the Form, and do not alter the Form.
 3. Unauthorized conditions, limitation, or provisions attached to the proposal shall be cause for rejection of the proposal.
 4. Telegraphic submittal or telegraphic modification of proposal will not be considered.
 5. Proposals received after time specified for receiving them will not be considered.
 6. Late proposals will be returned to the sender unopened.
 7. Each proposal shall be addressed to the Owner and shall be delivered to 17218 Highway 72 West, Athens, AL 35611 on or before the day and hour set for receiving proposal.
 8. Each proposal shall be enclosed in a sealed envelope bearing the title of the Work, the name of the Proposer and address, Proposer's State license number, classification of license, limits of classification, and expiration date, and the date and hour of proposal receipt.
 9. It is the sole responsibility of proposer to see that his proposal is received on time.

Proposers are cautioned that, to be considered responsive, a complete package for the project including unit prices and other requirements must be submitted. A proposal not including all required items will not be considered responsive and will be rejected from further consideration.

B. AWARD METHODOLOGY

1. The award of the Contract will be based upon:
 - a) Unit price evaluation: 50% based on the following:
 1. 75% weighted to unit costs for a mock water project.
 2. 25% weighted to unit costs for a mock sewer project.
 - b) Owner references: 20%
 - c) Contractor work force experience: 5%
 - d) Bonding Company Reference: 5%
 - e) Material suppliers' references: 5%
 - f) Bank reference: 5%
 - g) Proximity: 10%

C. REQUIRED DOCUMENTATION

The Contractor shall submit the following information with his proposal. Failure to submit any of the below-listed items will result in a disqualification of proposal.

1. Cost Proposal Form (Section 00300) with Unit Prices
2. Project References: Provide at least five (5) Owners for whom Contractor has worked within the past three (3) years as this contracting entity. Contract values shall be at least fifty thousand dollars (\$50,000.00) or greater. Names, titles and telephone numbers shall be provided for each reference with the project name and contract value. **Previous work with Limestone County Water & Sewer Authority will only count as one (1) reference regardless of number of contracts performed.**
3. List of principals, foremen, and superintendents who would likely be performing and managing the work and a brief resume of their background and length of experience.
4. Supplier References: At least two (2) material suppliers with whom Contractor has worked within the past two (2) years. Reference shall include approximate value of materials purchased from the supplier annually. Contact names, title and telephone number shall be provided for each reference.
5. Bank References: At least one (1) bank reference. Reference shall include the name, title and telephone number of the reference and the length of time the Contractor has been doing business with the bank.
6. Bonding Company Reference: Reference shall include the name, title and telephone number of the reference and the length of time the Contractor has been doing business with the bonding company.

- D. Items 2 through 6 listed above shall be submitted on an individual page(s) and type-written on 8.5x11 paper on company letterhead. Items 1 – 6 shall be collectively bound in a standard presentation report folder. Provide 2 copies of the bound items.

- E. The Owner reserves the right to reject all proposals and to waive informality and irregularity in the proposals.

1.03 BONDS

A. BONDS

1. Prior to signing the Contract, the Owner will require the selected Contractor to secure and post a Labor and Materials Payment Bond and a Performance Bond, each in the amount of \$250,000.00, and each on forms referenced in the Project Manual.
2. All such bonds shall be issued by Surety acceptable to the Owner. Include the costs of all such bonds in the proposed Cost Proposal Form.
3. The Owner will reimburse the cost of bond(s) if contract is awarded but due to funding restraints, no work is performed on the Contract.

1.04 PRIOR TO PROPOSAL DUE DATE

A. EXAMINATION OF PROJECT MANUAL

1. Before submitting a proposal, each Proposer shall carefully examine the Project Manual and all other proposed Contract Documents.
2. Each Proposer shall fully inform himself prior to submitting proposal as to all existing conditions and limitations under which the Work is to be performed, and he shall include in his proposal a sum to cover all costs of all items necessary to perform the Work as set forth in the proposed Contract Documents.
3. Allowance will not be made to any Proposer because of lack of such examination or knowledge.
4. The submission of a proposal will be constructed as conclusive evidence that the Proposer has made such examination.
5. This is a “no-plans” Contract. Owner will issue directive to install water lines and sewer lines at various locations across Limestone County, Alabama for varying size extensions that occur throughout the course of the year.

B. INTERPETATION OF CONTRACT DOCUMENTS PRIOR TO SUBMITTAL

1. If any person contemplating submitting a Proposal for the Work is in doubt as to the true meaning of any part of the proposed Contract Documents or finds discrepancies in or omissions from any part of the proposed Contract Documents, he may submit to the Owner a written request via email for interpretation thereof not later than three days before Proposals are specified to be received.
 - a) The person submitting the request shall be responsible for its prompt delivery.
 - b) Interpretation or correction of proposed Contract Documents will be made only by Addendum and will be mailed or delivered to each proposer of record.

- c) The Owner will not be responsible for any other explanations or interpretations of the proposed Contract Documents.

1.05 WITHDRAWAL OF PROPOSAL

- A. Any Proposer may withdraw his Proposal, either personally or by written request, received by the Owner at any time prior to the scheduled time for receiving proposals. Proposer cannot withdraw his Proposal for a period of 60 days after the date set for receiving thereof.

1.06 EXECUTION OF AGREEMENT

- A. The form of Agreement which the successful Proposer, as Contractor, will be required to execute is referenced in the Project Manual. The Standard Form of Agreement between Owner and Contractor on the basis of a stipulated price, as prepared by the EJCDC.
- B. The Proposer to whom the contract is awarded by the Owner shall, within 15 day after notice of award and receipt of Agreement forms from the Owner and Contractor, sign and deliver to the Owner all required copies of the contract.
- C. At or prior to delivery of the signed Agreement, the Contractor shall deliver to the Owner the Labor and Materials Payment Bond, the Performance Bond, and the policies of insurance or insurance certificates as required by the Contract Documents.
- D. All bonds and policies of insurance must be approved by the Owner before the successful proposer can proceed with the work.
- E. Failure or refusal to furnish bonds or insurance policies or certificates in a form satisfactory to the Owner and in a timely manner, shall subject the Proposer to rejection of proposal and loss of contract.

1.07 CONTRACT TIMES

- A. Contractor agrees that the work will be completed and ready for final payment in accordance with Paragraph 12.2 of the General Conditions within the work task directed after the date with the Contract Times commences to run. Each work task will be assigned a project time within which to be completed. Overall Contract time will be for a period of three-hundred sixty-five (365) calendar days.
- B. The Owner may, at his option, offer the Contractor for renewal for a period of up to two (2) additional years (in one-year increments). The Contractor may opt to accept or refuse a Contract extension after the first year. If the Contractor/Owner opts to terminate the Contract after any award year, notice must be submitted in writing by either party 90 days prior to Contract expiration (based on Notice of Award date). If a Contract extension is offered, it will be at the same unit prices and no cost increases will be considered for the work and the same unit prices would remain in effect for the additional year(s).
- C. If the Contract is extended beyond year one or year two, the Owner and Contractor will review the existing contract documents for potential updates that

may need to occur within the technical documents to conform to any changes in the Owner's Standard Specifications. If this occurs, changes will be noted and agreed to 60 days prior to execution of an extension.

1.08 CONTRACT CLOSEOUT

- A. The Contractor shall, immediately after the completion of the Contract, give notice of the completion by an advertisement in a newspaper of general circulation published within the city or county in which the work has been done, for a period of four successive weeks. A final settlement shall not be made upon the Contract until the expiration of 30 days after the completion of the notice. Proof of publication of the notice shall be made by the Contractor to the authority by whom the Contract was made by affidavit of the publisher and a printed copy of the notice published. If no newspaper is published in the county in which the work is done, the notice may be given by posting at the courthouse for 30 days, and proof of same shall be made by the judge of probate, sheriff, and the Contractor.

1.09 BASIS OF PAYMENT

- A. Basis of payment to the Contractor will be made only for the actual quantities of the several pay items of the Work performed at the Contract Unit Prices in the Cost Proposal, in accordance with the Specification, as finally determined from actual measurements made during the progress or after completion of the Work. Measurement for Payment of Unit Prices shall be as set forth in Section 01026 in these Specifications. Upon completion of the work, the Contract Unit Prices will still prevail except as otherwise provided. This is an Annual Contract and work will be performed on an as needed and requested by the Owner basis. It is anticipated the value of the contract will be in the range of one-hundred thousand dollars (\$100,000.00) to three-hundred fifty thousand dollars (\$350,000.00) annually, depending upon the need to extend water lines, sewer lines and funding availability.
- B. There is no guarantee to the level of annual work. The value of work could be zero if Owner does not have available funds with which to perform improvements. The Contractor will not be allowed to make claim for anticipated levels of work and levels of profit for this Work.

1.10 CONTRACT METHODOLOGY

- A. The Owner will issue work task directives to the Contractor to install specific quantities of material at specific locations. These work tasks will be pre-defined with a scope of work and time of completion for each work task. The Owner will issue a written directive to the Contractor to proceed with the work and define a completion date. The Owner will estimate the required material for the specific work task and will purchase and arrange for delivery of materials to the work

location. The Contractor will be responsible for off-loading, storage, protection and installation of material necessary to complete the specific work task.

1.11 OWNER FURNISHED MATERIALS

- A. For Annual Water and Sewer Contract, the Owner plans to furnish certain materials to the Contractor. These materials will include pipe, valve, valve boxes, pipe fittings, manual air release assembly components, tapping sleeves, tapping valves, service saddles, corporation stops, service line, curb stops, fire hydrants, meter boxes, blow-off assembly components, tracer wire, steel casing pipe, casing spacers, pre-cast manholes, manhole castings, air/vacuum valves or other water/sewer miscellaneous appurtenances.
- B. The Owner **will not** furnish such material as stone bedding, stone backfill, select backfill, topsoil, straw mats, grass seed, explosives required for rock removal, concrete for thrust restraint, concrete for encasement, concrete for driveway replacement, water for dust control, calcium chloride for dust control, cold mix for temporary pavement repair, asphaltic mix, paint for roadway striping, traffic control items such as barricades, arrow boards, signs, flagmen, etc., testing supplies or testing apparatus. These items or any other items not specifically described in Section 1.11A shall be the responsibility of the Contractor to furnish and shall be included in the appropriate unit price and no additional payment will be considered by Owner. Any Contractor furnished items shall include all applicable taxes, delivery fees and placement and installation of those materials not furnished by the Owner.
- C. The Owner will make available to the Contractor materials supplier(s) who have been approved. The Owner will purchase, arrange, schedule, and coordinate all materials ordering through the approved supplier(s). The Contractor will provide for all material handling, storage and protection, stringing, staging, and handling of materials, storage yards, and testing as required. The Contractor will check for damaged material and completeness of material order at time of delivery and notify Owner's Representative of damaged material or incomplete deliveries. Any materials ordered and not used in the installation of this Contract will be returned by the Contractor to the Owner. Owner shall pre-approve orders of materials for which quantities being ordered exceed those set forth in Cost Proposal Form.
- D. Since the Owner is furnishing material for this Contract, **NO** stored material payments for incidental Contractor-supplied material will be considered for monthly estimates.

1.12 WARRANTY FOR INSTALLATION

- A. All work installed by the contractor related to the 2023 Annual Water & Sewer Contract including final restoration shall be warranted for a period of one (1) year from date of final acceptance as established by the Owner for the specific task order.

1.13 STATE SALES TAX EXEMPTION

- A. No Alabama State Sales Tax exemption will be considered for this project. The Contractor will be responsible for all State Sales Taxes related to any Contractor furnished materials on the project.

END OF SECTION

SECTION 00300

COST PROPOSAL FORM

TO: Mr. Daryl Williamson, CEO
Limestone County Water and Sewer Authority
17218 Highway 72 West
Athens, Alabama 35611

1. Pursuant to and in compliance with the Request for Proposal and the proposed Contract Documents relating to construction of:

2026 Annual Water and Sewer Contract

Including Addenda _____

The undersigned, having become thoroughly familiar with the terms and conditions of the proposed Contract Documents and with local conditions affecting the performance and costs of the Work at the place where the Work is to be completed, and having fully inspected the site in all particulars, hereby proposed and agrees to fully perform the Work within the time stated and in strict accordance with the proposed Contract Documents, including furnishing any and all labor, equipment and materials not otherwise furnished by the Owner, and to do all work required to construct and complete said Work in accordance with the Contract Documents, for the following sum of money:

2. I understand that the Owner reserves the right to reject this Cost Proposal, but that this proposal shall remain open and not be withdrawn for a period of sixty days from the date prescribed for its receiving.
3. The Proposer, if awarded a contract, hereby agrees to commence work under this contract on or before a date to be specified in a written notice to proceed from the Owner.
4. If written notice of the acceptance of this proposal is mailed or delivered to the undersigned within sixty days after the date set for the receiving of this proposal, or at any other time thereafter before it is withdrawn, the undersigned shall execute and deliver the Contract Documents to the Owner in accordance with this proposal as accepted, and will also furnish and deliver to the Owner the Performance Bond, Labor and Material Payment Bond, and proof of insurance coverage, all within fifteen days after personal delivery or after deposit in the mail of the notification of acceptance of this proposal.
5. Proposer hereby agrees to commence work under this contract on or before date to be specified in written "Notice to Proceed" of the Owner. Overall Contract time will be for 365 calendar days with individual work tasks being assigned a completion time at the onset of each work task.
6. Notice of acceptance, or request for additional information, may be addressed to the undersigned at the address set forth below.

**NOTE: Refer to Section 00100, Paragraph 1.11 for Owner-furnished materials.
Refer to Section 01026 for definition of measurement & payment of work.**

WATER LINES

Item No.	Description	Unit	Unit Cost
W-1	Install PVC Class 200 Water Line		
	a. 3"	LF	\$ _____
	b. 4"	LF	\$ _____
	c. 6"	LF	\$ _____
	d. 8"	LF	\$ _____
	e. 10"	LF	\$ _____
	f. 12"	LF	\$ _____
W-2	Install Ductile Iron Class 250/350 Water Line		
	a. 4"	LF	\$ _____
	b. 6"	LF	\$ _____
	c. 8"	LF	\$ _____
	d. 10"	LF	\$ _____
	e. 12"	LF	\$ _____
	f. 16"	LF	\$ _____
	g. 18"	LF	\$ _____
	h. 24"	LF	\$ _____
	i. 36"	LF	\$ _____
W-3	Install Ductile Iron fittings	LBS	\$ _____
W-4	Install mega-lug type restraint devices where directed by Owner		
	a. 4"	EA	\$ _____
	b. 6"	EA	\$ _____
	c. 8"	EA	\$ _____
	d. 10"	EA	\$ _____
	e. 12"	EA	\$ _____
	f. 16"	EA	\$ _____
	g. 18"	EA	\$ _____
	h. 24"	EA	\$ _____
	i. 36"	EA	\$ _____

W-5	Install ductile iron pipe restraint gaskets where directed by Owner		
	a. 4"	EA	\$ _____
	b. 6"	EA	\$ _____
	c. 8"	EA	\$ _____
	d. 10"	EA	\$ _____
	e. 12"	EA	\$ _____
	f. 16"	EA	\$ _____
	g. 18"	EA	\$ _____
	h. 24"	EA	\$ _____
	i. 36"	EA	\$ _____
W-6	Install gate valve with valve box		
	a. 3"	EA	\$ _____
	b. 4"	EA	\$ _____
	c. 6"	EA	\$ _____
	d. 8"	EA	\$ _____
	e. 10"	EA	\$ _____
	f. 12"	EA	\$ _____
	g. 16"	EA	\$ _____
	h. 18"	EA	\$ _____
	i. 24"	EA	\$ _____
	j. 36"	EA	\$ _____
W-7	Install 1-inch or 2-inch manual air release valve with box	EA	\$ _____
W-8	Install tapping sleeve and tapping valve with valve box		
	a. 6" X 6"	EA	\$ _____
	b. 8" X 6"	EA	\$ _____
	c. 8" x 8"	EA	\$ _____
	d. 10" x 6"	EA	\$ _____
	e. 10" x 8"	EA	\$ _____
	f. 10" x 10"	EA	\$ _____
	g. 12" x 6"	EA	\$ _____
	h. 12" x 8"	EA	\$ _____
	i. 12" x 10"	EA	\$ _____
	j. 12" x 12"	EA	\$ _____
	k. 16" x 6"	EA	\$ _____
	l. 16" x 8"	EA	\$ _____
	m. 16" x 10"	EA	\$ _____
	n. 16" x 12"	EA	\$ _____
	o. 16" x 16"	EA	\$ _____
	p. 24" x 8"	EA	\$ _____
	q. 24" x 10"	EA	\$ _____
	r. 24" x 12"	EA	\$ _____
	s. 24" x 16"	EA	\$ _____

W-9	Tie to existing water line using MJ Tee, MJ Sleeve, & Foster Adapter		
	a. 3"	EA	\$ _____
	b. 4"	EA	\$ _____
	c. 6"	EA	\$ _____
	d. 8"	EA	\$ _____
	e. 10"	EA	\$ _____
	f. 12"	EA	\$ _____
	g. 16"	EA	\$ _____
	h. 18"	EA	\$ _____
	i. 24"	EA	\$ _____
	j. 36"	EA	\$ _____
W-10	Cut & Cap Existing Water Line		
	a. 3"	EA	\$ _____
	b. 4"	EA	\$ _____
	c. 6"	EA	\$ _____
	d. 8"	EA	\$ _____
	e. 10"	EA	\$ _____
	f. 12"	EA	\$ _____
	g. 16"	EA	\$ _____
	h. 18"	EA	\$ _____
	i. 24"	EA	\$ _____
W-11	Install 1" service assembly	EA	\$ _____
W-12	Install 1" HDPE DR 9 service line (open cut installation)	LF	\$ _____
W-13	Install 1" HDPE DR 9 service line (bore and jacked) with 2" PVC casing	LF	\$ _____
W-14	Install Fire Hydrant Assembly	EA	\$ _____
W-15	Install 2" Blowoff Assembly	EA	\$ _____
W-16	Install additional valve box riser	VF	\$ _____
W-17	Install valve operator extension stem	VF	\$ _____

SEWER LINES

Item No.	Description	Unit	Unit Cost
S-1	Install 8" Gravity Sewer Ductile Iron CL 350		
	a. 0 - 8' depth	LF	\$ _____
	b. 8.01 - 14' depth	LF	\$ _____
	c. 14.01 - 18' depth	LF	\$ _____
	d. 18.01 - 20' depth	LF	\$ _____
S-2	Install 8" Gravity Sewer PVC SDR 26		
	a. 0 - 8' depth	LF	\$ _____
	b. 8.01 - 14' depth	LF	\$ _____
	c. 14.01 - 18' depth	LF	\$ _____
S-3	Install 4" or 6" PVC SDR 26 Service Lateral Line	LF	\$ _____
S-4	Install 4" or 6" DIP CL 350 Service Lateral Line	LF	\$ _____
S-5	Install Service Tees		
	a. 8" x 4" PVC or 8" x 6" PVC	EA	\$ _____
	b. 8" x 4" DIP or 8" x 6" DIP	EA	\$ _____
	c. 12" x 4" or 12" x 6" PVC	EA	\$ _____
	d. 12" x 4" or 12" x 6" DIP	EA	\$ _____
S-6	Install Sewer Force Main		
	a. 4" PVC CL 200	LF	\$ _____
	b. 6" PVC CL 200	LF	\$ _____
	c. 8" PVC CL 200	LF	\$ _____
	d. 10" PVC CL 200	LF	\$ _____
	e. 12" PVC CL 200	LF	\$ _____
	f. 4" HDPE DR 17	LF	\$ _____
	g. 6" HDPE DR 17	LF	\$ _____
	h. 8" HDPE DR 17	LF	\$ _____
	i. 10" PVC CL 200	LF	\$ _____
	j. 12" HDPE DR 17	LF	\$ _____
S-7	Install Precast Concrete Manholes Base		
	a. 4' Diameter, 4.00 - 8.00' deep	EA	\$ _____
	b. 4' Diameter, 8.01 - 12.00' deep	EA	\$ _____
	c. 4' Diameter, 12.01 - 16.00' deep	EA	\$ _____
	d. 4' Diameter, 16.01 - 20.00' deep	EA	\$ _____
	e. 5' Diameter, 4.00 - 8.00' deep	EA	\$ _____
	f. 5' Diameter, 8.01 - 12.00' deep	EA	\$ _____
	g. 5' Diameter, 12.01 - 16.00' deep	EA	\$ _____
	h. 5' Diameter, 16.01 - 20.00' deep	EA	\$ _____

S-8	Install of a Manhole cone		
	a. 4' diameter	VF	\$ _____
	b. 5' diameter	VF	\$ _____
S-9	Install precast Manhole riser section		
	a. 4' Diameter, 4.00 – 8.00' deep	EA	\$ _____
	b. 4' Diameter, 8.01 – 12.00' deep	EA	\$ _____
	c. 4' Diameter, 12.01 – 16.00' deep	EA	\$ _____
	d. 5' Diameter, 4.00 – 8.00' deep	EA	\$ _____
	e. 5' Diameter, 8.01 – 12.00' deep	EA	\$ _____
	f. 5' Diameter, 12.01 – 16.00' deep	EA	\$ _____
S-10	Install precast Concrete Shallow Type Manhole (5-feet depth or less) including setting of MH casting	EA	\$ _____
S-11	Install connection to Existing Manhole including coring and resilient connector		
	a. 4"	EA	\$ _____
	b. 6"	EA	\$ _____
	c. 8"	EA	\$ _____
	d. 10"	EA	\$ _____
	e. 12"	EA	\$ _____
S-12	Install 4" or 6" PVC Cleanout Assembly including concrete donut ring	EA	\$ _____
S-13	Install 2-inch Air Release/Vacuum Valve Assembly	EA	\$ _____
S-14	Install watertight casting, manhole cover and grout, and vent per LCWSA detail 6.04S.	EA	\$ _____
S-15	Install standard manhole ring and cover and grout per LCWSA detail 6.01S	EA	\$ _____

MISCELLANEOUS ITEMS

Item No.	Description	Unit	Unit Cost
M-1	Furnish, deliver and install 4" or 6" concrete driveway replacement using 4,000 psi concrete	SF	\$ _____
M-2	Furnish, deliver and install 3" asphalt driveway replacement	SY	\$ _____
M-3	Furnish, deliver and install asphalt trench repair (2" surface mix)	SY	\$ _____
M-4	Furnish, deliver and install asphalt trench repair (4" binder and 1-½" surface)	SY	\$ _____

M-5	Furnish, deliver and install double surface bituminous treatment	SY	\$ _____
M-6	Furnish, deliver and install temporary cold mix where directed by Owner	TN	\$ _____
M-7	Furnish, deliver and install concrete encasement	CY	\$ _____
M-8	Furnish, deliver and placement of Rip-rap (min. D ₅₀ =12") where directed by Owner	TN	\$ _____
M-9	Rock excavation (water line, gravity sewer or force main)	CY	\$ _____
M-10	Install jack and bore steel casing (water line or force main - no rock)		
	a. 8" steel casing (0.25" wall thickness) (water line or force main) including installation of carrier pipe, casing spacers & end seals	LF	\$ _____
	b. 12" steel casing (0.25" wall thickness) (water line or force main) including installation of carrier pipe, casing spacers & end seals	LF	\$ _____
	c. 16" steel casing (0.312" wall thickness) (water line or force main) including installation of carrier pipe, casing spacers & end seals	LF	\$ _____
	d. 20" steel casing (0.312" wall thickness) (water line or force main) including installation of carrier pipe, casing spacers & end seals	LF	\$ _____
	e. 24" steel casing (0.375" wall thickness) (water line or force main) including installation of carrier pipe, casing spacers & end seals	LF	\$ _____
	f. 30" steel casing (0.375" wall thickness) (water line or force main) including installation of carrier pipe, casing spacers & end seals	LF	\$ _____
M-11	Install jack and bore steel casing (gravity sewer- no rock)		
	a. 16" steel casing (0.312" wall thickness) (gravity sewer line) including installation of carrier pipe, casing spacers & end seals	LF	\$ _____
	b. 24" steel casing (0.312" wall thickness) (gravity sewer line) including installation of carrier pipe, casing spacers & end seals	LF	\$ _____
	c. 30" steel casing (0.375" wall thickness) (gravity sewer line) including installation of carrier pipe, casing spacers & end seals	LF	\$ _____

M-12	Additional installation for jack and bore in rock (water line, force main, or gravity sewer)		
	a. 8" diameter casing	LF	\$ _____
	b. 12" diameter casing	LF	\$ _____
	c. 16" diameter casing	LF	\$ _____
	d. 20" diameter casing	LF	\$ _____
	e. 24" diameter casing	LF	\$ _____
	f. 30" diameter casing	LF	\$ _____
M-13	Install casing in open cut installation (water line or force main - no rock) including installation of carrier pipe, casing spacers and end seals		
	a. 8" diameter casing	LF	\$ _____
	b. 12" diameter casing	LF	\$ _____
	c. 16" diameter casing	LF	\$ _____
	d. 20" diameter casing	LF	\$ _____
	e. 24" diameter casing	LF	\$ _____
	f. 30" diameter casing	LF	\$ _____
M-14	Install driveway bores (no casing)		
	a. 4" water line or force main	LF	\$ _____
	b. 6" water line or force main	LF	\$ _____
	c. 8" water line or force main	LF	\$ _____
	d. 10" water line or force main	LF	\$ _____
	e. 12" water line or force main	LF	\$ _____
	f. 16" water line or force main	LF	\$ _____
M-15	Install casing in open-cut installation (gravity sewer - no rock) including installation of carrier pipe, casing spacers and end seals		
	a. 16" diameter casing, 0-8' depth	LF	\$ _____
	b. 16" diameter casing, 8.01-16' depth	LF	\$ _____
	c. 24" diameter casing, 0-8' depth	LF	\$ _____
	d. 24" diameter casing, 8.01-16' depth	LF	\$ _____
M-16	Install directional bore for water lines or force main		
	a. 4"	LF	\$ _____
	b. 6"	LF	\$ _____
	c. 8"	LF	\$ _____
	d. 10"	LF	\$ _____
	e. 12"	LF	\$ _____
	f. 16"	LF	\$ _____
	g. 18"	LF	\$ _____

M-17	Additional installation for directional boring in rock (water lines or force main)	LF	\$ _____
	a. 4"	LF	\$ _____
	b. 6"	LF	\$ _____
	c. 8"	LF	\$ _____
	d. 10"	LF	\$ _____
	e. 12"	LF	\$ _____
	f. 16"	LF	\$ _____
	g. 18"	LF	\$ _____
M-18	Furnish, install and maintain erosion control devices		
	a. Temporary silt fence	LF	\$ _____
	b. Temporary rip-rap check dams	EA	\$ _____
	c. Furnish, install, and maintain waddles	EA	\$ _____
	d. Furnish, install, and maintain straw bales	EA	\$ _____
M-19	Mobilization per each specified work task		
	a. Work Task Value \$ _____ 1 to \$ _____ 5,000	LS	\$ _____
	b. Work Task Value \$ _____ 5,001 to \$ _____ 10,000	LS	\$ _____
	c. Work Task Value \$ _____ 10,001 to \$ _____ 25,000	LS	\$ _____
	d. Work Task Value \$ _____ 25,000 and greater	LS	\$ _____
M-20	Furnish and install bypass sewage pumping for sewer flow control		
	a. 3" pump with suction hose & 400' of discharge hose	DAY	\$ _____
	b. 4" pump with suction hose & 400' of discharge hose	DAY	\$ _____
	c. 6" pump with suction hose & 400' of discharge hose	DAY	\$ _____
M-21	Furnish and install pump for groundwater pumping including suction hoses		
	a. 3" Diesel Engine Pump	DAY	\$ _____
	b. 4" Diesel Engine Pump	DAY	\$ _____
	c. 6" Diesel Engine Pump	DAY	\$ _____
M-22	Furnish 20' section of discharge hose for dewatering pump		
	a. 3" hose	EA	\$ _____
	b. 4" hose	EA	\$ _____
	c. 6" hose	EA	\$ _____
M-23	Furnish, deliver and placement of stone for bedding and/or refill for water lines, force mains and gravity sewers (No. 67 or No. 78)	TN	\$ _____
M-24	Furnish, delivery and placement of stone for roadway base (ALDOT 825)	TN	\$ _____

M-25	Provide the following for traffic control when required		
	a. Traffic flagger	DAY	\$ _____
	b. Battery powered lit sign/arrow board	DAY	\$ _____
	c. Road signage up to 3 traffic signs	EA	\$ _____
	d. Provide up to 10 (ten) traffic cones for traffic control	EA	\$ _____
	e. Provide up to 5 (five) traffic barrels with flashing light on top	EA	\$ _____
M-26	Dress up including rough grading, top soil, power raking, seed, and straw	SY	\$ _____
M-27	Dress up including rough grading, top soil, power raking, and sod placement (Bermuda, Zoysia, or Fescue)	SY	\$ _____
M-28	Furnish 3/4" hose and sprinkler setup, including up to 200' of hose, up to 3 (three) 360° heads or oscillating type, and one timer	WK	\$ _____
M-29	Cost of annual performance and payment bonds and insurance	Lump Sum/Year	\$ _____
M-30	Installation of meter, backflow, or valve vault as defined below:		
	a. 3'W x 5'L x 3'D, no more than 3,000 lb	EA	\$ _____
	b. 4'W x 6'L x 5'D, no more than 7,500 lb	EA	\$ _____
	c. 4'W x 8'L x 5'D, no more than 9,000 lb	EA	\$ _____
	d. Additional depth per foot for riser on item (a)	VF	\$ _____
	e. Additional depth per foot for riser on item (b)	VF	\$ _____
	f. Additional depth per foot for riser on item (c)	VF	\$ _____

The above unit prices shall include all labor, equipment, bailing, dewatering, shoring, removal, overhead, profit, insurance, fees, taxes, etc., to cover the finished work of several kinds called for less Owner furnished material will be as set forth in Section 00100, Paragraph 1.11.

Proposer understands that the Owner reserves the right to reject any or all proposals and to waive any formalities in the proposal process.

The Proposer agrees that his RFP shall be good and may not be withdrawn for a period of 60 days after the scheduled closing time for receiving RFPs.

The Proposer acknowledges by his signature the he agrees to requirements contained in the Request for Proposal and the Instructions to Proposals.

The required supporting documentation is attached to this RFP. Failure to include supporting qualification documentation as set forth in Section 00100, Paragraph 1.02.C will result in RFP being considered as incomplete and subject to rejection.

NAME OF FIRM: _____

STREET ADDRESS: _____

MAILING ADDRESS: _____

LICENSE #: _____ LICENSE EXPIRATION DATE: _____

NAME: _____ TITLE: _____
Printed Name

SIGNATURE: _____

TELEPHONE NO.: _____ FAX NO.: _____

NOTE: If a corporation, Proposal must be signed by person authorized by corporation by-laws to bind it to contract.

END OF COST PROPOSAL

NOTICE OF AWARD

Date of Issuance:

Owner: Limestone County Water & Sewer Authority

Contract Name: **2026 Annual Water and Sewer Contract**

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated [TBD] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

2026 Annual Water and Sewer Contract

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner **four (4)** counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: **Limestone County Water & Sewer Authority**

By (signature): _____

Name (printed): _____

Title: _____

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between **Limestone County Water & Sewer Authority** (“Owner”) and **[TBD]** (“Contractor”).

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **2026 Annual Water and Sewer Contract**

ARTICLE 2—THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: **2026 Annual Water and Sewer Contract**

ARTICLE 3—ENGINEER

N/A

ARTICLE 4—CONTRACT TIMES

4.01 *Time is of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.03 *Contract Times: Days*

A. The Work will be substantially complete within **365** days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **365** days after the date when the Contract Times commence to run.

ARTICLE 5—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

A. For all Work, at the prices stated in Contractor’s Bid, attached hereto as an exhibit.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the **10th** day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
 - 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
 - a. **95** percent of the value of the Work completed (with the balance being retainage).
 - 1) If 50 percent or more of the Work has been completed, as determined by Owner, and if the character and progress of the Work have been satisfactory to Owner, then as long as the character and progress of the Work remain satisfactory to Owner, there will be no additional retainage; and
 - b. **95** percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *Consent of Surety*

- A. Owner will not make final payment or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 *Interest*

- A. All amounts not paid when due will bear interest at the rate of **[number]** percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

- A. The Contract Documents consist of all of the following:
 - 1. This Agreement.

2. Bonds:
 - a. Performance bond (together with power of attorney).
 - b. Payment bond (together with power of attorney).
 3. General Conditions.
 4. Supplementary Conditions.
 5. Specifications as listed in the table of contents of the project manual
 6. Drawings – This is a no plans contract.
 7. Drawings listed on the attached sheet index (N/A)
 8. Addenda (N/A)
 9. Exhibits to this Agreement (enumerated as follows):
 10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
 - e. Warranty Bond, if any.
- B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 Contractor's Representations

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the

Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
9. Contractor has given Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Owner is acceptable to Contractor.
10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

8.03 *Standard General Conditions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or “track changes” (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on **[TBD]** (which is the Effective Date of the Contract).

Owner:

Limestone County Water & Sewer Authority

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name: Daryl Williamson

(typed or printed)

Title: CEO

(typed or printed)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

Limestone County Water & Sewer Authority

17218 Highway 72 West

Athens, AL 35611

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

Contractor:

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

(typed or printed)

Title:

(typed or printed)

(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

License No.:

(where applicable)

State:

NOTICE TO PROCEED

Owner: Limestone County Water & Sewer Authority
Contractor: [TBD] Contractor's Project No.: N/A
Project: 2026 Annual Water and Sewer Contract
Contract Name: 2026 Annual Water and Sewer Contract
Effective Date of Contract: March 13, 2026

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on March 13, 2026, pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No work will be done at the site prior to such date.

In accordance with the Agreement the date by which Substantial Completion must be achieved is March 13, 2027, and the date by which readiness for final payment must be achieved is March 13, 2027 or the number of days to achieve Substantial Completion is 365 from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of March 13, 2027; and the number of days to achieve readiness for final payment is 365 from the commencement date of the Contract Times, resulting in a date for readiness for final payment of March 13, 2027.

Before starting any Work at the Site, Contractor must comply with the following:

N/A

Owner: **Limestone County Water & Sewer Authority**
By *(signature)*: _____
Name *(printed)*: Daryl Williamson
Title: CEO
Date Issued: _____

PERFORMANCE BOND

<p>Contractor</p> <p>Name: [Full formal name of Contractor]</p> <p>Address <i>(principal place of business)</i>: [Address of Contractor's principal place of business]</p>	<p>Surety</p> <p>Name: [Full formal name of Surety]</p> <p>Address <i>(principal place of business)</i>: [Address of Surety's principal place of business]</p>
<p>Owner</p> <p>Name: Limestone County Water & Sewer Authority</p> <p>Mailing address <i>(principal place of business)</i>: 17218 Highway 72 West Athens, AL 35611</p>	<p>Contract</p> <p>Description <i>(name and location)</i>: 2026 Annual Water and Sewer Contract</p> <p>Effective Date of Contract: March 13, 2026</p>
<p>Bond</p> <p>Bond Amount: \$250,000</p> <p>Date of Bond: [TBD]</p> <p><i>(Date of Bond cannot be earlier than Effective Date of Contract)</i></p> <p>Modifications to this Bond form: <input checked="" type="checkbox"/> None <input type="checkbox"/> See Paragraph 16</p>	
<p>Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.</p>	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature)(Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<p><i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i></p>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
 - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
 - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
 - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
 - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

- 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
- 6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
- 7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
- 8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
- 9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
- 10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
- 11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
- 12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
- 13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

- 14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
 - 14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
 - 14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: **None**

PAYMENT BOND

<p>Contractor Name: [Full formal name of Contractor] Address <i>(principal place of business)</i>: [Address of Contractor's principal place of business]</p>	<p>Surety Name: [Full formal name of Surety] Address <i>(principal place of business)</i>: [Address of Surety's principal place of business]</p>
<p>Owner Name: Limestone County Water & Sewer Authority Mailing address <i>(principal place of business)</i>: 17218 Highway 72 West Athens, AL 35611</p>	<p>Contract Description <i>(name and location)</i>: 2026 Annual Water and Sewer Contract Effective Date of Contract: March 13, 2026</p>
<p>Bond Bond Amount: \$250,000 Date of Bond: [TBD] <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 18</p>	
<p>Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.</p>	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature)(Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<p><i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i></p>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
 - 5.1. Claimants who do not have a direct contract with the Contractor
 - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2. Pay or arrange for payment of any undisputed amounts.
 - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. Definitions
 - 16.1. *Claim*—A written statement by the Claimant including at a minimum:
 - 16.1.1. The name of the Claimant;
 - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
 - 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 - 16.1.7. The total amount of previous payments received by the Claimant; and
 - 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic’s lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of “labor, materials, or equipment” that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor’s subcontractors, and all other items for which a mechanic’s lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
18. Modifications to this Bond are as follows: **[Describe modification or enter “None”]**

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By



Endorsed By



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GUIDELINES FOR USE OF EJCDC® C-700, STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

1.0 PURPOSE AND INTENDED USE OF THE DOCUMENT

EJCDC® C-700, Standard General Conditions of the Construction Contract (2018), is the foundation document for the EJCDC Construction Series. The General Conditions define the basic rights, responsibilities, risk allocations, and contractual relationship of the Owner and Contractor, and establish how the Contract is to be administered.

2.0 OTHER DOCUMENTS

EJCDC documents are intended to be used as a system and changes in one EJCDC document may require a corresponding change in other documents. Other EJCDC documents may also serve as a reference to provide insight or guidance for the preparation of this document.

These General Conditions have been prepared for use with either EJCDC® C-520, Agreement Between Owner and Contractor for Construction Contract (Stipulated Price), or EJCDC® C-525, Agreement Between Owner and Contractor for Construction Contract (Cost-Plus-Fee) (2018 Editions). The provisions of the General Conditions and the Agreement are interrelated, and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC® C-800, Supplementary Conditions of the Construction Contract (2018).

The full EJCDC Construction series of documents is discussed in the EJCDC® C-001, Commentary on the 2018 EJCDC Construction Documents (2018).

3.0 ORGANIZATION OF INFORMATION

All parties involved in a construction project benefit significantly from a standardized approach in the location of subject matter throughout the documents. Experience confirms the danger of addressing the same subject matter in more than one location; doing so frequently leads to confusion and unanticipated legal consequences. Careful attention should be given to the guidance provided in EJCDC® N-122/AIA® A521, Uniform Location of Subject Matter (2012 Edition) when preparing documents. EJCDC® N-122/AIA® A521 is available at no charge from the EJCDC website, www.ejcdc.org, and from the websites of EJCDC's sponsoring organizations.

If CSI MasterFormat™ is used for organizing the Project Manual, consult CSI MasterFormat™ for the appropriate document number (e.g., under 00 11 00, Advertisements and Invitations), and accordingly number the document and its pages.

4.0 EDITING THIS DOCUMENT

Remove these Guidelines for Use. Some users may also prefer to remove the two cover pages.

Although it is permissible to revise the Standard EJCDC Text of C-700 (the content beginning at page 1 and continuing to the end), it is common practice to leave the Standard EJCDC Text of C-700 intact and unaltered, with modifications and supplementation of C-700's provisions set forth in EJCDC® C-800, Supplementary Conditions of the Construction Contract (2018). If the Standard Text itself is revised, the

user must comply with the terms of the License Agreement, Paragraph 4.0, Document-Specific Provisions, concerning the tracking or highlighting of revisions. The following is a summary of the relevant License Agreement provisions:

1. The term “Standard EJCDC Text” for C-700 refers to all text prepared by EJCDC in the main body of the document. Document covers, logos, footers, instructions, or copyright notices are not Standard EJCDC Text for this purpose.
2. During the drafting or negotiating process for C-700, it is important that the two contracting parties are both aware of any changes that have been made to the Standard EJCDC Text. Thus, if a draft or version of C-700 purports to be or appears to be an EJCDC document, the user must plainly show all changes to the Standard EJCDC Text, using “Track Changes” (redline/strikeout), highlighting, or other means of clearly indicating additions and deletions.
3. If C-700 has been revised or altered and is subsequently presented to third parties (such as potential bidders, grant agencies, lenders, or sureties) as an EJCDC document, then the changes to the Standard EJCDC Text must be shown, or the third parties must receive access to a version that shows the changes.
4. Once the document is ready to be finalized (and if applicable executed by the contracting parties), it is no longer necessary to continue to show changes to the Standard EJCDC Text. The user may produce a final version of the document in a format in which all changes are accepted, and the document at that point does not need to include any “Track Changes,” redline/strikeout, highlighting, or other indication of additions and deletions to the Standard EJCDC Text.

5.0 LICENSE AGREEMENT

This document is subject to the terms and conditions of the **License Agreement, 2018 EJCDC® Construction Series Documents**. A copy of the License Agreement was furnished at the time of purchase of this document, and is available for review at www.ejcdc.org and the websites of EJCDC’s sponsoring organizations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1—Definitions and Terminology.....	1
1.01 Defined Terms.....	1
1.02 Terminology	6
Article 2—Preliminary Matters.....	7
2.01 Delivery of Performance and Payment Bonds; Evidence of Insurance.....	7
2.02 Copies of Documents	7
2.03 Before Starting Construction	7
2.04 Preconstruction Conference; Designation of Authorized Representatives.....	8
2.05 Acceptance of Schedules	8
2.06 Electronic Transmittals	8
Article 3—Contract Documents: Intent, Requirements, Reuse.....	9
3.01 Intent.....	9
3.02 Reference Standards.....	9
3.03 Reporting and Resolving Discrepancies	10
3.04 Requirements of the Contract Documents.....	10
3.05 Reuse of Documents.....	11
Article 4—Commencement and Progress of the Work	11
4.01 Commencement of Contract Times; Notice to Proceed.....	11
4.02 Starting the Work.....	11
4.03 Reference Points	11
4.04 Progress Schedule.....	12
4.05 Delays in Contractor’s Progress	12
Article 5—Site; Subsurface and Physical Conditions; Hazardous Environmental Conditions	13
5.01 Availability of Lands	13
5.02 Use of Site and Other Areas.....	14
5.03 Subsurface and Physical Conditions.....	15
5.04 Differing Subsurface or Physical Conditions	16

5.05	Underground Facilities.....	17
5.06	Hazardous Environmental Conditions at Site	19
Article 6—Bonds and Insurance.....		21
6.01	Performance, Payment, and Other Bonds.....	21
6.02	Insurance—General Provisions.....	22
6.03	Contractor’s Insurance.....	24
6.04	Builder’s Risk and Other Property Insurance.....	25
6.05	Property Losses; Subrogation	25
6.06	Receipt and Application of Property Insurance Proceeds	27
Article 7—Contractor’s Responsibilities		27
7.01	Contractor’s Means and Methods of Construction	27
7.02	Supervision and Superintendence	27
7.03	Labor; Working Hours	27
7.04	Services, Materials, and Equipment	28
7.05	“Or Equals”.....	28
7.06	Substitutes	29
7.07	Concerning Subcontractors and Suppliers.....	31
7.08	Patent Fees and Royalties.....	32
7.09	Permits	33
7.10	Taxes	33
7.11	Laws and Regulations.....	33
7.12	Record Documents.....	33
7.13	Safety and Protection	34
7.14	Hazard Communication Programs	35
7.15	Emergencies.....	35
7.16	Submittals	35
7.17	Contractor’s General Warranty and Guarantee	38
7.18	Indemnification	39
7.19	Delegation of Professional Design Services	39
Article 8—Other Work at the Site.....		40
8.01	Other Work	40
8.02	Coordination	41
8.03	Legal Relationships.....	41

Article 9—Owner’s Responsibilities	42
9.01 Communications to Contractor	42
9.02 Replacement of Engineer	42
9.03 Furnish Data	42
9.04 Pay When Due.....	42
9.05 Lands and Easements; Reports, Tests, and Drawings.....	43
9.06 Insurance.....	43
9.07 Change Orders	43
9.08 Inspections, Tests, and Approvals.....	43
9.09 Limitations on Owner’s Responsibilities	43
9.10 Undisclosed Hazardous Environmental Condition.....	43
9.11 Evidence of Financial Arrangements.....	43
9.12 Safety Programs	43
Article 10—Engineer’s Status During Construction	44
10.01 Owner’s Representative.....	44
10.02 Visits to Site.....	44
10.03 Resident Project Representative.....	44
10.04 Engineer’s Authority	44
10.05 Determinations for Unit Price Work	45
10.06 Decisions on Requirements of Contract Documents and Acceptability of Work	45
10.07 Limitations on Engineer’s Authority and Responsibilities	45
10.08 Compliance with Safety Program.....	45
Article 11—Changes to the Contract	46
11.01 Amending and Supplementing the Contract	46
11.02 Change Orders	46
11.03 Work Change Directives.....	46
11.04 Field Orders.....	47
11.05 Owner-Authorized Changes in the Work	47
11.06 Unauthorized Changes in the Work.....	47
11.07 Change of Contract Price	47
11.08 Change of Contract Times.....	49
11.09 Change Proposals.....	49
11.10 Notification to Surety.....	50

Article 12—Claims.....	50
12.01 Claims.....	50
Article 13—Cost of the Work; Allowances; Unit Price Work	51
13.01 Cost of the Work	51
13.02 Allowances	55
13.03 Unit Price Work.....	55
Article 14—Tests and Inspections; Correction, Removal, or Acceptance of Defective Work	56
14.01 Access to Work.....	56
14.02 Tests, Inspections, and Approvals.....	56
14.03 Defective Work	57
14.04 Acceptance of Defective Work.....	58
14.05 Uncovering Work	58
14.06 Owner May Stop the Work	58
14.07 Owner May Correct Defective Work.....	59
Article 15—Payments to Contractor; Set-Offs; Completion; Correction Period	59
15.01 Progress Payments.....	59
15.02 Contractor’s Warranty of Title	62
15.03 Substantial Completion.....	62
15.04 Partial Use or Occupancy	63
15.05 Final Inspection	64
15.06 Final Payment.....	64
15.07 Waiver of Claims	65
15.08 Correction Period.....	66
Article 16—Suspension of Work and Termination	67
16.01 Owner May Suspend Work	67
16.02 Owner May Terminate for Cause.....	67
16.03 Owner May Terminate for Convenience.....	68
16.04 Contractor May Stop Work or Terminate	68
Article 17—Final Resolution of Disputes	69
17.01 Methods and Procedures.....	69
Article 18—Miscellaneous	69
18.01 Giving Notice	69
18.02 Computation of Times.....	69

18.03 Cumulative Remedies 70
18.04 Limitation of Damages 70
18.05 No Waiver 70
18.06 Survival of Obligations 70
18.07 Controlling Law 70
18.08 Assignment of Contract..... 70
18.09 Successors and Assigns 70
18.10 Headings..... 70

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*
 - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

- requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.
- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. A demand for money or services by a third party is not a Claim.
11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
 12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.
 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
 15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
 17. *Cost of the Work*—See Paragraph 13.01 for definition.
 18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
 19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
 20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
 21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers’ instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - 1. does not conform to the Contract Documents;
 - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - 3. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
 - 1. The word “furnish,” when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 - 2. The word “install,” when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 - 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.
 - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
 - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.
- G. Nothing in the Contract Documents creates:
 - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 - 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

- A. *Standards Specifications, Codes, Laws and Regulations*
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - 2. Abnormal weather conditions;
 - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings*: The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

- B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

- C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

- D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
 2. is of such a nature as to require a change in the Drawings or Specifications;
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
- a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
 - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures

- of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer’s Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

- Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.
- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
 - F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
 - G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
 - H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
 - I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
 - J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
 - K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 Contractor's Insurance

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
 - 4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and
 - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
 2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
 - a. will certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design;
 - 2) be similar in substance to the item specified; and
 - 3) be suited to the same use as the item specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

- 1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
- 2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.
 2. *Samples*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 Contractor's General Warranty and Guarantee

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
1. Observations by Engineer;
 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. Use or occupancy of the Work or any part thereof by Owner;
 5. Any review and approval of a Shop Drawing or Sample submittal;
 6. The issuance of a notice of acceptability by Engineer;
 7. The end of the correction period established in Paragraph 15.08;
 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. An itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
 - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
 - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

- 9.05 *Lands and Easements; Reports, Tests, and Drawings*
- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
 - B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
 - C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.
- 9.06 *Insurance*
- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.
- 9.07 *Change Orders*
- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.
- 9.08 *Inspections, Tests, and Approvals*
- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.
- 9.09 *Limitations on Owner's Responsibilities*
- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- 9.10 *Undisclosed Hazardous Environmental Condition*
- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.
- 9.11 *Evidence of Financial Arrangements*
- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).
- 9.12 *Safety Programs*
- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
 - B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 - 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
 - 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
 - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will be determined as follows:
1. A mutually acceptable fixed fee; or
 2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
 - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS

12.01 *Claims*

- A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
 5. Other costs consisting of the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are

consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
- 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
- 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work does not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
- 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 6. Expenses incurred in preparing and advancing Claims.
- 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
- 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances*: Contractor agrees that:
1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work,

or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
 - 2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

- b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without

significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

- d. a list of all duly pending Change Proposals and Claims; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
 - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
 2. agree with the other party to submit the dispute to another dispute resolution process; or
 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SECTION 00815

SUPPLEMENTAL GENERAL CONDITIONS

The “Standard General Conditions of the Construction Contract”, NSPE/ACEC EJCDC C-700 (2018 Edition) bound herein are revised as follows:

Article 2. PRELIMINARY MATTERS

2.04 Revise as follows:

Add the following statement:

The Owner shall determine at the Preconstruction Conference the start date of the project.

Article 4. COMMENCEMENT AND PROGRESS OF WORK

4.02 Add the following new paragraph immediately after Paragraph 4.02A.

4.02.B. Contractor shall employ a competent photographer to take construction record photographs for preconstruction conditions, periodically during course of work, and post-construction.

4.02.C. Contractor shall employ a competent video recording professional to take pre-construction (existing) conditions video records.

4.03A Delete the entire paragraph and replace with the following:

The Owner will provide no engineering surveys to establish reference products for construction. The Engineer will provide coordinate points for use by the Contractor

Article 5. AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS.

5.03.A & 5.03.B: Delete both paragraphs and replace with the following:

5.03.A: Not Used

5.03.B: Not Used.

5.06A & 5.06B: Delete both paragraphs and replace with the following:

5.06 A No reports or drawings related to Hazardous Environmental Conditions are known to Owner.

5.06 B Not used.

Article 6. BONDS AND INSURANCE

6.03 Add the following new paragraph immediately after Paragraph 6.03J..

6.03.K The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Worker's Compensation, and related coverages under Paragraph 6.03A.1 and A.3 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:
 - a. State: Statutory
 - b. Applicable Federal (e.g., Longshoreman's): Statutory
 - c. Employer's Liability: \$500,000 each accident.

2. Contractor's General Liability under Paragraph 6.03.B through 6.03.C of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:
 - a. General Aggregate \$1,000,000
 - b. Products-Completed Operations Aggregate \$1,000,000 Annual Aggregate
 - c. Personal and Advertising Injury \$1,000,000 Annual Aggregate
 - d. Each Occurrence (Bodily Injury and Property Damage) \$1,000,000
 - e. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable.

- f. Excess or Umbrella Liability
 - 1) General Aggregate \$1,000,000
 - 2) Each Occurrence \$1,000,000
 - 3) Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:
 - a) Bodily injury:
 - Each person \$500,000
 - Each accident \$1,000,000
 - b) Property Damage:
 - Each accident \$500,000
 - c) Combined Single:
 - Limit of \$500,000
 - 4) The Contractual Liability coverage required by Paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:
 - a) Bodily injury:
 - Each accident \$1,000,000
 - Annual Aggregate \$1,000,000
 - b) Property Damage:
 - Each Accident \$1,000,000
 - Annual Aggregate \$1,000,000

6.05 Property Insurance

- 1. Delete Paragraph 6.05.A in its entirety and insert the following in its place:
 - A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof.
 - 1. This insurance shall:
 - a. include the interests of Owner, Contractor, Subcontractor, Engineer and any other individuals, or entities identified

herein, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured:

- b. be written of a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, falsework, and materials and equipment in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;
 - c. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 - d. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 - e. allow for partial utilization of the Work by Owner;
 - f. include testing and startup; and
 - g. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor and Engineer with 30 days written notice to whom a certificate of insurance has been issued.
2. Contractor shall be responsible for any deductible or self-insured retention.
3. The policies of insurance required to be purchased and maintained by Contractor in accordance with this Paragraph SC-6.05.A shall comply with the requirements of paragraph 6.03 I3 and 6.03I 4 of the General Conditions.

6.07 Receipt and Application of Property Insurance Proceeds

Delete paragraphs 6.07 A., B., and C. of General Conditions in its entirety and insert the following in its place:

A. Any insured loss under the policies of insurance required by paragraphs 6.03, 6.04 and 6.05 shall be adjusted with Owner and Contractor and made payable to Owner and Contractor as trustees for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 6.07. B. Owner and Contractor shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner and Contractor as trustees shall have no power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen (15) days after the occurrence of loss to Owner's and Contractor's exercise of this power. If such objection is made, Owner and Contractor as trustees shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If required in writing by any party in interest, Owner and Contractor as trustees shall upon the occurrence of an insured loss, give bond for the proper performance of their duties.

Article 7. CONTRACTOR'S RESPONSIBILITIES

7.12 Safety and Protection

Add the following language immediately after the second sentence of paragraph 7.12.B. of the Conditions:

The Contractor shall comply with the "Safety and Health Regulations for Construction" and subsequent amendments, promulgated by the Department under the Occupational and Health Act of 1970 (PL-91-596) and under Section 107 of the Contractor Work Hours and Safety Standards Act (PL-91054). These regulations are identified as Chapter XVII of Title 29, Code of Federal Regulations (CFS), Part 1926 (formerly Chapter XIII of Title 29, CFR, Part 1518)

Article 13. COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.03 Unit Price Work

Delete Paragraph 13.03.E in its entirety and insert the following in its place:

- E. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:
1. if the Bid price of a particular item of Unit Price Work amounts to 10 percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 15 percent from the estimated quantity of such item indicated in the Agreement; and
 2. if there is no corresponding adjustment with respect to any other item of Work; and
 3. if Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner believes that the quantity variation entitles Owner or Contractor may make a Claim for and adjustment in the Contractor Price in accordance with Article 11 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

Article 17. FINAL RESOLUTION OF DISPUTES

17.01 Methods and Procedures

Delete Paragraph 17.01 in its entirety and insert the following in its place:

SC-17.01 Meet to Confer and Negotiate

- A. Engineer's action under Paragraph 11.06.A.2 shall become final and binding 30 days after receipt of written notice of Engineer's action or decision unless, within that time period, Owner or Contractor give to the other party written notice or intent to submit the Claim to a process of bilateral negotiation as set forth below.
- B. Within 30 days of the delivery of such notice, Owner and Contractor shall meet and confer regarding the Claim. A good-faith effort to negotiate resolution shall be made by both parties.
- C. If the negotiations contemplated by Paragraph SC-17.01.B are unsuccessful, management representatives of Owner and Contractor at least on tier above the individuals who met under SC-17.01.B shall meet, confer, and negotiate within 30 days of the closure of the unsuccessful negotiations.

- D. If the Claim is not resolved by negotiation, Engineer's action under Paragraph 11.06.A.2 shall become final and binding within 30 days after termination of the negotiations unless, within that time period, Owner or Contractor:
1. elects in writing to demand arbitration of the Claim, pursuant to Paragraph SC-17.02, or
 2. agrees with the other party to submit the Claim to another dispute resolution process.

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01

SC-17.02 Arbitration

- A. All Claims or counterclaims, disputes, or other matters in question between Owner and Contractor arising out of or relating to the Contract Documents or the breach thereof (except for Claims which have been waived by the making or acceptance of final payment as provided by Paragraph 15.07) including but not limited to those not resolved under the provisions of Paragraph SC-17.01 will be decided by arbitration in accordance the American Arbitration Association, subject to the condition and limitation of this Paragraph SC-17.02. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.
- B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made in within the 30 day period specified in Paragraph SC-17.01.C, and in all other cases within a reasonable time after the Claim or counterclaim, dispute, or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such Claim or other dispute or matter in question would be barred by the applicable statute of limitations.
- C. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:
1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and

2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.
- D. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties, in writing, and include: (i) a concise breakdown of the award; (ii) a written explanation of the award specifically citing the Contract Document provisions deemed applicable and relied on in making the award.
 - E. The award will be final. Judgement may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Controlling Law relating to vacating or modifying an arbitral award.
 - F. The fees and expenses of the arbitrators and any arbitration service shall be shared equally by Owner and Contractor.

END OF SECTION

SECTION 01000

SPECIAL REQUIREMENTS

PART 1 - GENERAL

1.01 MAINTAINING TRAFFIC AND BUSINESS OPERATIONS

- A. The operations performed under this Contract shall be closely coordinated, scheduled, and conducted in such a manner and sequence as to cause the least practical interference with the traveling public, fire protection service, public utility service or work by other contractors.
- B. When it becomes necessary to make connections, cut ins, or alterations or to perform any other work that temporarily interferes with normal operations, coordinate such work with the Owner and/or utility company at least 48 hours in advance of interruptions and perform the work as directed in a prompt and orderly manner to minimize such interference.
- C. All traffic control items such as flagmen, cones, barrels, arrowboards, construction signage, etc., required to protect the public from the construction activity shall be in accordance with the latest edition of the Manual of Uniform Traffic Control Devices.

1.02 ACCESS TO THE JOB SITE

- A. The Owner will designate, for the Contractor and his forces, the method of access to the job site and the areas to be used for vehicle parking. The Contractor shall instruct his personnel, subcontractors, and material suppliers accordingly.
- B. Equipment and supplies shall be stored in areas designated by the Owner.

1.03 SAFETY

- A. Keep all flammable liquids in the areas designated. Provide and maintain in working order standard UL labeled, water pressurized fire extinguishers as required.

1.04 CUTTING AND PATCHING

- A. No cutting or patching shall be done except under the direction of the Contractor and the consent of the Owner. Cutting and patching, when allowed, shall be skillfully managed and completed in a timely manner.

- B. Patching and renewing after the installation of new work, including lines, ducts, etc., shall be performed as specified under the relevant specification sections for the type of material involved.

1.05 DAMAGE TO EXISTING GROUNDS

- A. All damage caused to existing grounds or in-place construction shall be made good in a manner acceptable to the Owner. In addition, the Owner must be protected from claims for damages within or without the premises that may result from this Contract.

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

3.01 WARRANTY

- A. All work installed by the contractor related to the 2023 Annual Water & Sewer Contract including final restoration shall be warranted for a period of one (1) year from date of final acceptance as established by the Owner for the specific task order.

END OF SECTION

SECTION 01010

PROJECT SUMMARY

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Summary of the Work
- B. General Requirements
- C. Special Project Procedures

1.02 SUMMARY OF THE WORK

- A. Work consists of an Annual Contract for miscellaneous water and sewer installations including various sizes and types of pipe; valves, hydrants, manholes, various size bore and jacks, pavement replacement, and other related work items and appurtenances.

1.03 GENERAL REQUIREMENTS

- A. Smoking and Fire Precautions: No smoking, fire, or use of any fire or explosion producing tools or equipment shall be permitted on the premises or at any locations where such may endanger said premises or the current operations thereon.
- B. Manufacturers Qualifications: The manufacturers of all materials and equipment used must be reputable and regularly engaged in the manufacture of the material or equipment for the use and service to which it will be subjected.
- C. Contractor Shall Pay for All Laboratory Inspection Service: All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by the Contractor and approved by the Owner. Contractor to pay for all laboratory inspection services as a part of the Contract. Submit all material test reports to the Owner in triplicate.
- D. Compliance with State and Local Laws: Comply with all applicable requirements of state and local laws and ordinances to the extent that such requirements do not conflict with federal laws or regulations.
- E. Protection of Public and Private Property: Take special care in working areas to protect public and private property. The contractor shall replace or repair at his

own expense any damaged water pipes, power and communication lines, or other public utilities, roads, curbs, gutters, sidewalks, drainpipes, ponds or pond structures, sewer drainage ditches, all properties and fixtures (both permanent and temporary), fences, and all plantings, including grass or sod on the site of the work. Leave the site in original or better condition after all cleanup work has been done.

- F. Markers: Preserve all USGS, TVA, and State of Alabama property markers and private markers. Do not remove or disturb any such markers without prior approval from the Owner. Any removal and replacement of such markers shall be at the expense of the Contractor.
- G. Non-discrimination: The Contractor agrees to hire qualified persons without regard to race, creed, color, sex, or national origin for the performance of the work specified in this contract.
- H. Pavement Repair and/or Replacement: Whenever pipe trenches are cut across or along existing pavement or shoulders, backfill entirety of trench under paved surfaces with Owner approved stone and restore traffic over the cuts as quickly as possible by constructing a temporary surface with twelve (12) inches of Class A, grade D crushed stone. Add material and otherwise maintain such surface until the permanent pavement is restored by the Contractor or until the entire project is accepted.
- I. Department of Transportation Permits: The Owner shall secure any permits and provide bond as required by the Alabama Department of Transportation or Limestone County, Alabama for the installation of permanent facilities on highway rights-of-way. All such work shall be coordinated with and be subject to the approval of the Department of Transportation and the office of the Limestone County Engineer.
- J. Approved Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, must show approval of either EPA or USDA. The use of all such chemicals and the disposal of residues shall be in strict conformance with instructions.
- K. Drawings of Record: Provide and keep up-to-date a complete record of work installed. The Contractor shall, prior to request for final payment for each work task, assist the Owner with development of as-built sketches of the project. These sketches shall be of clear reproducible quality, and shall indicate the location of the water line, sewer line and all appurtenances such as sewer service tee locations, water service tap connections, etc., and shall include dimensions to the centerline of the pipe and each appurtenance. The drawings shall be delivered to the Owner prior to release of final payment.

- L. Preservation of Existing Vegetation: Take reasonable care during construction to avoid damage to vegetation. Where the area to be excavated is occupied by trees, brush, or other uncultivated vegetable growth, clear such growth from the area and dispose of it in a satisfactory manner. Leave undisturbed any trees, cultivated shrubs, flowers, etc., situated within public rights-of-way and/or easements through private property, but not located directly within excavation limits. Transplant small ornamental trees, cultivated shrubs, flowers, etc., located directly within excavation limits so they may be replaced during property restoration operations. Do not remove or disturb any tree larger than six (6) inches in diameter without the permission of the Owner. Take special precautions (including the provision of barricades and the temporary tying back of shrubbery and tree branches) for the protection and preservation of such objects from all stages of construction.

The Contractor will be held liable for any damage that may result to said objects from excavation or construction operations. Trim any limbs or branches of trees broken during construction operations with a clean cut and paint with an approved tree pruning compound. Treat tree trunks receiving damage from equipment with a tree dressing.

- M. Utilities: The Contractor shall contact the Owner of all underground utilities before beginning construction in the area. Carefully protect from damage all utilities in the vicinity of the work at all times. If it is necessary to repair, remove, and/or replace any such utility in order to complete the work properly, do so in compliance with the rules and regulations of the particular utility involved. Any such work shall be considered incidental to the construction or repairs of utility lines, and no additional payment will be allowed therefor. Existing water mains shall remain in service at all times during construction. Contractor shall provide any temporary piping necessary to maintain water service to existing customers.
- N. Operation of Existing LCWSA System: No contractor shall operate valves, hydrants, blow-offs, pump stations or other appurtenances without the presence of Authority personnel.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01026

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Measurement for payment on a unit price basis shall be as described below. Payment for each unit installed shall be made according to the unit price cost, as listed in the Cost Proposal. Only those items appearing in the Cost Proposal will be considered for payment on a unit price basis.
- B. Even though an item of work is included in the technical specifications, if it is not both covered herein and specifically itemized in the Cost Proposal, payment for it shall not be separately made. Such work shall be considered a necessary part of or incidental to its related work.
- C. Measurement for payment shall not include Owner furnished material as set forth in Section 00100, Paragraph 1.11.
- D. **5% retainage will be withheld on work tasks until testing and final cleanup have been completed and accepted on each specified work task.**

1.02 SCHEDULE OF PAY ITEMS

- A. Section 02110, Clearing
 - 1. Clearing is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices proposed for items with which clearing is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.
- B. Section 2.16, Erosion Control
 - 1. Erosion control is a pay item. Payment shall be made for each linear foot of erosion/silt fencing placed and/or each temporary rock check dam placed. Contractor is responsible for maintenance of erosion control devices after placement and no separate payment will be considered for such maintenance. Contractor is responsible to furnish and install the erosion/silt fencing and the stone for check dams. Owner will not furnish these materials.

C. Section 2.14, Trenching, Backfilling, and Compaction for Utilities

1. Trenching, Backfilling and Compaction for Utilities is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices proposed for items with which trenching, select backfilling and compaction for utilities is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.
2. Stone bedding required for water lines or force mains placed in rock trenches shall be paid at the contract unit price for stone.
3. Stone bedding required for PVC or DIP gravity sewer pipe shall be paid at the contract unit price for stone.
4. Stone refill for water lines or gravity sewer or force main placed in roadways or paved area shall be paid at the contract unit price for stone.

D. Section 02222, Classified Excavation for Utilities

1. Classified excavation for utilities is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices proposed for utilities with which classified excavation is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.
2. Rock excavation is a pay item. Where rock is encountered in a trench for pipeline installation, additional payment shall be made to remove the rock. Rock excavating shall be considered where excavation cannot be achieved by ripping or pulling with a track hoe. Rock excavation shall include all costs for permits, drilling, tools, labor, material, hoe-ramming, explosives, equipment, etc. required to remove the rock to the required grade to accomplish the pipeline installation. Payment for rock excavation shall be based on the formula for trench width of $\frac{4}{3} d + 18''$ (where d = outside diameter of the pipe) times the actual depth of rock removed to a point 6 inches below the invert of the pipe expressed as cubic yards. Owner representative has to verify rock excavation at time of work or no additional payment will be considered. It is the responsibility of the Contractor to notify the Owner that rock has been encountered.

E. Section 2.17, Finish Grading

1. Finish Grading is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices proposed for items with which finish grading is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.

F. Section 2.18, Seeding

1. Seeding is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices proposed for items with which seeding is connected shall be full compensation for this item and for all labor, materials and equipment required to complete the item in accordance with the drawings and specifications. Seeding shall include preparation of subgrade to receive seed and straw mat; furnishing and installing seed and straw mat. Owner will not furnish the seed or the straw mats and is the responsibility of the contractor to furnish.

G. Section 2.21, Pavement Repair

1. Pavement repair is a pay item. Payment shall be made at the unit price for each type of temporary or permanent pavement replacement. Payment shall be full compensation for all saw-cutting, compaction and placement of crushed base stone, asphaltic paving, pavement marking and all other work necessary to complete the work. Owner will not furnish the asphaltic materials or striping materials and is the responsibility of the contractor to furnish.
2. Payment for temporary cold mix where directed by the Owner will be paid based on weigh tickets for cold mix delivered and applied. Owner will not furnish the cold mix material and is the responsibility of the contractor to furnish.
3. Driveway repair is a pay item for concrete and asphalt driveways. Payment shall be full compensation for all saw-cutting, compaction, crushed base stone, wire, concrete, asphalt and all other work necessary to complete the work. Concrete drives shall be repaired to the nearest existing expansion joint. Owner will not furnish the asphaltic materials or concrete materials and is the responsibility of the contractor to furnish.

H. Section 3.03, Manholes

1. Payment for manholes shall be made at the contract unit price for each type of manhole up to 6 feet in depth less Owner furnished material. Manhole

depth shall be measured from finished casting elevation to invert of outlet pipe and shall include setting of the appropriate casting, manhole steps, resilient pipe connectors, butyl gaskets, inverts, classified excavation, vacuum testing and all other items of work necessary and incidental to completion of the work.

2. Manholes deeper than 6-feet shall be paid additional contract unit price for additional manhole sidewall over 6 feet measured by the vertical foot to the finished casting elevation less 6 feet of base depth less Owner furnished material.
3. No additional payment shall be made for placement of castings.
4. Connection to existing manholes shall be paid at the Contract Unit Price per each connection. Contractor shall furnish the coring and resilient connector.

I. Section 2.20 Horizontal Directional Drilling

1. The linear foot price for horizontal directional drilled water line or force main shall be priced complete and shall include the drilling and installing of pipe and work incidental thereto less Owner furnished material including but not limited to pilot hole, back-reaming, drilling lubricant, as-builts, restoration, traffic control, complete and in place and shall be measured by the linear foot along the centerline of the pipe. A separate price and additional price shall be utilized for rock drilling if encountered and directed by the Owner and shall be measured by the linear foot based on the length of rock encountered as measured along the centerline of pipe. Pipe installed by HDD will not be paid under the force main or water line installation line items. No payment will be made for incomplete or faulty bores. Damages caused by same shall be at the expense of the Contractor.

J. Section 4.02, Valves, Hydrants and Blow-offs

1. The quantities of valves, hydrants and blow-offs for which payment will be made shall be the number of each size and type furnished and installed. Payment shall be at the unit price for each listed in the Cost Proposal and shall include all items incidental to their installation, less Owner furnished materials. Tapping sleeves and valves shall be paid at the unit price including cost to make tap and all items incidental to their installation, less Owner furnished materials. **The Owner will make no taps.**

K. Section 3.05, Sewage Valves

1. The quantities of valves for which payment will be made shall be the number of each size and type furnished and installed. Payment shall be at the unit price for each listed in the Cost Proposal and shall include all items incidental to their installation less Owner furnished material.
2. Payment for Air/Vacuum valve assemblies shall include excavation of area for manhole assembly, setting and assembling and installing all parts and

materials, backfill, and testing for a complete Air/Vacuum assembly as shown on the details less all Owner furnished materials.

L. Section 4.01 Water Lines

1. The quantities of pipe for which payment will be allowed shall be expressed in linear feet for each size of pipe in terms of the horizontal lengths of pipe installed in place as measured along the centerline with no deductions for valves or fittings. Such payment shall be full compensation for the installing of pipe, jointing materials, classified excavation, select bedding, select backfill, and reaction blocking, tracer wire and all other work necessary for and incidental to completion of the work, less Owner furnished materials. No additional payment will be made for flushing, sterilization, pressure and leak testing and bacteriological testing. Costs for this work shall be included in the cost of the water line.
2. Where stone refill/backfill is required for pipe placed in roadways or paved areas, stone shall be paid for as at the contract unit cost for stone per ton based on stone weigh tickets.
3. Stone bedding required for the pipe in areas where a rock trench is present shall be paid for at the contract unit cost per ton based on stone weigh tickets.
4. Fittings are a pay item. They shall be paid at the actual weight based on submittal plus accessories, less Owner furnished materials.
5. Mega lug restraining devices are a pay item. These shall be paid at the Contract Unit Price and installed where directed by Owner less Owner furnished material.
6. Restraint gaskets for ductile iron water pipe are a pay item. These shall be paid at the Contract Unit Price and installed where directed by Owner less Owner furnished material.
7. Connection to existing water lines shall be paid at the Contract Unit Price per each for the respective size less Owner-furnished materials. No payment will be provided for this item if connection is made utilizing a tapping sleeve and valve.
8. Cut and cap existing water lines shall be paid at the Contract Unit Price per each for the respective size less Owner-furnished materials.
9. Cost for tapping sleeve and tapping valves shall include the excavation, setting of tapping sleeve and tapping valve, testing of tapping saddle,

performance of the actual tap, and final backfilling and setting of valve box less Owner furnished material. **The Owner will make no taps.**

M. Section 4.03 1-inch Service Assemblies

1. The quantities of service pipe for which payment will be allowed shall be expressed in linear feet for each size of pipe and shall be the shortest horizontal distance from the main to the near edge of the meter box. It shall include classified excavation, backfilling, less Owner furnished materials.
2. The quantities of new service assemblies for which payment will be allowed shall be the actual number of each size installed. The assembly, to be considered for payment must include corporation cock, valves, meter box, saddle, meter and dual check zone valve less Owner furnished materials.
3. Boring of services will be made at the contract unit price including the installation of the service line less Owner furnished materials. It shall be paid as measured along the actual bored length and installed casing.

N. Section 3.01, Sanitary Sewer (Gravity)

1. The quantities of pipe for which payment will be allowed shall be expressed in linear feet for each size and type of pipe in terms of the horizontal lengths at the appropriate depth of pipe installed in place as measured along the centerline with no deductions for manholes or fittings. **Depth for payment will be determined from Owner approved cut sheets.** Such payment shall be full compensation for the furnishing and installing of pipe at design grade, jointing materials (including connections to existing manholes, classified excavation, dewatering, shoring and select backfill) and all other work necessary for and incidental to completion of the work less Owner furnished material. The quantities of service tees, wyes, cleanouts, service reconnections and stub-outs for which payment will be allowed shall be the actual number of each size installed less Owner furnished material.
2. No additional payment will be made for air testing or infiltration testing and cost of all testing shall be merged into the unit prices of the sewer.
3. Separate payment will be made for televising of gravity sewers upon their completion for acceptance by the Owner. Payment will be made on the cost per linear foot of gravity line surveyed. Payment will not be released until the Owner has received all supporting CCTV documentation.
3. Stone bedding required for PVC or DIP gravity sewer pipe shall be paid at the contract unit price for stone per ton based on stone weigh tickets.

4. Where stone refill/backfill is required for gravity sewer pipe placed in roadways or paved areas, stone shall be paid for as at the contract unit cost for stone per ton based on stone weigh tickets.

O. Section 3.02, Sewage Force Main

1. The quantities of pipe for which payment will be allowed shall be expressed in linear feet for each size of pipe in terms of the horizontal lengths of pipe installed in place as measured along the centerline with no deductions for valves or fittings. Such payment shall be full compensation for the installing of pipe, fittings, jointing materials, classified excavation, select bedding and select backfill, reaction blocking, tracer wire and all other work necessary for and incidental to completion of the work less Owner furnished material. No additional payment will be made for flushing, sterilization, pressure and leak testing. Costs for this work shall be included in the cost of the force main.
2. Connection to existing manholes shall be paid at the Contract Unit Price per each connection. Contractor shall furnish the coring and the resilient connector to make connections to existing manholes.
3. Where stone refill/backfill is required for force main pipe placed in roadways or paved areas, stone shall be paid for as at the contract unit cost for stone per ton based on stone weigh tickets.
4. Stone bedding required for the force main pipe in areas where a rock trench is present shall be paid for at the contract unit cost per ton based on stone weigh tickets.

P. Section 2.20 Boring and Casing for Sanitary Sewers and Water Lines

1. The linear foot price for the boring and casing of sanitary sewer lines, force mains or water lines shown in the Cost Proposal shall include the pit excavation (classified), boring of casing, proper alignment (horizontal and vertical), installation of carrier pipe in casing, casing spacers, end seals, signs, and all labor and equipment, less Owner supplied materials to complete the bore installation. No payment will be made for bores which are unusable. If grout refill is required for sealing a faulty bore, it will be at the expense of the contractor.
2. The linear foot price for the open-cut installation of casing for sanitary sewer lines, force mains or water lines shown in the Cost Proposal shall include the classified excavation, placement of casing, proper alignment (horizontal and vertical), installation of carrier pipe in casing, casing spacers, end seals, signs, and all labor and equipment, less Owner supplied materials to complete the open-cut casing installation.

3. Bores of concrete or asphalt driveways shall include all labor and equipment to bore the drive less Owner supplied material, but no casing pipe shall be included. No additional payment will be made for water line installation or sewer force main installation or pavement replacement where bores occur.
4. An additional price for boring in rock will be paid for where boring is performed in a rock condition along actual distance where rock is encountered. Cost of casing, spacers and end seals and all other work related to the bore shall be paid in the respective bore and jack line item.

Q. Section 3.06, Sewer Flow Control

1. Sewer flow control is a pay item. It shall include all labor, pumps, hoses, equipment, and fuels to operate and maintain the pump during the pumping exercise and to prevent overflows. Cost shall be based on an hourly basis for each hour of actual pump time.

R. Section 03303, Concrete for Utility Lines

1. Concrete for cradles, anchors, thrust blocking, caps or pipe protection is not a pay item and shall be considered and designated as incidental to construction. It shall be considered and designated a necessary part of the construction, and unit prices proposed for items with which concrete is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.
2. Concrete for protection such as encasement or caps is a pay item and shall be paid by the linear foot measured along the centerline of the pipe being installed. It shall include all labor, materials, equipment and concrete required to place the encasement or cap.

S. Rip Rap

Rip rap shall be paid at the cost per ton based on delivery weigh tickets. Payment shall include all labor, equipment and materials to provide and install the rip rap where directed by the Owner.

T. Traffic Control

Traffic control is not a pay item. All traffic control items such as flagmen, construction signage, barricades, cones, message boards, arrow boards, etc. shall be considered and designated a necessary part of the construction, and unit prices proposed for items with which traffic control is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.

U. Mobilization

Mobilization will be paid for as the cost for transporting equipment and materials to a designated work area at the rate as defined in the cost proposal which is based on the value of the work task. The work area may include multiple improvements within a geographic area and mobilization will be paid for as a one-time transportation cost to the defined work area and not to the individual points where improvements will be made. The Owner will attempt to consolidate areas of multiple improvements to an area no larger than a 1-mile radius. If the work identified is the installation of water or sewer lines along designated routes, then the work area will be considered the entire route(s) in the area where the improvements are made. No separate payment will be considered for demobilization.

V. Bonds

The cost of Contractor furnished performance and payment bonds and maintaining insurance premium as called for by the Contract will be paid on a one-time occurrence per year for each year the Owner and Contractor enter the Contract. Claim for payment on this item will be allowed after execution of the Contract between Owner and Contractor. Payment will be made at the amount set forth on the Cost Proposal Form.

W. Stone for Bedding, Refill and Roadway Base

Stone shall be paid at the cost per ton based on delivery weigh tickets. Weigh ticket shall include the work task identifier and Owner's name. Payment shall include all labor, equipment and materials to provide and install the stone (No. 57 or No. 67 or No. 78 or roadway base stone) as set forth by these specifications.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 Requirements Included

Section includes the following items as required by or necessary for each Contractor to perform the scope of work.

- A. Temporary utilities
- B. Construction aids
- C. Barriers and Enclosure
- D. Access roads and parking
- E. Field office, sheds, and staging areas
- F. Construction Cleaning
- G. Comply with Federal, State and local codes/regulations; with utility company requirements.

1.02 Quality Assurance

Comply with National Electric Code.

- A. Regulations: Comply with Federal, State and local codes/regulations.
- B. Standards: Comply with applicable NFPA, NSI and NECA requirements.

1.03 Temporary Electricity and Lighting

- A. Arrange with utility company, provide service required for power and lighting and pay all costs for service and for power used.
- B. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work, and for areas accessible to the public.
- C. Lamps and light fixtures: Provide general service type incandescent lamps of wattage required for adequate illumination. Where exposed to breakage by construction operations, protect lamps with guard cages or tempered glass enclosures. Provide exterior type fixtures where exposed to weather or moisture.
- D. Electrical Power Cords: Use only grounded extension cords: "hard-service" type where exposed to abrasion and traffic. Use single lengths or tape intermediate connections with waterproof electrical tape or use waterproof connectors.

1.04 Temporary Water

- A. Arrange with utility company to provide water for construction purposes; pay all cost for installation, maintenance, removal, and service used.
- B. Install branch piping with taps located so that water is available throughout the construction by the use of hoses. Protect piping and fittings against freezing.
- C. It is the responsibility of the Contractor to maintain the site and construction work free of water accumulation and flooding. De-watering should not endanger the construction or adjacent properties.

1.05 Temporary Sanitary Facilities

Sanitary Facilities: Provide type acceptable to governing authorities and adequate (at all stages of construction) for use of personnel at project site. Provide separate facilities for male and female personnel when both sexes are working (in any capacity) at project site. Keep such facilities clean and in a sanitary condition and remove them upon completion of the construction.

1.06 Dust Control

- A. Provide positive methods and apply dust control materials to minimize raising dust from construction operations and provide positive means to prevent air-borne dust from dispersing into the atmosphere.

1.07 Water Control

- A. Provide methods to control surface water to prevent damage to the Project, the site, or adjoining properties.
 - 1. Control filling, grading, and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper runoff.
- B. Provide, operate, and maintain hydraulic equipment of adequate capacity to control surface water.
- C. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas, as required by local rules and regulations.

1.08 Debris Control

- A. Maintain all areas under Contractor's control free of extraneous debris.

- B. Initiate and maintain a specific program to prevent accumulation of debris at the construction site, storage and parking areas, or along access roads and haul routes.
 - 1. Provide containers for deposit of debris.
 - 2. Prohibit overloading of trucks to prevent spillages on access roads or haul routes.
 - 3. Provide periodic inspection of traffic areas to enforce requirements.
- C. Schedule periodic collection and disposal of debris. Provide additional collections and disposals of debris whenever the periodic schedule is inadequate to prevent accumulation.

1.09 Pollution Control

- A. Provide methods, means and facilities required to prevent contamination of soil, water, or atmosphere by the discharging of noxious substances from construction operations.
- B. Provide equipment and personnel, perform emergency measures required to contain any spillage, and to remove contaminated soils or liquids.
 - 1. Excavate and dispose of any contaminated earth off-site and replace with suitable compacted fill and topsoil.
- C. Take special measures to prevent harmful substances from entering public waters.
 - 1. Prevent disposal of waste, effluents, chemicals, or other such substances adjacent to streams or in sanitary sewers.
- D. Provide system for control of atmospheric pollutants.
 - 1. Prevent toxic concentrations of chemicals.
 - 2. Prevent harmful disposal of pollutants into the atmosphere.

1.10 Barricades and Enclosures

- A. Provide as required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide barricades and temporary lighting at streets and open ditches where construction work may present hazards to vehicles and personnel.

- C. Replace, or suitably repair, trees and plants designated to remain which are damaged or destroyed due to construction operations.

PART 2 - PRODUCTS

2.01 Materials, General

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

PART 3 - EXECUTION

3.01 General

- A. Maintain and operate systems to assure continuous service.
- B. Modify and extend systems as work progress requires.

3.02 Removal

- A. Completely remove temporary materials and equipment when their use is no longer required.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.
- C. Restore existing facilities used for temporary service to specified or original condition.

END OF SECTION

SECTION 01620

STORAGE AND PROTECTION

PART 1 – GENERAL

1.01 GENERAL STORAGE

- A. Store products immediately on delivery in accordance with manufacturer's printed instructions with seals and labels intact and legible. Protect until installed in the work.
- B. Arrange storage in a manner to provide easy access for inspection.
- C. Provide protection and restrict access to project site, in-place work, and stored materials from vandalism.

1.02 EXTERIOR STORAGE

- A. Provide substantial platforms, blocking or skids to support fabricated products above ground to prevent soiling and staining.
- B. Cover products which are subject to discoloration or deterioration from exposure to the elements with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
- C. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- D. Provide surface drainage to prevent erosion and ponding of water.
- E. Prevent mixing of refuse or chemically injurious materials or liquids.

1.03 MAINTENANCE OF STORAGE

- A. Maintain a periodic system of inspection of stored products on a scheduled basis to assure that:
 - 1. Owner supplied material have not been vandalized or stolen.

PART 2- PRODUCTS

Not Used

PART 3- EXECUTION

Not used

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 – GENERAL

1.01 SUBSTANTIAL COMPLETION

- A. When the work task is substantially complete, submit the following to Owner:
 - 1. Written notice that the specific work task is substantially complete.
 - 2. List of items to be completed or corrected.
- B. Within a reasonable time, Owner will inspect to determine status of completion and compile a punch list of items to be completed and corrected. If Owner determines that Work is not substantially complete, he will immediately notify Contractor in writing. Owner will generally point out his reasons, but he will not be obligated to give an exhaustive list of discrepancies.
- C. Contractor's Duties: Remedy deficiencies and send Owner another written Notice of Substantial Completion.
- D. Owner's Actions:
 - 1. Re-inspect the Work
 - 2. When Owner considers Work substantially complete, he will issue the Certificate of Substantial Completion.

1.02 OWNER OCCUPANCY

- A. Owner's Action: Occupy the Project, or designated portion of the Project, in accordance with provisions of the Certificate of Substantial Completion.
- B. Contractor's Duties:
 - 1. Make corrections listed on punch list attached to Certificate of Substantial Completion.
 - 2. Perform final clean-up

1.03 FINAL COMPLETION

- A. When this project is complete, Contractor shall submit certification in indication of the following:
 - 1. Contract Documents have been reviewed and Work has been inspected for compliance with those Documents.
 - 2. Work has been completed in accordance with Contract Documents.
 - 3. All punch list items have been corrected.
 - 4. Equipment and systems have been tested in presence of Owner's Representative and are operational.
 - 5. Work is complete and ready for final inspection.
- B. Owner's Action During Final Inspection:
 - 1. Inspect to verify the status of completion with reasonable promptness.
 - 2. If he considers Work incomplete or defective, he will promptly notify Contractor in writing, listing deficiencies.
- C. Contractor's Duties: Take immediate action to correct deficiencies and send certification to Owner that Work is complete.
- D. When Owner determines that Work is acceptable, he will request Contractor to make closeout submittals.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS REQUIRED

- A. Documents required by State Licensure inspectors and other authorities having jurisdiction.
- B. Project Record Documents: Provide and keep up to date a complete record of work installed. The Contractor shall, prior to request for final payment for each work task, assist the Owner with development of as-built sketches of the project. These sketches shall be of clear reproducible quality, and shall indicate the location of the water line, sewer line and all appurtenances such as sewer service tee locations, water service tap connections, etc., and shall include dimensions to the centerline of the pipe and each appurtenance. The drawings shall be delivered to the Owner prior to release of final payment.
- C. Evidence of Payment and Release of Liens: Comply with requirements and Condition of the Contract.
- D. Consent of Surety to Final Payment.
- E. Certificates of Insurance for Products and Completed Operations: Comply with Supplementary Conditions.

1.05 STATEMENT OF ADJUSTMENT OF ACCOUNTS

A. Submit a final statement to Owner indicating all adjustments to the Contract Sum. Include the following:

1. Original Contract Sum.
2. Previous change orders.
3. Changes under unit prices.
4. Total Contract Sum, as adjusted
5. Previous payments

B. If required, a final Change Order will be prepared reflecting approved adjustments to Contract Sum which were not previously made on Change Orders.

1.06 FINAL APPLICATION FOR PAYMENT

A. Submit final Application for Payment in accordance with procedures and requirements of the Conditions of the Contract.

1.07 FINAL PAYMENT

A. Owner will make final payment.

PART 2- PRODUCTS

Not Used

PART 3- EXECUTION

Not Used

SECTION 01710

CLEANING

PART 1 - GENERAL

1.01 CLEANING

- A. The Contractor is responsible for cleanup.
- B. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.
- C. Keep streets clean from mud, dirt, debris, and other materials removed from the job site. Promptly remove mud and dirt tracked by vehicles from street surfaces.
- D. At completion of work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials. Clean all sight-exposed surfaces. Leave project clean and ready for construction work to follow, and ready for occupancy, as applicable.
- E. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile waste such as mineral spirits, oil, and paint thinner in storm drains or sanitary sewers.
- F. Hazard Control:
 - 1. Store volatile wastes in covered metal containers and remove from premises daily.
 - 2. Prevent accumulation of waste which might cause hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile and noxious substances.

1.02 DURING CONSTRUCTION

- A. Clean building, grounds and public properties and keep free from accumulations of waste materials and rubbish.

- B. At reasonable intervals during progress of Work, but in no case less than once a week, clean site and public properties and dispose of waste materials, debris and rubbish.
- C. Provide on-site containers for collection of waste materials, debris, and rubbish. Type of container is at Contractor's option. Provide containers with adequate capacity to accommodate anticipated needs. If containers do not have adequate capacity, increase intervals of waste removal until adequate capacity is provided.

1.03 FINAL CLEANING

- A. Remove waste, debris and surplus materials from site. Clean grounds; remove stains, spills, and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.
- B. Maintain cleaning until Final Completion.
- C. Prior to Final Completion, Contractor shall conduct an inspection of all work areas to verify that the entire work is clean.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 02110

CLEARING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Clear site of trees, shrubs, plant life, grasses and debris.
- B. Remove root system of trees and shrubs to be removed measuring three (3) inches and over at the diameter of the base.
- C. Remove rocks, boulders and other debris.

1.02 RELATED WORK

- A. Section 02221: Trenching, Backfilling and Compaction for Utilities.
- B. Section 02485: Seeding.

1.03 PROTECTION

- A. Protect existing trees, shrubs, lawn areas to receive planting, rock outcropping and other features remaining as part of final landscaping.
- B. Protect benchmarks and existing structures, roads, sidewalks, paving, and curbs against damage from vehicular or foot traffic.
- C. Maintain designated temporary roadways, walkways and detours for vehicular and pedestrian traffic.

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

3.01 PREPARATION

- A. Maintain benchmarks, monuments and other reference points. Re-establish if disturbed or destroyed at no expense to the Owner.

3.02 CLEARING

- A. Clear areas as required for access to the site excavation and performance of work.
- B. Cut down trees and shrubs within construction areas. Grub out stumps, roots, embedded rocks and boulders. Consult with Owner before actual removal of trees and shrubs.
- C. Clear out undergrowth and deadwood, without disturbing subsoil.
- D. Do not disturb trees or roots of trees which are to remain.
- E. Remove any damaged branches on trees which are to remain.

3.03 BACKFILLING AND SURFACE PREPARATION

- A. Backfill and compact all depressions resulting from clearing and grubbing with suitable materials in accordance with Section 02221.
 - 1. Backfill embankment areas to natural ground elevation.
 - 2. Backfill excavation areas below finished subgrade to finished subgrade.
- B. Perform backfilling a satisfactory time period ahead of construction operations.
- C. Prepare areas designated on the Drawings to receive erosion controls to smooth surfaces that have been shaped, in accordance with the Drawings.

3.04 REMOVAL OF DEBRIS

- A. Promptly remove cleared debris from site. Burning or burying on site is not permitted.
- B. Obtain permission from applicable regulatory authority for disposal of debris to waste disposal site.

END OF SECTION

SECTION 02222

CLASSIFIED EXCAVATION FOR UTILITIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The work called for by this section shall consist of clearing and grubbing, loosening, loading, removing, and disposing of, in the specified manner, all wet and dry materials encountered that must be removed for construction purposes; furnishing, placing, and maintaining all sheeting, shoring, bracing, and timbering necessary for the proper protection and safety of the work, the workmen, the public, and adjacent property and improvements; the dewatering of trenches and other excavations; the preparation of fills and embankments; the removal of unsuitable material from outside the normal limits of excavation and, where ordered by the Owner, their replacement with suitable materials; and all other grading or excavation work incidental to or necessary for the work. This work shall be performed as specified below.

1.02 RELATED SECTIONS

- A. Sections Included:
1. Section 02221 - Trenching, Backfilling & Compaction for Utilities
 2. Section 02600 - Manholes
 3. Section 02713 - Water Lines
 4. Section 02722 - Gravity Sewers
 5. Section 02723 - Sewage Force Main

1.03 JOB CONDITIONS

- A. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.
- B. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping

- respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
- C. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.
 - 1. Provide minimum of 48-hour notice to Owner and receive written notice to proceed before interrupting any utility.
 - D. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.
 - E. Use of Explosives: Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.
 - F. Preserve from damage surveying monuments, property pins, and similar items. If disturbed or damaged by construction operations, pay the cost of restoration by a registered surveyor.
 - G. Costs for locating, maintaining, and protecting existing facilities shall be merged in the unit price of the pipeline.
 - H. Protect structures, utilities, sidewalks, pavements, any other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.04 PROTECTION

- A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation work.
- B. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.
- C. Notify Owner of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.

- D. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- E. Grade excavation bottoms against freezing when atmospheric temperature is less than 35°F.
- G. Protect trees, shrubbery, fences, poles, and all other property and surface structures during construction operations unless their removal for purposes of construction is authorized by Owner. Fences, poles, or other manmade surface improvements which are moved or disturbed shall be restored to the original conditions after construction is completed. Trees, shrubbery, or other vegetation which are approved for removal in order to facilitate construction operations shall be removed completely, including stumps and main roots. Responsibility for damage or claims for damage caused by construction operations to shrubbery or other landscape improvements which were not authorized for removal by Owner shall be assumed by Contractor.

1.05 SAFETY

- A. Barricades, Guards, and Safety Provisions: Place and maintain barricades, fences, construction signs, torches, flashing lights, lanterns, guards, and flagmen as required during the progress of the construction work and until it is safe for traffic to use the roads and streets. Material piles, equipment, and pipe which may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. The rules and regulations of OSHA and appropriated authorities respecting safety provisions shall be observed.
- B. Structure Protection: Provide temporary support, protection, and maintenance of underground and surface, drains, sewers, and other obstructions encountered during the progress of the work. Structures which may have been disturbed shall be restored upon completion of the work.

1.06 DEVIATIONS OCCASIONED BY STRUCTURES OR UTILITIES

- A. Wherever obstructions are encountered during the progress of the work which occupy the space required for the pipeline, Owner shall have the authority to order a deviation from the line and grade or arrange with the Owners of the structures for the removal, relocation, or reconstruction of the obstructions.

- B. Where gas, water, telephone, electrical, or other existing utilities directly interfere with the vertical or horizontal alignment of the pipeline, Owner will order a change in grade or alignment or will arrange with the Owners of the utilities for their removal.

1.07 DUST CONTROL

- A. When ordered by Owner, furnish and distribute over traveled road surfaces which have not been fully restored an application of regular flake calcium chloride having a minimum calcium chloride content of 77 percent, or a brine solution consisting of 1.5 pound of calcium chloride and one pound of sodium chloride per 100 gallons of water applied by a pressure distributor. Rate of application shall be 3 pounds/square yard for the flake calcium chloride, and 0.48 gallon/square yard for brine solution.
- B. Whenever dust control is necessary, it shall be considered an integral part of the work, and no separate payment shall be made for it.

1.08 MAINTENANCE OF THE TRAFFIC AND CLOSING OF STREETS

- A. Carry on the work in a manner which will cause a minimum of interruption to traffic, and do not close to through travel more than two consecutive blocks, including the cross street intersected. Where traffic must cross open trenches, provide bridges at street intersections and driveways. Post signs indicating that a street is closed and necessary detour signs for the proper maintenance of traffic. Before closing any streets notify responsible municipal authorities.
- B. Coordinate all road closures with the Limestone County Engineer's office and the Limestone County 911 office.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. Satisfactory soil materials are defined as those complying with ASTM D2487 unified soil classification system groups GW, GP, GM, SM, SW and SP.
- B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 unified soil classification system GC, SC, ML, MH, CL, CH, OL, OH and PT.

- C. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1-1/2" sieve and not more than 5% passing a No. 4 sieve.
- D. Backfill and Fill Materials: Satisfactory soil material of clay, rock, or gravel not larger than 2" in any dimension, free of debris, waste, frozen materials, vegetation and other deleterious matter.

PART 3 - EXECUTION

3.01 PREPARATION OF THE SITE

- A. Before starting construction, remove from the work site all vegetation growth (except as hereinafter excluded), debris, and/or other objectionable matter as well as any buildings and/or other structures that the Owner specifically indicate are to be removed. Dispose of this refuse materials in a manner acceptable to the Owner.
- B. In certain areas it may be desirable for existing trees, shrubs, or other vegetation on the site to be preserved for the permanent landscape. Such vegetation may be specifically listed in the specifications, marked on the site, or identified by the Owner. In no case damage or remove such growth without written permission from the Owner.
- C. If the area to be excavated is occupied by trees, brush, or other vegetation growth, clear such growth and grub the excavated area and remove all large roots to a depth of not less than 2' below the bottom of the proposed construction. Dispose of the growth removed in a manner satisfactory to the Owner. Fill all holes or cavities created during this work that extend below the subgrade elevation with suitable material and compact to the same density as the surrounding material.
- D. Trees, cultivated shrubs, etc., that are situated within public rights-of way and/or construction easements through private property but not directly within the excavation area shall remain undisturbed unless it is necessary to remove them so that the work can be performed safely and unless their removal is specifically ordered by the Owner. Take special precautions to protect and preserve such growth throughout all stages of the construction.
- E. Preparation of the site shall be considered an integral part of the excavation and one for which no separate payment shall be allowed.

3.02 EXCAVATION

- A. Excavation is classified and includes excavation to subgrade elevations.

3.03 UNSUITABLE MATERIALS

- A. Whenever muck, quicksand, soft clay, swampy ground, or other material unsuitable for foundations, subgrade, or backfilling is encountered, remove it and continue excavation until suitable material is encountered. The material removed shall be disposed of in the manner described below. Then refill the areas excavated for this reason with 1" to 2" crushed stone up to the level of the lines grades, and/or cross sections shown on the drawings. The top 6" of the refill shall be No. 67 (ALDOT) crushed stone for bedding.

3.04 ROCKS AND BOULDERS

- A. Any material that is encountered within the limits of the required excavation that cannot be removed except by drilling and /or blasting, including rock, boulders, masonry, hard pan, chert, shale, street and sidewalk pavements, and/or similar materials, shall be considered as rock excavation. Rock material shall be considered where it cannot be removed by a trackhoe by ripping the material.
- B. Should rock be encountered in the excavation, remove it by blasting, rock saws, rock trenchers, hoe rams or otherwise. Where blasts are made, cover the excavation with enough excavation material and/or timber or steel matting to prevent danger to life and property. The Contractor shall secure, at his own expense, all permits required by law for blasting operations and the additional hazard insurance required. Observe all applicable laws and ordinances pertaining to blasting operations.
- C. Excavate rock over the horizontal limits of excavation and to a depth of not less than 6" below the bottom of pipe up to 30" in diameter and not less than 12" below the bottom of larger pipes if rock extends to such depth. Then backfill the space below grade with No. 67 (ALDOT) Crushed stone, tamp to the proper grade, and make ready for construction.
- D. Payment for rock excavation shall be measured by the formula for trench width of $4/3D + 18''$ (where D = outside diameter of pipe) times the actual

depth of rock removed to a point 6 inches below the invert of the pipe expressed as cubic yards.

3.05 DISPOSAL OF MATERIALS

- A. Whenever practicable, all materials removed by excavation that are suitable for backfilling pipe trenches or for other purposes shown on the drawings or directed by the Owner shall be used for these purposes. Any materials not so used shall be considered waste materials and disposed of by the Contractor as specified below.
- B. Waste materials may be deposited in spoil areas at locations approved by the Owner. Waste materials shall be properly disposed of off-site if no spoil area is approved by the Owner. Provide a copy of executed property owner agreements to Owner. Do not leave in unsightly piles but instead spread in uniform layers, neatly level, and shape to drain. Seed as specified in Section 02485, Seeding.
- C. Once any part of the work is completed, properly dispose of all surplus or unused materials (including waste materials) left within the construction limits of that work. Leave the surface of the work in a neat and workmanlike condition, as described below.
- D. The disposal of waste materials shall be considered an integral part of the excavation work and on for which no separate payments shall be allowed.

3.06 SHEETING, SHORING AND BRACING

- A. Take special care to avoid damage wherever excavation is being done. Sufficiently sheet, shore, and brace the sides of all excavations to prevent slides, cave-ins, settlement, or movement of the banks and to maintain the specified trench widths. Use solid sheets in wet, saturated, or flowing ground. All sheeting shoring, and bracing shall have enough strength and rigidity to withstand the pressures exerted, to keep the walls of the excavation properly in place, and to protect all persons and property from injury or damage. Separate payment will not be made for sheeting, shoring, and bracing, which are considered an incidental part of the excavation work.
- B. Wherever employees may be exposed to moving ground or cave-ins, shore and lay back exposed earth excavation surfaces more than 5' high to a stable slope, or else provide some equivalent means of protection. Effectively protect trenches less than 5' deep when examination of the

- ground indicates hazardous ground movement may be expected. Guard the wall and faces of all excavations in which employees are exposed to danger from moving ground by a shoring system, sloping of the ground, or some equivalent protection.
- C. Comply with all OSHA standards in determining where and in what manner sheeting, shoring, and bracing are to be done. The sheeting, shoring, and bracing system shall be designed by a professional engineer licensed in the State of Alabama and shall be subject to approval by the Owner. However, such approval does not relieve the Contractor of the sole responsibility for the safety of all employees, the effectiveness of the system, and any damages or injuries resulting from the lack or inadequacy of sheeting, shoring, and bracing.
 - D. Where excavations are made adjacent to existing buildings or structures or in paved streets or alleys, take particular care to sheet, shore, and brace the sides of the excavation to prevent any undermining of or settlement beneath such structures or pavement. Underpin adjacent structures wherever necessary, with approval of the Owner.
 - E. Do not leave sheeting, shoring, or bracing materials in place unless this is called for by the drawings, ordered by the Owner, or deemed necessary or advisable for the safety or protection of the new or existing work or features. Remove these materials in such a manner that the new structure or any existing structures or property, whether public or private, will not be endangered or damaged and the cave-ins and slides are avoided.
 - F. Fill and compact all holes and voids left in the work by the removal of sheeting, shoring, or bracing as specified herein.
 - G. The Contractor may use a trench box, which is a prefabricated movable trench shield composed of steel plates welded to a heavy steel frame. The trench box shall be designed to provide protection equal to or greater than that of an appropriated shoring system.
 - H. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
 - I. Do not allow water to accumulate in excavations. Remove water to prevent softening of sub-grade foundation bottoms, undercutting footings, and soil changes detrimental to stability of sub-grades and foundation. Provide and maintain pumps, well points sumps, suction and

discharge lines, and other dewatering system components to convey water away from excavations.

- J. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

3.08 BORROW EXCAVATION

- A. Whenever the backfill of excavated areas or the placement of embankments requires more material than is available from authorized excavations, or whenever the backfill material from such excavations is unsuitable, then obtain additional material from other sources. This may require the opening of borrow pits at points accessible to the work. In such cases, make suitable arrangements with the property owner and pay all incidental costs, including any royalties, for the use of the borrowed material. Before a borrow pit is opened, the quality and suitability of its material shall be approved by the Owner.
- B. Excavate borrow in such a way that the remaining surfaces and slopes are reasonably smooth, and the adequate drainage is provided over the entire area. Construct drainage ditches wherever necessary to provide outlets for water to the nearest natural channel, thus preventing the formation of pools in the pit area. Leave the sides of borrow pit cuts at a maximum slope of 2:1 unless otherwise directed by the Owner.
- C. Properly clear and grub borrow pits and remove all objectionable matter from the borrow pit materials before placing it in the backfill.
- D. The taking of materials from borrow pits for use in the construction of backfill, fills, or embankment shall be considered an incidental part of the work; no separate payment shall be made for this.

3.09 BACKFILLING

- A. Conduct backfilling around manholes, inlet, outfalls, and/or structures in the same manner as specified for water lines, gravity sewers and/or force mains except that even greater care is necessary to prevent damage to the utility structure.
- B. Perform backfilling so as not to disturb or injure any pipe and/or structure against which the backfilling is being placed. If any pipe or

structure is damaged and/or displace during backfilling, open up the backfill and make whatever repairs are necessary.

3.10 MAINTENANCE

- A. Seed and maintain in good condition all excavated areas, trenches, fills, embankments, and channels until final acceptance by the Owner.
- B. Maintain trench backfill at the approximate level of the original ground surface by periodically adding backfill material wherever necessary and whenever directed to do so by the Owner. Continue such maintenance until final acceptance of the project, or until Owner issues a written release.

3.11 SLOPES

- A. Neatly trim all open cut slopes, and finish to conform either with the slope lines shown on the drawings or the directions of the Owner. Leave the finished surfaces of bottom and sides in reasonably smooth and uniform planes like those normally obtainable with hand tool, though the Contractor will not be required to use hand methods if he is able to obtain the required degree of evenness with mechanical equipment. Conduct grading operations so that material is not removed or loosened beyond the required slope.

END OF SECTION

SECTION 2.14

TRENCHING, BACKFILLING AND COMPACTION FOR UTILITIES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Excavation for buried utility material.
- B. Provide necessary sheeting, shoring and bracing.
- C. Prepare trench bottom with appropriate materials.
- D. De-water excavations as required.
- E. Place and compact granular beds, as required, and backfill.

1.02 RELATED WORK

- A. Section 2.22: Pavement Repair.
- B. Section 2.15: Unclassified Excavation for Utilities
- C. Section 3.01: Sanitary Sewers (Gravity)
- D. Section 3.02: Sewage Force Main
- E. Section 3.03: Manholes
- F. Section 4.01: Water Lines

1.03 PRECAUTIONS

- A. Contractor shall shore and brace all open cut trenches as required by State and Federal Laws including 29 CFR 1926.651 and 1926.652 and Local Ordinances; conform with recommendations set forth in AGC Manual of Accident Prevention in Construction; protect life, property, or work; and avoid excessively wide cuts in unstable material. The Contractor is responsible for all compliance with laws and statutes related to trenching and excavation.

- B. Notify utility companies when necessary to disturb existing facilities and abide by their requirements for repairing and replacing.
- C. Protect all vegetation and other features to remain.
- D. Protect all benchmarks, property pins and survey points. Any damaged or destroyed property pins shall be replaced at the Contractor's expense.

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

3.01 PREPARATION

- A. Install barriers and other devices to protect areas adjacent to construction.
- B. Protect and maintain all benchmarks and other survey points.

3.02 EXCAVATION OF TRENCHES

- A. Perform in such a manner as to form a suitable trench in which to place the pipe and so as to cause the least inconvenience to the public.
- B. Maximum width at the crown of the pipe shall be 18 inches plus $\frac{4}{3}$ nominal diameter of the pipe.
- C. Cut pavement along neat, straight lines with either a pavement breaker or pavement saw.
- D. Trench depth: To provide minimum cover as specified in Section 3.01, 3.02, or 4.01 over the top of the pipe.
- E. Align trench as shown on the drawings unless a change is necessary to miss an unforeseen obstruction.
- F. When unstable soil is encountered at the trench bottom, remove it to a depth required to assure support of the pipeline and backfill to the proper grade with coarse aggregate AASHTO M-43, Size No. 2 or 3.
- G. Remove rock encountered in trench excavation to a depth of six (6) inches below the bottom of the pipe barrel, backfill with an approved material,

and compact to uniformly support the pipe. In no case shall solid rock exist within six (6) inches of the finished pipeline.

3.03 SHEETING, SHORING AND BRACING

- A. When necessary, furnish, put in place, and maintain such sheeting, bracing, etc., as may be required to support the sides of the excavation and to prevent movement.
- B. Take care to prevent voids outside the sheeting.
- C. If voids are formed, immediately fill and compact to the satisfaction of the Engineer.
- D. Unless adjacent facilities will be damaged, remove all sheeting, shoring, and bracing after backfill has been placed to a depth of 18 inches over the pipeline.
- E. Cut shoring off at the top of the pipe and leave the lower section in the trench.

3.04 USE OF EXPLOSIVES

- A. Conduct all blasting operations in accordance with prevailing municipal, state, or other agency regulations, codes, ordinances, or laws. No blasting materials shall remain overnight on work site.
- B. Exercise due caution when blasting adjacent to existing structure and pipe lines.
- C. Cover all shots with blasting mats to prevent flying material.

3.05 DISPOSAL OF EXCAVATED MATERIAL

- A. Satisfactorily dispose of all excess excavated material that cannot be used for or is not suitable for embankments.

3.06 UNAUTHORIZED EXCAVATION

- A. Unauthorized excavation is defined as all excavation outside or below the proposed lines and grades shown on the drawings.

- B. Backfill areas of unauthorized excavation with the type material necessary (earth, rock or concrete) to insure the stability of the structure of construction involved.
- C. Unauthorized excavation or backfill to replace same shall not be a pay item.

3.07 REMOVAL OF WATER

- A. Keep excavated areas free of water while work is in progress.
- B. Well-pointing shall be performed if required.
- C. Take particular precautions to prevent the displacement of structures or pipelines as a result of accumulated water.

3.08 OBSTRUCTIONS

- A. Obstructions shown on the drawings are for information only and do not guarantee their exact locations nor that other obstructions are not present.
- B. When utilities or obstructions are not shown on the drawings but are present off the roadway at the location of the proposed pipeline route, the Contractor should notify the appropriate utility owner prior to continuing with any installation.
- C. Exercise due care in excavating adjacent to existing obstructions and do not disturb same unless absolutely necessary.
- D. In the event obstructions are disturbed, repair or replace as quickly as possible to the condition existing prior to their disturbance.
- E. Coordinate all obstruction relocation with the appropriate utility owner.

3.09 BEDDING AND BACKFILLING

- A. Do not begin backfilling before Authority has inspected the grade and alignment of the pipe, the bedding of the pipe and the joints between the pipe. If backfill material is placed over the pipe before an inspection is made, reopen the trench in order for an inspection to be made.

- B. Refer to the Sections of these specifications for details related to the specific bedding and backfilling requirements for sewage force mains, water lines, and gravity sewers.
- C. If pipe (water, gravity sewer or force main) is installed in a rock trench, install a 6-inch bedding of No. 67 (ALDOT) crushed stone below the bottom of the pipe. Then add additional No. 67 stone to a point 12-inches above the top of the pipe in accordance with the details. Rock is defined as material non excavatable by a trackhoe.
- D. Dispose of and replace all soft or yielding material which is unsuitable for trench backfill with suitable material.
- E. Deposit backfill to the surface of the ground by dragline, bulldozer or other suitable equipment in such a manner so as not to disturb the pipe.
- F. Neatly round sufficient surplus excavated material over the trench to compensate for after settlement.
- G. Backfill all roadways and paved areas with No. 67 or No. 78 stone, with the final 8-inches of backfill to be crushed stone roadway base. Refer to each pipeline specification for details.
- H. Dispose of all surplus excavated materials.
- I. Prior to final acceptance, remove all mounds to the elevation of the surrounding terrain.

END OF SECTION

SECTION 2.16

EROSION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This work shall consist of erosion control on all cut and fill operations, excavation, backfill, or other construction activities within the limits of the construction site, within any temporary or permanent easements, and within any borrow site used during the period of construction. The protection of these sites shall continue throughout the construction period. During flood seasons, protect the sites by sandbagging, the pumping of water, and any other means appropriate to restrain flooding. During dry weather, sprinkle the sites with water or use other means as necessary to provide dust control. In case of abnormally cold weather, any construction such as excavation work may be delayed until warmer weather or covered to prevent freezing.
- B. The temporary pollution control provisions contained herein shall be coordinated with the permanent erosion control features, to ensure economical, effective, and continuous erosion control throughout the construction and post-construction period.
- C. All erosion control structures and practices shall be implemented and maintained according to the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas. Contractor shall be knowledgeable of the requirements set forth in said document.
- D. Developer/contractor shall be responsible for obtaining permits and adhering to the erosion control standards as set forth by the State of Alabama.

PART 2 - PRODUCTS

2.01 TEMPORARY BERMS

- A. A temporary berm is constructed of compacted soil, with or without a shallow ditch, at the top of fill slopes or transverse to centerline on fills.

- B. These berms are used temporarily at the top of newly constructed slopes to prevent excessive erosion until permanent controls are installed or slopes stabilized.

2.02 TEMPORARY SLOPE DRAINS

- A. A temporary slope drain is a facility consisting of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half round pipe, metal pipe, plastic pipe, sod, or other material that may be used to carry water down slopes to reduce erosion.

2.03 SEDIMENT STRUCTURES

- A. Sediment basins, ponds, and traps, are prepared storage areas constructed to trap and store sediment from erodible areas in order to protect properties and stream channels below the construction areas from excessive siltation.

2.04 CHECK DAMS

- A. Check dams are barriers composed of large stones, sandbags, or other non-corrodible materials placed across or partially crossing a natural or constructed drain way.

2.05 TEMPORARY SEEDING AND MULCHING: Temporary seeding and mulching are measures consisting of seeding, mulching, fertilizing, and matting utilized to reduce erosion. All cut and fill slopes including waste sites and borrow pits shall be seeded when and where necessary to eliminate erosion.

2.06 BALED HAY OR STRAW CHECKS

- A. Baled hay or straw erosion checks are temporary measures to control erosion and prevent siltation. Bales shall be either hay or straw containing five (5) cubic feet or more of material.
- B. Baled hay or straw checks shall be used where the existing ground slopes toward or away from the embankment along the toe of slopes, in ditches, or other areas where siltation erosion or water runoff is a problem.

2.07 TEMPORARY SILT FENCES

- A. Silt fences are temporary measures utilizing woven wire or other approved material attached to posts with filter cloth imposed or burlap,

plastic filter fabric, etc., attached to the upstream side of the fence to retain the suspended silt particles in the runoff water.

PART 3 - EXECUTION

3.01 The project drawings show the minimum erosion and siltation control measures required for this job. If the Contractor desires to stockpile construction materials, stone, earth, etc., the location of same and protection thereof shall be outlined in an Erosion and Siltation Control Plan.

3.02 The Contractor shall prepare and maintain a spill prevention plan. The contents of this spill prevention plan shall depend on what types of chemicals, lubricants and fuels will be used and if these will be stored on site. As a minimum, if fuel or lubricants or other chemicals are stored on site, either temporarily in vehicular tanks or in skid or trailer mounted tanks, a plan shall be supplied which directs all employees of the Contractor in the proper procedures to be followed should a spill occur. For more complex chemical storage requirements, a more complex plan will be required.

3.03 CONSTRUCTION REQUIREMENTS

A. The Contractor shall be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in his accepted schedule. Temporary pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during the preconstruction stage; that are needed prior to installation of permanent pollution control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

B. Where erosion is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise erosion control measures may be required between successive construction stages.

C. In the event of conflict between these requirements and pollution control laws, rules or regulations, or other Federal, State or Local agencies, the more restrictive laws, rules, or regulations shall apply.

3.06 CONSTRUCTION OF STRUCTURES

A. Temporary Berms

1. A temporary berm shall be constructed or compacted soil, with a minimum width of 24 inches at the top and a minimum height of 12 inches, with or without a shallow ditch, constructed at the top of fill slopes or transverse to centerline on fills. Temporary berms shall be graded so as to drain to a compacted outlet at a slope drain. The area adjacent to the temporary berm in the vicinity of the slope drain must be properly graded to enable this inlet to function efficiently and with only minimum ponding in this area. All transverse berms required on the downstream side of a slope drain shall extend across the grade to the highest point at approximately a ten (10) degree angle with a perpendicular to centerline. The top width of these berms may be wider and the side slope flatter on transverse berms to allow equipment to pass over these berms with minimal disruptions. When practical and until final roadway elevations are approached, embankments should be constructed with a gradual slope to one side of the embankment to permit the placement of temporary berms and slope drains on only one side of the embankment.

B. Temporary Slope Drains

1. Temporary slope drains shall consist of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half round pipe, metal pipe, plastic pipe, flexible rubber, or other materials which can be used as temporary measures to carry water accumulating in the cuts and on the fills down the slopes prior to installation of permanent facilities or growth of adequate ground cover on the slopes.
2. Fiber matting and plastic sheeting shall not be used on slopes steeper than 4:1 except for short distances of 20 feet or less.
3. All temporary slope drains shall be adequately anchored to the slope to prevent disruption by the force of the water flowing in the drains. The base for temporary slope drains shall be compacted and concavely formed to channel the water or hold the slope drain in place. The inlet end shall be properly constructed to channel water into the temporary slope drain. Energy dissipater would be dumped rock or a small sediment basin which would slow the water as well as pick up some sediment. All temporary slope drains shall be removed when no longer necessary and the site restored to match the surroundings.

- C. Sediment Structures
1. Sediment structures shall be utilized to control sediment at the foot of embankments where slope drains outlet; at the bottom as well as in the ditch lines atop waste sites; and in the ditch lines or borrow pits. Sediment structures may be used in most drainage situations to prevent excessive siltation of pipe structures. All sediment structures shall be at least twice as long as they are wide.
 2. When use of temporary sediment structures is to be discontinued, all sediment accumulation shall be removed, and all excavation backfilled and properly compacted. The existing ground shall be restored to its natural and intended condition.
- D. Check Dams
1. Check dams shall be utilized to retard stream flow or restrict stream flow within the channel. Materials utilized to construct check dams are varied and should be clearly illustrated or explained in the Contractor's erosion control plan.
 2. All check dams shall be keyed into the sides and bottom of the channel. A design is not needed for check dams.
- E. Temporary Seeding and Mulching: Seeding and mulching shall be performed in accordance with the Section 02485 - Seeding. Seeding and mulching shall occur as soon as practical, and no later than 10 working days after line installation.
- F. Baled Hay or Straw Erosion Checks: Hay or straw erosion checks shall be embedded in the ground four (4) to six (6) inches to prevent water flowing under them. The bales shall also be anchored securely to the ground by wooden stakes driven through the bales into the ground. Bales can remain in place until they rot, or be removed after they have served their purpose. The Contractor shall keep the checks in good condition by replacing broken or damaged bales immediately after damage occurs. Normal debris cleanout will be considered routine maintenance.
- G. Temporary Silt Fences
1. Temporary silt fences shall be placed on the natural ground, at the bottom of fill slopes, in ditches, or other areas where siltation is a problem. Silt fences are constructed of wire mesh fence with a covering of burlap or some other suitable material on the upper grade side of the fence and anchored into the soil.
 2. The Contractor shall be required to maintain the silt fence in a satisfactory condition for the duration of the project. The silt accumulation at the fence may be left in place and seeded or

removed. The silt fence remains the property of the Contractor whenever the fence is removed.

H. Under no circumstances shall spent oil wastes be discharged on the site.

3.07 MAINTENANCE: The temporary erosion control features installed by the Contractor shall be acceptably maintained by the Contractor until no longer needed or permanent erosion control methods are installed. Any materials removed shall become the property of the Contractor.

3.08 EROSION CONTROL OUTSIDE PROJECT AREA: Temporary pollution control shall include construction work outside the project area where such work is necessary as a result of construction such as borrow pit operations, haul roads, and equipment storage sites.

PART 4 - ADDITIONAL REQUIREMENTS

4.01 All erosion control structures and practices shall be implemented and maintained according to the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas.

A. Contractor shall maintain a copy of the approved ADEM Notice of Registration (NOR) permit at all times during construction, and shall be capable of presenting said document to any ADEM personnel who may visit the construction site.

B. An erosion control inspection shall be performed after every rain event, and no less than one (1) inspection shall be performed each month. Contractor shall be in attendance for every inspection.

C. Contractor shall be responsible for providing Facility Identification Signs for the project. Signs shall be located where accessible, including locations where the project crosses paved county, State or Federal highways/roads. Each sign shall include the Registrant (Owner) Name, the ADEM NPDES Registration Number, Project Name and Registrant (Owner) contact information. A sample sign is located at the end of this section. Contractor is responsible for removal of all signs upon approval of the Engineer.

D. Contractor shall provide a rain gauge on-site for the duration of the project. Gauge shall be placed in a location accessible to site visitors (Owner, Engineer, ADEM Personnel) and free from any obstructions which may produce inaccurate measures of rainfall such as trees and

buildings. Contractor is responsible for removal of rain gauge upon approval of the Engineer.

- E. Additional inspections may be performed by ADEM personnel during the life of the project. Contractor shall be accommodating to such personnel, and shall note any changes/corrections suggested by said personnel with regards to erosion control. Contractor shall make notes of such visits, including name of inspector, date/time of inspection and items discussed with inspector.

END OF SECTION

SECTION 2.17

FINISH GRADING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The work called for by this section shall include, but not necessarily be limited to, finish grading and the spreading and shaping of topsoil to the finished contour elevations indicated by the drawings.

PART 2 - PRODUCTS

2.01 TOPSOIL

- A. Use stripped topsoil that has been stockpiled as specified elsewhere. If the quantity of topsoil on the job is inadequate, furnish enough additional topsoil. Topsoil furnished shall be natural, fertile, friable soil possessing characteristics of representative productive solids in the vicinity. It shall be obtained from naturally well drained areas. It shall not be excessively acid or alkaline nor contain toxic substances that may be harmful to plant growth. Topsoil shall be without admixture of subsoil and shall be cleaned and reasonably free from clay, lumps, stones, stumps, roots, or similar substances 2" or more in diameter, debris, or other objects that are a hindrance to planting operations. Such material shall be subject to testing.

PART 3 - EXECUTION

3.01 GRADING

- A. Do not begin work until the earth is dry enough to be tillable.
- B. Inspect subgrades to see that they generally conform to the standards called for elsewhere in these specifications, particularly with regard to the approximate depths required for the work. After work is completed, inspect it to ensure that all finish grading complies with design requirements.
- C. Finish grade all areas to the depths required for the work as follows:

1. Grade uniformly with rounded surfaces at the tops and bottom of abrupt changes of planes.
 2. Hand grade steep slopes and areas that are inaccessible for machine work.
 3. Protect graded areas from undue erosion, and repair and regrade areas where erosion does occur.
 4. Refill areas where noticeable settlement has occurred.
 5. Finish grade areas that are to receive topsoil up to 4" below the finished contour elevations called for by the drawings or, over rock, to 12" below these elevations.
- D. Place topsoil uniformly over disturbed areas that do not receive other work as follows:
1. Scarify subgrade to a depth of 3".
 2. Place the topsoil to a depth of 4" when lightly rolled or, on rock, to a depth of 12".
 3. Level the topsoil so that it slopes uniformly and has no water pockets.
 4. Carefully rake the topsoil by hand to remove all clods, roots, sticks, stones over 1" in diameter, and other foreign materials from the surface.
- E. Dispose of excess excavated materials and debris away from the site.

END OF SECTION

SECTION 2.18

SEEDING

PART 1 - GENERAL

- 1.01 This work shall be performed in all disturbed areas not receiving such site improvements as buildings, roads, walks, sod, planting, etc., and shall include, but not necessarily be limited to, all seed bed preparation; the supplying and placing of soil additives, seed, and mulch and maintenance.
- 1.02 Refer to other sections for items affecting seeding. Coordinate this work with that specified by other sections for timely execution.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. GRASS SEED: Kentucky 31 Fescue (*Festuca elatior*) and/or annual rye meeting the requirements of the State Department of Agriculture and furnished in new bags or bags that are sound and not mended; no "below standard" seed will be accepted.
- B. FERTILIZER: commercially manufactured; Grade 10-10-10; furnished in standard containers that are clearly marked with the name, weight, and guaranteed analysis of the contents and that ensure proper protection in transportation and handling; and in compliance with all local, state, and federal fertilizer laws.
- C. AGRICULTURAL LIMESTONE: containing a minimum of 85% calcium carbonate and magnesium carbonate combined, 85% of which passes a No. 10 mesh sieve.
- D. MULCH: Provide straw grass-seed germination blankets atop area where seeding is to occur. Area to be raked and seeded prior to placement of straw blankets. Provide stakes or pins and stake straw blankets to maintain blanket in place.

PART 3 - EXECUTION

3.01 SEEDING

- A. Perform all seeding and related work as a continuous operation. Sow seed as soon as the seed bed has been prepared, and perform subsequent work in a continuous manner
- B. Before beginning seeding operations in any area, complete the placing of topsoil and final grading.
- C. Scarify, disk, harrow, rake, or otherwise work each area to be seeded until the soil has been loosened and pulverized to a depth of not less than two (2) inches. Perform this work only when the soil is in a tillable and workable condition.
- D. Apply fertilizer and agricultural limestone uniformly over the seed bed, and lightly harrow, rake, or otherwise incorporate them into the soil for a depth of approximately one (1) inch at the following rates:
 - Fertilizer: 40 pounds per 1,000 square feet
 - Agricultural Limestone: 80 pounds per 1,000 square feet
- E. Sow seed uniformly with a rotary seeder, wheelbarrow seeder, hydraulic equipment or by other satisfactory means.
- F. The seeding rate shall be five (5) pounds per 1,000 square feet for Kentucky 31 Fescue (*Festuca elatior*) .
- G. For temporary stabilization seeding rate shall be three (3) pounds per 1,000 square feet of annual rye grass.
- H. Perform no seeding during windy weather or when the ground surface is frozen, wet, or otherwise untillable. Seeding shall not occur during the months of May through August.
- I. When seeding with mulch is specified spread mulch material evenly over the seeded areas immediately following the seeding operation.

Mulch Rate: Two (2) bales (100 pounds minimum) per 1,000 square feet

- J. The mulch rate may be varied, depending on the texture and condition of the mulch material and the characteristics of the area seeded. Cover all portions of the seeded areas with a uniform layer of mulch so that approximately 25% of the ground is visible.
- K. No equipment, material storage, construction traffic, etc., will be permitted on newly seeded ground.

3.02 INSPECTIONS

- A. The Authority shall inspect the seeding within 60 days after planting and determine if it is acceptable.

3.03 GUARANTIES

- A. Secure an acceptable growth of grass in all areas designated for seeding.
- B. An area is considered acceptable if it is represented by a minimum of 100 seedlings per square foot of the permanent species of grass representative of the seed mixture. If an acceptable growth is not obtained on the first planting, reseeding and remulching will be required.
- C. If the planting is less than 50% successful, rework the ground, refertilize, reseed, and remulch.

END OF SECTION

SECTION 2.19

BORING AND CASING FOR SANITARY SEWERS AND WATER LINES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The work to be performed hereunder shall consist of the installation of a casing pipe for the purpose of installing water line. It shall include the excavation of a boring pit, auger boring between the points as specified on the drawings, furnishing and installing of the casing pipe and carrier pipe, and disposing of the excavated materials in the manner herein provided.
- B. Water lines and force mains crossing beneath existing concrete drives shall be bored. No casing pipe is required for drives. Water line and force main shall be installed beneath drive so that no bell or spigot is located beneath drive.
- C. All crossing of County or State roads shall be installed by bore and jack methods with steel casing unless otherwise approved by the local roadway governing agency.

PART 2 - PRODUCTS

2.01 CASING PIPE

- A. The casing pipe shall be of steel meeting the latest approved American Railway Engineering Association "Specifications" for Pipelines for Carrying Flammable and Nonflammable Substances." The steel casing pipe shall be a ASTM A252, Grade 2 and shall have a minimum yield strength of 35,000 PSI and shall have the minimum wall thickness shown in the following table:

TABLE OF MINIMUM WALL THICKNESS FOR STEEL CASING PIPE
FOR E72 LOADING

<u>Carrier Pipe Diameter</u>	<u>Casing Pipe Diameter</u>	<u>Nominal Thickness</u>
4 inches	8 inches	0.250 inches
6 inches	12 inches	0.250 inches
8 inches	16 inches	0.312 inches
10 inches	20 inches	0.312 inches
12 inches	24 inches	0.312 inches
15/16 inches	24 inches	0.375 inches

B. When the casing pipe is installed without benefit of a protective coating, the wall thickness shown above shall be increased to the nearest standard size, which is a minimum of 0.063 inches greater than the thickness shown.

2.02 CARRIER PIPE: The water lines and force mains, the carrier pipe shall be as noted on the plans. For gravity sewer installations, ductile iron Class 350 with epoxy lining shall be used.

2.03 CASING SPACERS: Casing spacers shall be Model C, painted steel spacers by Pipeline Seal and Insulator Co.; Model SI8 by Advanced Product Systems, Inc. or approved equal.

2.04 END SEALS: Ends of casing pipe shall be closed by installing a 1/8" thick synthetic rubber end seal, Model W by Pipeline Seal and Insulator Co.; Model AW by Advanced System Products, Inc. or approved equal.

PART 3 - EXECUTION

3.01 BORING: The boring shall be accomplished by means of augering to the size, line, and the grade shown on the drawings.

3.02 INSTALLATION OF CASING PIPE

A. Jack the steel casing pipe into place as the boring proceeds. Weld sections of casing pipe together with continuous welds to provide watertight joints. Tack welding of casing will not be permitted.

B. Do not remove unacceptable casing without prior approval from the A/E. If the removal of casing pipe is permitted, make proper provisions to prevent caving in of the earth surrounding the casing. Void spaces shall

be filled with grout or flowable fill. At a minimum, abandoned bore holes shall be pumped full with grout or flowable fill.

3.03 INSTALLATION OF CARRIER PIPE

- A. The carrier pipe shall be furnished by the Contractor. Upon acceptance of the casing, install the carrier pipe in the casing by jacking it through the casing.
- B. Casing spaces shall be used to provide alignment and support of the carrier pipe inside the casing. At a minimum carrier pipe shall be supported at the midpoint of pipe joint and at 1' from each end of pipe joint, (3 per pipe segment).
- C. No wood blocking of carrier pipe will be permitted.
- D. Where gravity sewer pipe is installed, casing spacers with appropriate length skids shall be used in order to prevent flotation of carrier pipe which might impact vertical grade alignment.
- E. Upon completion of installing carrier pipe in casing pipe, seal both ends with end seals.

3.04 LAYOUT OF WORK: The Contractor will provide all layout required to keep the bore on grade and alignment.

END OF SECTION

SECTION 2.20 HORIZONTAL DIRECTIONAL DRILLING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The work specified in this section consists of furnishing and installing underground utilities using the horizontal directional drilling (HDD) method of installation, also commonly referred to as directional boring. This work shall include all services, equipment, materials, and labor for the complete and proper installation, testing, restoration of underground utilities and environmental protection and restoration. For the supply of domestic water during construction, the contractor shall utilize an Authority supplied meter assembly (meter & backflow device) and pay for all water consumed.

1.02 RELATED SECTIONS

- A. Section 3.02 Force Main

1.03 QUALITY ASSURANCE

- A. The requirements set forth in this document specify a wide range of procedural precautions necessary to insure that the very basic, essential aspects of a proper horizontal directional drilling installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification or within any associated permit. Adherence to the specifications contained herein, or the Authority approval on any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract. The HDD contractor shall be responsible for the repair of all damage to private and/or public property (at no expense to Authority). Repair work shall meet all local and state rules and requirements.

1.04 PROJECT SCHEDULE AND COOPERATION

- A. The project schedule shall be established on the basis of working a normal work schedule including five days per week, single shift, and eight hours per day or four days per week, single shift, ten hours per day. Unless approved otherwise by Authority, normal or general items of work, such

as bacteriological testing, leakage and pressure testing, density testing and final inspections, shall be scheduled during the normal work schedule.

1.05 WARRANTY

- A. The contractor shall supply to Authority a two (2) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

1.06 REFERENCED STANDARDS

- A. The work shall conform to applicable provisions of the Authority's Water and Sewer Standards, and the following standards, latest editions, except as modified herein.

American Water Works Association (AWWA) Standards:

- AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 63 inch, for Water Distribution American Society for Testing and Materials (ASTM) Standards.
- ASTM D618 Standard Methods of Conditioning Plastics and Electrical Insulating Materials for Testing.
- ASTM D638 Standard Test Method for Tensile Properties of Plastics.
- ASTM D1238 Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.
- ASTM D1248 Standard Specifications for Polyethylene Plastics Molding and Extrusion Materials.
- ASTM D1505 Standard Test Method for Density of Plastics by the Density-Gradient Technique.
- ASTM D1598 Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
- ASTM D1599 Standard Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.
- ASTM D1603 Standard Test Method for Carbon Black in Olefin Plastics.
- ASTM D2122 Standard Method of Determining Dimensions of Thermoplastics Pipe and Fittings.

- ASTM D2290 Standard Test Method for Apparent Tensile Strength or Tubular Plastics and Reinforced Plastics by Split Disk Method.
- ASTM D2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Piping and Tubing.
- ASTM D2837 Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
- ASTM D2839 Standard Practice for Use of a Melt-Index Strand for Determining Density of Polyethylene.
- ASTM D3035 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.
- ASTM E3261 Standard Specification for Butt Heat Fusion Polyethylene Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- ASTM D3350 Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.
- ASTM D4218 Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
- ASTM F412 Standard Terminology Relating to Plastic Piping Systems.

1.07 PERMITS

- A. Permits for all work within the DOT or local county rights-of-way shall be obtained by the Developer. The Contractor shall verify the existence of all permits before commencing any work on the project.

1.08 SUBMITTALS

- A. Contractor shall provide an example of similar successful project experience. Minimum requirements are 8" outside diameter, HDPE pipe, and 600 LF single pull. Provide project contact name, title, telephone number, mailing address, email address, etc. for whom the successful project was performed.
- B. Contractor shall provide calculations (in accordance with ASTM F 1962 or equal) for pull back force required and the resulting rig size proposed for this project.

- C. Contractor shall provide calculations demonstrating that the pipe will not be overstressed.
- D. Contractor shall verify that the information and calculations presented herein will be fully incorporated into the work plan.
- E. Contractor shall identify which, if any, items of the basis of design that the Contractor proposes to change (entry/exit angles, depth, radius, etc.). These changes shall be reflected in the calculations and information required in these evaluation criteria.
- F. Work Plan: Prior to beginning work, the Contractor must submit to the Authority, a work plan detailing the procedure and schedule to be used to execute the project. The work plan should include a description of all equipment to be used, down-hole tools, a list of personnel and their qualifications and experience (including back-up personnel in the vent that an individual is unavailable), list of sub-contractors, a schedule of work activity, a safety plan (including MSDS of any potentially hazardous substances to be used), traffic control plan (if applicable), an environmental protection plan and a contingency plan. The work plan should be comprehensive, realistic and based on actual working conditions for the particular project. Plan should document the thoughtful planning required to successfully complete the project. The HDD contractor shall submit and obtain Authority's approval of a pre-construction bore-log depicting a plan and profile (horizontal and vertical alignment) of the proposed bore path. The bore-log shall show all utility crossings and existing structures. All deviations from the drawings included in the contract documents shall be clearly identified. The work plan shall specifically address the following potential problems:
 - 1. A Frac-Out and Surface Spill Contingency Plan
 - 2. Loss of Returns
 - 3. Obstructions along bore path during reaming or pullback
 - 4. Drill pipe or product pipe cannot be advanced
 - 5. Deviations from design line and grade exceed allowable tolerances
 - 6. Drill pipe or product pipe broken off in borehole
 - 7. Collapse or product pipe or excessive deformation
 - 8. Damage to a utility
 - 9. Excessive subsidence or heave
- G. Calculations - The following calculations shall be submitted prior to beginning any HDD work:
 - 1. Pullback load calculation
 - 2. Pipe stress calculation

3. Contractor shall confirm that the design parameters do not result in installation stresses that exceed allowable pipe stress.
- H. Existing Utilities – Provide a plan to locate and protect all adjacent utilities and infrastructure.
- I. Record Drawing:
1. Submit for the Authority’s approval, the record drawing to the Authority within ten days after completing the pull back for review and approval. The drawings (24 x 36 (min.), 20 horizontal max scale with 2 foot vertical max scale) shall include a plan, profile (data every 25 LF of main, at a minimum), and all information recorded during the progress of the work. The entry and exit points shall be located with GPS coordinates based on an Alabama State Plane reference system (lat/long, state plane coordinates, etc.). The HDD contractor shall certify the accuracy of all record drawings.

1.09 NOTIFICATION

- A. The Authority must be notified 48 hours (minimum) in advance of starting the drilling work. The HDD work shall not begin until the proper preparations (see work plan) for the operation have been completed and approved.

1.10 SITE PREPARATION

- A. Protection of Existing Utilities – Contractor shall abide by the Common Ground Alliance, Best Practices Version 1.0 or latest, unless exceptions are specifically agreed to by Authority. Also, the Contractor shall coordinate utilities locates with the state one-call. Once the locate service has field marked all utilities, the Contractor shall verify each utility (including any service laterals, I.e. water, sewer, cable, gas, electric, phone, etc.) and those within each paved area. Verification may be performed utilizing Ground Penetrating Radar, hand dig, or vacuum excavation. Prior to initiating drilling, the Contractor shall record on the drawings both the horizontal and vertical location of the utilities off of a predetermined baseline. The Contractor shall manage and control drilling practices to prevent damage to existing utilities. The Contractor shall be responsible for all losses and repairs as a result of damage to underground utilities resulting from drilling operations. The Contractor shall make a reasonable effort to locate evidence of any other potential subsurface obstructions such as piles or piers.

- B. Work site shall be graded and filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.
- C. Following drilling operations, Contractor will de-mobilize equipment and restore the work-site to original condition. All excavations will be backfilled and compacted to 90% of original density (at a minimum), or as otherwise specified.

1.11 UTILITY LOCATING

- A. The Contractor shall be responsible for following the procedures in this specification to identify, locate, and verify the presence of existing utilities along the route of the proposed pipeline or work areas.
- B. Utility Locating will be performed in three parts: identification, designating, and verification.
 - 1. Utility Identification - Identify the presence of underground utilities through One Call and visual observation of surface markers or other indicators such as manholes, valve boxes, fire hydrants, etc.
 - 2. Utility Designation - Marking the location of underground utilities with paint or flags based on utility owner information or third party locating equipment.
 - 3. Utility Verification - Verification of Utility Identification and Designation by excavation or other methods to determine the horizontal and vertical location of the underground utility. This also provides the size and material of the underground utility. Approved methods to accomplish this task include vacuum excavation, potholing, and test holes with traditional equipment (backhoes, etc.).
- C. The Contractor shall record the location (horizontal and vertical) of all known utilities, as defined within this specification, on the construction plans. At a minimum, utilities shall be located by station and offset from the project baseline or with state plane coordinates. Vertical location can be based on depth from existing grade or elevation using the project vertical datum.

1.12 ENVIRONMENTAL PROTECTION

- A. Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Contractor shall place hay bales, or approved protection, to limit intrusion upon project

area. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations stated in local, state and federal permits.

1.13 SAFETY

- A. Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner.

1.14 PERSONNEL QUALIFICATIONS CERTIFICATION

- A. Directional Drilling: All personnel shall be fully trained in their respective duties as part of the directional drilling crew and in safety. (Each person must have been fully trained for over 1,000 hours on all facets of directional drilling, including, but not limited to machine operations, mud mixing, locating, and material fusion.) A responsible representative who is thoroughly familiar with the equipment and type of work to be performed, must be in direct charge and control of the operation at all times. In all cases the supervisor must be continually present at the job site during the actual HDD operation. The Contractor shall have a sufficient number of competent workers on the job at all times to insure the HDD work is made in a timely and satisfactory manner.
- B. Pipe and Fitting Jointing: Joints between plain end pipes and pipe fittings shall be made by butt fusion when possible. The on-site welder making the joints shall have received specific training from the manufacturer of the fitting and/or pipe being welded and shall have written proof of proper training/certification from the associated manufacturers. Only certified welders who have written training certifications from the fitting and/or pipe manufacturer will be allowed to perform this work. That is, to weld a fitting in place, the on-site welder (employee) must be trained and certified by the fitting manufacturer. To butt weld pipe, the on-site welder (employee) must be trained and certified by the pipe manufacturer. The fusion work shall be accomplished (welding and cool-down/closing times) in accordance with the fitting and pipe manufacturers' recommendations, at a minimum. External and internal beads shall not be removed unless approved by Authority.

PART 2 - MATERIALS

2.01 Refer to Section 3.02 for force main technical specifications.

PART 3 - INSTALLATION

3.01 EQUIPMENT REQUIREMENTS

A. GENERAL: The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the pilot hole, reaming, and pullback the pipe; a drilling fluid mixing, delivery and recovery system of sufficient capacity to successfully complete the drill; a drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be re-used; a guidance system to accurately guide boring operations; a vacuum truck of sufficient capacity to handle the drilling fluid volume; and trained, competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

B. DRILLING SYSTEM

1. Drilling Rig: The directional drilling machine shall consist of a power system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The power system shall be self-contained with sufficient pressure and volume to power drilling operations. The hydraulic system shall be free of leaks. The rig shall have a system to monitor maximum pull-back force during pull-back operations. The rig shall be grounded during drilling and pull-back operations. There shall be a system to detect electrical current from the drilling string and an audible alarm which automatically sounds when an electrical current is detected.
2. Drill Head: The drill head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and drilling fluid jets.
3. Mud Motors (if required): Mud motors shall be of adequate power to turn the required drilling tools.
4. Drill Pipe: Shall be constructed of high quality heat-treated, forged alloy steel.

C. GUIDANCE SYSTEM:

1. The position of the drill head shall be continuously tracked and recorded by a 'walkover' tracking locator system between the entry point and the exit point. The guidance system shall be capable of tracking at all depths up to forty feet and in any soil condition, including hard rock. It shall enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). The guidance system shall be accurate to +/- 2% of the vertical depth of the borehole at sensing position at depths up to one hundred feet and accurate within 1.5 meters horizontally.
2. The Guidance System shall be of a proven type and shall be operated by personnel trained and experienced with this system. The Operator shall be aware of any magnetic anomalies on the surface of the drill path and shall consider such influences in the operation of the guidance system if using a magnetic system.
3. Bore Tracking and Monitoring: At all times during the pilot bore the Contractor shall provide and maintain a bore tracking system that is capable of accurately locating the position of the drill head in the x, y, and z axes. The Contractor shall record these data at least once per drill pipe length or every twenty-five (25) feet, whichever is most frequent.
4. Downhole and Surface Grid Tracking System: Contractor shall monitor and record x, y, and z coordinates relative to an established surface survey benchmark. The data shall be continuously monitored and recorded at least once per drill pipe-length or at twenty-five (25) feet, whichever is more frequent.
5. Deviations between the recorded and design bore path shall be calculated and reported on the daily log. If the deviations exceed plus or minus 5 feet (horizontal or vertical deviation) from the design path, such occurrences shall be reported immediately to the Authority. The Contractor shall undertake all reasonable and necessary measures to correct deviations and return to design line and grade.

D. DRILLING FLUID (MUD) SYSTEM and pressure monitoring system:

1. Mixing System: A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid. Mixing system shall continually agitate the drilling fluid during operations.
2. Drilling Fluid Pressures and Flow Rates: Drilling fluid pressures and flow rates shall be continuously monitored and recorded by the

Contractor. The pressures shall be monitored at the pump. These measurements shall be made during pilot bore drilling, reaming, and pullback operations.

3. Drilling Fluids: Drilling fluid shall be composed of clean water, appropriate additives and clay. Water shall be from an authorized source with a minimum pH of 6.0. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No potentially hazardous material may be used in drilling fluid.
4. Delivery System: The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and conveyed to the drilling fluid recycling system. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage and recycling facilities.
5. Drilling Fluid Recycling System: Control of Drilling Fluids: The drilling fluid recycling system shall separate sand, dirt and other solids from the drilling fluid to render the drilling fluid re-usable. Spoils separated from the drilling fluid will be stockpiled for later use or disposal. The Contractor shall follow all requirements of the Frac-Out and Surface Spill Contingency Plan as submitted and approved and shall control operational pressures, drilling fluid weights, drilling speeds, and any other operational factors required to avoid hydrofracture fluid losses to formations, and control drilling fluid spills. This includes any spillages or returns at entry and exit locations or at any intermediate point. All inadvertent returns or spills shall be promptly contained and cleaned up. The Contractor shall maintain on-site mobile spoil removal equipment during all drilling, pre-reaming, reaming and pullback operations and shall be capable of quickly removing spoils. The Contractor shall immediately notify Owner of any inadvertent returns or spills and immediately contain and clean up the return or spill.

E. OTHER EQUIPMENT:

1. Pipe Rollers: Pipe rollers, if utilized, shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe.

2. Pipe Rammers: Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of the Owner's Representative.
 - a. Restrictions: Other devices or utility placement systems for providing horizontal thrust other than those defined above in the preceding sections shall not be used unless approved by the OWNER Representative prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the projects.

3.02 DRILLING PROCEDURES

- A. Drill Path: Prior to drilling, Contractor shall utilize all verified locate information to determine drill pathway. Marked up drawings (see Site Preparation paragraph) shall be on site at all times, and referred to during the drill operation.
- B. Drilling fluid pressures and flow rates: Drilling fluid pressures and flow rates shall be continuously monitored and recorded.
- C. Subsidence and Heave: Subsidence or heave of utilities, roads, or other features above the HDD centerlines and within the zone influenced by the HDD construction shall be limited to values that avoid damage. These values shall be determined by the utility or right-of-way owner. The Contractor shall repair any damage resulting from settlement or heave caused by HDD activities. The Contractor shall grout any voids caused by or encountered during drilling.
- D. Pilot Hole: The pilot hole shall be drilled along the path shown on the plans and profile drawings or as directed by the Authority in the field. Unless approved otherwise by Authority, the pilot-hole tolerances shall be as follows:
 1. Elevation: As shown on the plans.
 2. Alignment: ± 5 feet and within 3 feet of right-of-way or easement boundary.
 3. Curve Radius: The pilot hole radius shall be no less than 150% of the minimum bending radius as recommended by the pipe manufacturer of the pipe being installed.

4. Entry Point Location: The exact pilot hole entry point shall be within ± 5 feet of the location shown on the drawing or as directed by the Owner's Representative in the field.
 5. Exit Point Location: The exit point location shall be within ± 5 feet of the location shown on the drawing.
 6. Water Main and Non-Water Main Separation Requirements: The minimum separation requirements between water main and a non-water main shall be as defined in ADEM Design Criteria.
- E. Pull Back: After successfully reaming bore hole to the required diameter, Contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel and reamer to compact bore hole walls. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations Contractor will not apply more than the maximum safe pipe pull pressure at any time. Maximum allowable tensile force imposed on the pull section shall be equal to 80% of the pipe manufacturer's safe pull (or tensile) strength.
1. Torsional stress shall be minimized by using a swivel to connect a pull section to the reaming assembly.
 2. The pullback section of the pipeline shall be supported during pullback operations so that it moves freely and the pipe is not damaged.
 3. External pressure shall be minimized during installation of the pullback section in the reamed hole. Damaged pipe resulting from external pressure shall be replaced at no cost to the Owner.
 4. Locate wire shall be attached to the leading end of the pipe pulling head and shall extend the full length of the installed pipe.
 5. Buoyancy modification shall be at the discretion of the Contractor and shall be approved by the Owner's Representative. The Contractor shall be responsible for any damage to the pull section resulting from such modifications.
 6. In the event that pipe becomes stuck, Contractor will implement the submitted and approved contingency plan. If pipe remains stuck, Contractor will notify Owner Representative. The Owner's Representative and Contractor will discuss options and then work will proceed accordingly.
 7. The Contractor shall cease operations if the pipe is damaged and shall remove the pipe from the bore hole and repair the pipe using the manufacturer's recommended procedure or replace the damaged pipe before resuming installation.

END OF SECTION

SECTION 2.21

PAVEMENT REPAIR

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The work specified by this section shall consist of repairing or replacing all damaged pavement disturbed by utility construction. Dirt shoulders, roads, streets, drives, and walks shall be restored to their original condition as an incidental part of the installation of utilities. Repair damaged base on either side of a trench wherever necessary. Trim the oxidation surface to neat lines outside of the trench wall and repave the entire area as specified below and as shown on the pavement replacement schedule.
- B. Both these specifications and the drawings make reference to the current edition of the standard specifications of the Alabama Department of Transportation (ALDOT). Even though the weather limitations, construction methods, and materials specifications contained in the ALDOT specifications may not be explicitly repeated in these specifications, they shall, wherever applicable to the work called for by this section, be considered as implied and therefore adhered to. However, the various subsections "Basis for Payment" contained in the ALDOT specifications shall not be considered applicable.
- C. All pavement repair shall be in accordance with the requirements of the Limestone County Engineer's office, relevant municipalities, or the Alabama Department of Transportation where applicable.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. MINERAL AGGREGATE BASE: crushed stone (ALDOT specifications, Section 825)
- B. BITUMINOUS PRIME COATS: Cutback asphalt, Grade RC-250, or emulsified asphalt, Grade AE-P (ALDOT Specifications- Section 401.02 and 804)

- C. CRUSHED STONE CHIPS: Size 6 or Size 7 (ALDOT Specifications - Section 801)
- D. DOUBLE BITUMINOUS SURFACE: for both courses, either cutback asphalt, Grade RC-800, or RC-3000, or emulsified asphalt, Grade CRS-2 (ALDOT Specifications- Section 401.02 and 804)
- E. BITUMINOUS CONCRETE BINDER: Grading AC-20 or AC-30, as directed by the Engineer (ALDOT Specifications- Section 414).
- F. BITUMINOUS TACK COAT: Emulsified asphalt or asphalt cement (ALDOT Specifications - -Section 405).
- G. WEARING CONCRETE SURFACE: Asphalt Cement, Grade AC-20 or AC-30 (ALDOT Specifications - Section 416)

PART 3 - EXECUTION

3.01 TEMPORARY PAVEMENT REPAIR

- A. Road surfaces shall be temporarily restored by placing a layer of crushed stone or cold mix material.
- B. Temporary pavement repair shall be maintained in a safe condition until a permanent repair is made.

3.02 SUBGRADE

- A. Before any base material is installed, compact the subgrade of the area to be paved to 95% of optimum density as determined by ASTM D698 (Standard Proctor).
- B. The backfill material shall contain no topsoil or organic matter. For all areas where subgrade has been prepared, test for uniformity of support by driving a loaded dump truck at a speed of two (2) to three (3) miles per hour over the entire surface. Make further improvements on all areas that show a deflection of one (1) inch or more. When completed, the finished subgrade shall be hard, smooth, stable, and constructed in reasonably close conformance with the lines and grades that existed prior to beginning construction.
- C. When a base course is compacted, cut back the surface course of the existing pavement a minimum of one (1) foot beyond the limit of the joint

between the old and new base course or as shown on the standard drawings. Take special care to ensure good compaction of the new base course at the joint. Apply and compact the surface to conform to the existing pavement so that it will have no surface irregularity.

3.02 BASE

- A. Install a mineral aggregate base of the type specified above. The maximum compacted thickness of any one layer shall be six (6) inches and total thickness of the base shall be that indicated by the standard drawings or as shown on the plans.

3.03 SEAL COAT SURFACE

- A. Uniformly apply a bituminous prime coat of either emulsified asphalt, Grade AE-P, or cutback asphalt, Grade RC-250, over the entire width of the area to be surfaced at a rate of 0.3 gallon per square yard. Immediately after application, uniformly cover the entire area with Size 7 crushed stone chips at a rate of 12 pounds per square yard.

3.04 DOUBLE BITUMINOUS SURFACE

- A. Apply the first course at a rate of 0.38 to 0.42 gallon per square yard with either emulsified asphalt, Grade RS-2, or cutback asphalt, Grade RC-800 or RC-3000, and then immediately cover the Size 6 crushed stone chips at a rate of 33 to 37 pounds per square yard. After this is rolled, apply the second course at a rate of 0.30 to 0.35 gallon per square yard, and at once uniformly cover the Size 7 chips at a rate of 20 to 25 pounds per square yard. Then roll the entire area.
- B. After the application of the cover aggregate, lightly broom or otherwise maintain the surface for a period of four (4) days. Maintenance of the surface shall include the distribution of cover aggregate over the surface to absorb any free bitumen and cover any areas deficient in aggregate. Sweep excess material from the entire surface with rotary brooms.

3.05 ASPHALTIC CONCRETE BINDER

- A. Apply a bituminous prime coat of emulsified asphalt, Grade AE-P, or cutback asphalt, Grade RC-250, at a rate of 0.38 to 0.42 gallon per square yard. Take care to prevent the bituminous material splashing on exposed faces of curbs and gutters, walls, walks, trees, etc.; if such splashing does occur, remove it immediately. After the prime coat has been properly

cured, apply an asphaltic concrete binder to the thickness shown on the standard drawings or the plans.

- B. Carefully place the material to avoid segregation of the mix. Broadcasting of the material will not be permitted. Remove any lumps that do not readily break down.

3.06 ASPHALTIC CONCRETE SURFACE

- A. If the asphaltic concrete surface course is to be placed directly on the mineral aggregate base, place a bituminous prime coat as described above. If, however, the surface course is to be placed on a binder course, then apply a bituminous tack coat of the sort specified above under PRODUCTS at a rate of 0.05 to 0.10 gallon per square yard.

Take care to prevent the bituminous material splashing on exposed faces of curbs, gutters, walls, walks, trees, etc.; if such splashing does occur, remove it immediately. After the prime or tack coat has been properly cured, apply the asphaltic concrete to the thickness shown of the drawings or standard drawings. Apply the surface course as described above for the binder course.

3.07 SMOOTHNESS

- A. The finished surfaces shall conform to the lines and grades that existed prior to construction. No deviations, variations, or irregularities exceeding 1/4 inch in any direction when tested with a 12-foot straightedge shall be permitted in the finished work, nor will any depressions that will not drain. Correct all such defects.

3.08 PAVEMENT STRIPING

- A. All disturbed pavement markings shall be replaced to match existing striping.

3.09 ACCEPTANCE

- A. Contractor shall obtain approval of the Limestone County Engineer for all repairs to County Roads, to the relevant municipality for city roads, and the Alabama Department of Transportation for all repairs to State Roads.

END OF SECTION

SECTION 3.01

SANITARY SEWERS (GRAVITY)

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Pipe material for gravity sewer lines shall be as shown on the drawings.
- B. All contractors installing water or sewer infrastructure in any way related to the distribution of collections systems of the Authority, must be a licensed General Contractor in the State of Alabama. This license must also declare a major classification of Municipal and Utility (MU) and/or Municipal and Utility Specialty (MU-S). Work performed by any person or company not possessing the proper license will not be accepted into service for the water distribution and sewer collection system.
- C. Lateral Branches: Service lines shall have a four (4)-inch inside diameter for residential service and six (6)-inch inside diameter for commercial/industrial services unless otherwise specified or noted. Service branches and laterals must be able to withstand all test pressures involved without leakage. Service lines shall be PVC Schedule 40 with solvent weld fittings where PVC sewer lines are used. Service lines shall be DIP CL 350 with epoxy lining where DIP sewer lines are used. Tees shall be constructed of the same material as the main sewer line and gasketed. PVC sewer tees shall be configured to accept PVC SDR 26 for the main sewer line and Schedule 40 PVC for the branch sewer service line in 4-inch service line. For 6-inch service line, the tee shall accept SDR 26 pipe and then the service pipe shall be transitioned to Schedule 40 PVC using an appropriate transition piece.

1.02 OTHER APPLICABLE SECTIONS

- A. Section 2.14 - Trenching, Backfilling and Compaction for Utilities
- B. Section 2.15 - Unclassified Excavation for Utilities
- C. Section 3.03 - Manholes & Wet Wells
- D. Section 3.02 - Sewage Force Main
- E. Section 3.04 - Cementitious Waterproofing for Manholes
- F. Section 3.05 - Sewage Valves
- G. Section 3.06 - Sewage Flow Control

PART 2 - PRODUCTS

2.01 PVC PIPE

- A. Polyvinyl Chloride (PVC) 4" - 15":
To meet and/or exceed the requirements of ASTM D3034, SDR 26; suitable for use as a gravity sewer conduit with provisions for contraction and expansion at each joint; with a rubber ring and standard lengths of 20-foot and 12.5-foot plus or minus one (1) inch; designed to pass all tests at 73 degrees F (plus or minus 3 degrees F); six (6) inch long sections of pipe to be subjected to impact from a free falling top (20 pounds, Type A) in accordance with ASTM D2444 with no evident splitting or shattering (denting not considered a failure). Joints shall meet the requirements of ASTM D3212. Joint design shall be tested and certified to result in no leakage under prescribed laboratory test conditions of joint alignment, load conditions, pressure and vacuum, and deflection. Pipe and fittings shall have integral bell with elastomeric seal joint.
- B. For PVC pipe, pipe manufacturer shall furnish a certificate indicating that the pipe meets all applicable requirements of these specifications. If requested by the Engineer, the Contractor shall provide copies of the actual tests performed as outlined in other paragraphs of this section.
- C. The minimum pipe stiffness for PVC pipe at five percent (5%) deflection shall be 46 for all sizes when tested in accordance with ASTM D2412; external loading properties of plastic pipe shall be by parallel plate loading.
- D. A specimen of PVC pipe six (6) inches long shall be flattened between parallel plates in a suitable press until the distance between the plates is 40% of the outside diameter of the pipe. The rate of loading shall be uniform and such that the compression is complete in two (2) to five (5) minutes.
- E. After being immersed for two (2) hours in a sealed container of anhydrous acetone (99.5% pure), a sample ring of PVC pipe shall show no visible spalling or cracking when tested in accordance with ASTM D2152 (swelling or softening is not considered a failure).
- F. Polyvinyl Chloride (PVC Schedule 40) 4"-6" for Service Laterals and fittings shall be manufactured from a Type I, Grade PVC compound with a Cell Classification of 12454 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D1785 and ASTM D2665, consistently meeting and/or exceeding the Quality Assurance test requirements of these

standards with regard to material, workmanship, burst pressure, flattening, and extrusion quality. Schedule 40 pipe systems shall be assembled using solvent weld joints. Solvent cements for Schedule 40 PVC pipe and fittings shall conform to the requirements of ASTM D2564.

2.02 DUCTILE IRON PIPE

- A. Ductile Iron: with push-on joints conforming to ASTM A746, Class 350 unless otherwise shown on the drawings.
- B. Ductile Iron Pipe Joints: Gasket type joints for bell and spigot ductile iron pipe designed to meet the infiltration requirements of these specifications; jointing to comply with the applicable provisions of ANSI A21.11.
- C. Ductile Iron pipe shall be lined with an amine cured novalac epoxy containing at least 20% by volume of ceramic quartz pigment. Any request for substitution must be accompanied by a successful history of lining pipe and fittings for sewer service, a test report verifying the following properties, and a certification of the test results.
 - 1. A permeability rating of 0.00 when test according to Method A of ASTM E96, Procedure A with a test duration of 30 days.
 - 2. The following test must be run on coupons from factory lined ductile iron pipe:
 - a. ASTM B117 Salt Spray (scribed panel) – Results to equal 0.0 undercutting after two year.
 - b. ASTM G95 Cathodic Disbondment 1.5 volts @ 77°F. Results to equal no more than 0.5mm undercutting after 30 days.
 - c. Immersion Testing rated using ASTM D714.
 - i. 20% Sulfuric Acid – No effect after 2 years.
 - ii. 25% Sodium Hydroxide – No effect after 2 years.
 - iii. 160°F Distilled Water – No effect after 2 years.
 - iv. 120°F Tap Water (scribed panel) – 0.0 undercutting after 2 years with no effect.
 - 3. An abrasion resistance of no more than 4 mils loss after one million cycles – European Standard EN 598: 1994 Section 7.8 Abrasion resistance.
 - 4. The lining shall be applied by a competent firm with a successful history of applying linings to the interior of ductile iron pipe and fittings.
 - 5. Prior to abrasive blasting, the entire area to receive the protective compound shall be inspected for oil, grease, etc. Any areas where oil, grease of any substance which can be removed by solvent is

present shall be solvent cleaned using the guidelines outlined in DIPRA-1 Solvent Cleaning. After the surface has been made free of grease, oil or other substances, all areas to receive the protective compounds shall be abrasive blasted using compressed air nozzles with sand or grit abrasive media. The entire surface to be lined shall be struck with the blast media so that all rust, loose oxides, etc., are removed from the surface. Only slight stains and tightly adhering annealing oxide may be left on the surface. Any area where rust reappears before lining must be reblasted.

6. After surface preparation and within 8 hours of surface preparation, the interior of the pipe shall receive 40 mils nominal dry film thickness of Protecto 401. No lining shall take place when the ambient or substrate temperature is below 40 degrees Fahrenheit. The surface also must be dry and dust free.
7. Due to the tolerances involved, the gasket area and spigot end up to 6 inches back from the end of the spigot must be coated with 6 mils nominal, 10 mils maximum Protecto Joint Compound. The joint compound shall be applied by brush to ensure coverage. Care should be taken that the joint compound is smooth without excess buildup in the gasket seat or on the spigot ends. Coating of the gasket seat and spigot shall be done after the application of the lining.
8. The number of coats of lining material applied shall be as recommended by the lining manufacturer. However, in no case shall this material be applied above the dry thickness per coat recommended by the lining manufacturer in printed literature. The maximum or minimum time between coats shall be that time recommended by the lining material manufacturer. No material shall be used for lining which is not indefinitely recoatable with itself without roughening of the surface.
9. Protecto Joint Compound shall be used for touch-up or repair in accordance with manufacturer's recommendations.
10. Inspection
 - a. All ductile iron pipe and fittings shall be checked for the thickness using a magnetic film thickness gauge. The thickness testing shall be done using the method outlined in SSPC-PA-2, Film Thickness Rating.
 - b. The interior lining of all pipe barrels and fittings shall be tested for pinholes with a non-destructive 2500 volt test. Any defect found shall be repaired prior to shipment.
 - c. Each pipe joint and fitting shall be marked with the date of application on that date and records maintained by the applicator.

11. The pipe or fitting manufacturer must supply a certificate attesting to the fact that the applicator met the requirements of this specification, and that the material used was as specified.
 12. Protecto 401 lined pipe and fittings must be handled only from the outside of the pipe and fittings. No forks, chains, straps, hooks, etc. Shall be placed inside the pipe or fittings for lifting, positioning of laying.
- D. For ductile iron pipe, pipe manufacturer is to furnish Engineer a certificate of inspection, sworn to by the factory inspector in the presence of a notary public, stating that pieces of pipe in the shipment were made and tested in accordance with ANSI A21.51 and that they were subjected to and withstood a hydrostatic pressure of 500 psi. Each statement is to give the number of pieces of pipe in shipment, length of each piece of pipe, and identification number of each piece of pipe making up the shipment. In addition, the weight of each individual piece of pipe making up the shipment is to be listed opposite the identification number of each pipe length and attached to the certificate of inspection.

2.03 COMPRESSION COUPLINGS

- A. Compression couplings may be used in transition of service laterals between the end of Authority service line and private service line (generally located at R.O.W.) The compression couplings shall be of natural or synthetic rubber or rubber-like material and shall comply with the requirements and test methods specified in Table 2 of ASTM C425. The coupling shall meet the leak requirements specified in ASTM C425, and the bands for attaching the couplings to the dissimilar pipes shall be of stainless steel meeting ASTM A167 or A240. Each coupling shall bear the manufacturer's identifying mark and an indication of its size.
- B. Compression couplings will not be allowed in the new sewers (main line). Repairs shall be made with ductile iron mechanical joint sleeves or gasketed, PVC compression (knock-on) fittings.

PART 3 - EXECUTION

3.01 EXCAVATION FOR GRAVITY SEWERS

- A. Unclassified excavation for pipelines shall consist of the excavation necessary for the construction of sewer lines and their appurtenances (including manholes, collars, concrete saddles, and pipe protection) that are called for by the drawings. It shall include clearing and grubbing where

necessary, backfilling and tamping pipe trenches and around structures, and disposing of waste materials, all of which shall conform to the applicable provisions set forth elsewhere in these specifications.

- B. The Contractor may, if he chooses, use a motor powered trenching machine. If he does, however, he shall be fully responsible for the preservation or repair of existing utility service connections.
- C. Unless the construction of lines by tunneling, jacking, or boring is called for by the drawings or specifically authorized by the Engineer, make excavation for pipelines in open cut and true to the lines and grades shown on the drawings or established by the Engineer on the ground. Cut the banks of trenches between vertical parallel planes equidistant from the pipe centerline. The horizontal distance between the vertical planes (or, if sheeting is used, between the inside faces of that sheeting) shall vary with the size of the pipe to be installed, but shall not be more than the distance determined by the following formula: $(4/3)d + 15$ inches, where "d" represents the internal diameter of the pipe in inches. When approved in writing by the Owner, the banks of trenches from the ground surface down to a depth not closer than 1 foot above the top of the pipe may be excavated to nonvertical and nonparallel planes, provided the excavation below that depth is made with vertical and parallel sides equidistant from the pipe centerline in accordance with the formula given above. Any cut made in excess of the formula $(4/3)d + 15$ inches shall be at the expense of the Contractor and may be cause for the Engineer to require that stronger pipe and/or a higher class of bedding be used at no cost to the Owner.
- D. For all pipe, provide a minimum of 6-inches of No. 67 (ALDOT) crushed stone for bedding below the pipe.
- E. Do not excavate pipe trenches more than 200 feet ahead of the pipe laying, and not more than two hundred (200) feet of open ditch shall be left behind the pipe laying, and perform all work so as to cause the least possible inconvenience to the public. Construct temporary bridges or crossing when and where the Engineer deems necessary to maintain vehicular or pedestrian traffic.
- F. In all cases where materials are deposited along open trenches, place them so that in the event of rain no damage will result to the work and/or to adjacent property.
- G. Refer to Section 2.15, Unclassified Excavation for Utilities, paragraph 3.06, for sheeting, shoring and bracing requirements.

3.02 PIPE LAYING

- A. Lay no pipe except in the presence of an inspector representing the Authority.
- B. Before placing sewer pipe in position in the trench, carefully prepare the bottom and sides of the trench, and install any necessary bracing and sheeting as provided in Section 2.15, Unclassified Excavation for Utilities.
- C. Wherever necessary to provide satisfactory bearing surface, place concrete cradles as shown on the drawings or as directed by the Engineer. Cradles shall be of concrete and conform to the dimensions shown on the drawings. Concrete placed outside the dimensions shown shall be at the Contractor's expense.
- D. Lasers must be used after the type and procedures are approved by the Engineer. When lasers are used, set reference points for both line and grade at each manhole. Where grades are 0.6% or less, check the elevation of the beam each 100 feet with an offset point or engineer's level.
- E. Do not allow water to run or stand in the trench while pipe laying is in progress or before the trench has been backfilled. Do not at any time open up more trench than the available pumping facilities are able to de-water.
- F. Correct trench bottoms found to be unsuitable for foundations after pipe laying operations have started, bringing them to exact line and grade with crushed stone as necessary.
- G. Carefully inspect each piece of pipe and special fitting before it is placed, and lay no defective pipe in the trench. Pipe laying shall proceed upgrade, starting at the lower end of the grade and with the bells upgrade. When pipe laying is not in progress, keep the ends of the pipe tightly closed with an approved temporary plug.
- H. Bell holes shall be large enough to allow ample room for the pipe joints to be properly made. Cut out bell holes no more than two (2) joints ahead of the pipe laying. Carefully grade the bottom of the trench between bell holes so that each pipe barrel rests on a solid foundation for its entire length. Lay each pipe joint so as to form a close concentric joint with adjoining pipe and to avoid sudden offsets or inequalities in the flow line.

- I. Before constructing or placing any joints, demonstrate to the Authority, by completing at least one (1) sample joint, that the methods to be used conform to the specifications and will provide a watertight joint and further that the workmen to be involved in this phase of work are thoroughly familiar and experienced with the type of joint proposed.
- J. No other type of joint may be used unless authorized in writing by the Authority.
- L. Install tee branches in sewer lines to serve properly each lot facing or abutting on the street or alley in which sewer is being laid and at such other locations as may be designated by the Owner. If tee branches are not to be used immediately, close them with approved stoppers that are held in place to prevent infiltration and withstand all test requirements. Tees shall be of the same material as the main pipe. Tees shall be located at either 10 o'clock or 2 o'clock position when viewed upstream. No other positioning of tees will be permitted. Tees shall not be placed in back-to-back position. Tees installed consecutively in the sewer main shall be separated by at least 6-foot of main line pipe.
- M. For all tees that are plugged and laid in rock, blast a minimum of six (6) linear feet of ditch line in the direction and to the approximate grade of the future lateral as directed by the Authority, but do not excavate the material. This shall be done at no extra cost to the Authority. Furnish the Authority with a record of the exact horizontal and vertical location of each tee installed. Distance shall be measured from the nearest downstream manhole. Length and depth of service lateral shall also be provided.
- N. If the work consists of constructing a new sewer to replace an existing one, connect existing service lines to the new line.
- O. New service laterals shall conform to the standard drawings.
- P. As the work progresses, thoroughly clean the interior of the pipe in place. After each line of pipe has been laid, carefully inspect it, and remove all earth, trash, rags, and other foreign matter from its interior. Pipe shall be temporarily plugged with a watertight plug at the conclusion of each day's work.
- Q. After the joints have been completed, they shall be inspected, tested, and accepted by the Authority before being covered. The pipe shall meet the test requirements for watertightness; immediately repair any leak or defect discovered at any time after completion of the work. Any pipe that has

been disturbed after joints were formed shall be taken up, the joints cleaned and remade, and the pipe re-laid at the Contractor's expense. Carefully protect all pipe in-place from damage until backfilling operations are completed.

- R. Do not begin the backfilling of trenches until the pipe in place has been inspected and approved by the Authority.
- S. Lay sewers at least five (5) feet horizontally from any existing or proposed water main. If this is not practical, the sewer may be laid closer than five (5) feet to a water main provided it is laid in a separate trench and the elevation of the top of the sewer is at least 18 inches below the bottom of the water main.
- T. Where a sewer crosses under water mains, the top of the sewer shall be at least 18 inches below the bottom of the water main. If the elevation of the sewer cannot be varied to meet the above requirements, relocate the water main to provide this separation, or else reconstruct it with mechanical joint ductile iron pipe for a distance of ten (10) feet on each side of the sewer with a full joint of the water main centered over the sewer.
- U. If it is impossible to obtain proper horizontal and vertical separation as stipulated above, construct both the water main and the sewer of mechanical joint ductile iron pipe, and pressure test each.
- V. Make connections to all existing sewer lines as shown on the drawings or as directed by the Owner. Make connections either by removing a section of the sewer from the existing line and inserting a wye or tee branch of the proper size or by constructing a manhole, junction box, regulator chamber, or other structure as shown on the drawings.
- W. Make connections to existing manholes or inlets by core drilling a hole in the wall of the existing structure, installing a resilient pipe connector, inserting a length of sewer pipe into the hole. Shape or reshape the bottom of the manholes as necessary to fit the invert of the sewer pipe.
- X. Join dissimilar pipe by using suitable compression couplings on service laterals at property line/R.O.W./ edge of easements. Repairs or coupling of dissimilar pipe materials on main line sewers shall be accomplished by use of mechanical joint, long-pattern ductile iron sleeve and glands.
- Y. Provide concrete protection or concrete cap as shown on the drawings for pipe sewers that, when completed, have less than 2.5-feet of cover in non-

traffic areas and 4-feet of cover in traffic areas. Ductile iron pipe shall be used on all sewer applications with less than 4' of cover.

- Z. Provide check dams downstream of creek crossings.
- AA. Carefully protect from damage all existing sewers, water lines, gas lines, sidewalks, curbs, gutters, pavements, electrical lines, and other utilities or structures in the vicinity of the work at all times. If it is necessary to repair, remove, and/or replace any such utility or structure in order to complete the work properly, do so in compliance with the provisions set forth in other sections of these specifications or as required by the appropriate utility. Any such work shall be considered incidental to the construction of pipe sewers, and no additional payment will be allowed.
- BB. Service or house connections to existing sewers that are damaged or removed shall be repaired or replaced by the Contractor at his own expense as an incidental part of the work.

3.03 BACKFILLING

- A. For the PVC pipe, begin backfilling after the line construction is completed and then inspected and approved by the Engineer. On each side of the line from a point measured 6-inches below the bottom of pipe to 12 - inches above the top of the pipe the backfill material shall consist of No. 57 or 67 (ALDOT) stone. Place this backfill simultaneously on either side of pipe in even layers that before compaction are no more than 6-inches deep. Thoroughly and completely tamp each layer into place before placing additional layers.
- B. For ductile iron pipe, begin backfilling after the line construction is complete and then inspected and approved by the Owner. On each side of the line, from the bottom of barrel to the crown of the pipe, the backfill material shall consist of No. 57 or 67 (ALDOT) stone. From the crown of the pipe to 1-foot above the crown the backfill material shall be selected backfill consisting of either fine, loose earth like sandy soil or loam or of granular material that is free from clods, vegetable matter, debris, stone, and/or other objectionable materials and that has a size of no more than 2-inches. Place this backfill simultaneously on either side of the pipe in even layers that before compaction are no more than 6-inches deep. Thoroughly and completely tamp each layer into place before placing additional layers. If the excavation is in a rock trench, then the backfill from the crown of the pipe to a point 12-inches above the top of the pipe shall consist of No. 57 or 67 crushed stone.

- C. From 1-foot above the pipe upward for PVC pipe and 1-foot above the pipe upward for ductile iron pipe, the backfill material may contain broken stones that make up approximately $\frac{3}{4}$ of the backfill's total volume. However, if this type of backfill is used, there must be enough spalls and earth materials to fill all voids completely. The maximum dimension of individual stones in such backfill shall not exceed 6-inches, and the backfill material shall be placed and spread in even layers not more than 12-inches deep.
- D. At locations beneath or closely adjacent to pavement, inside roadways and traffic areas or at locations of improvements subject to damage by displacement, the backfill shall be entirely No. 57 or 67 stone to within 8-inches of the surface. The final 8-inches of backfill shall be crushed roadway base stone. Tamp and thoroughly compact the backfill in layers that before compaction are 6-inches deep.
- E. In other areas, the backfill for the upper portion of the trenches may be placed without tamping but shall be compacted to a density equivalent to that of adjacent earth material as determined by laboratory tests. Use special care to prevent the operation of backfilling equipment from causing any damage to the pipe.
- F. If earth material for backfill is, in the opinion of the Owner, too dry to allow for thorough compaction, then add enough water so that the backfill can be properly compacted. Do not place earth material that the Owner considers too wet or otherwise unsuitable.
- G. Wherever excavation has been made within easements across private property, the top 1-foot of backfill material shall consist of fine loose earth free from large clods, vegetable matter, debris, stone, and/or other objectionable materials.
- H. Wherever trenches have been cut across or along existing pavement, temporarily pave the backfill of such trenches by placing Class A, Grade D, crushed stone as the top 8-inches of the backfill. Maintain this temporary pavement either until the permanent pavement is restored or until the project is accepted by the Owner.
- I. Conduct backfilling around manholes, inlets, outfalls, and/or structures in the same manner as specified above for pipelines except that even greater care is necessary to prevent damage to the utility structure.

- J. Wherever pipes have diameters of 15-inches or less, do not use power operated tampers to tamp that portion of the backfill around the pipe within 1-foot above the pipe.
- K. Perform backfilling so as not to disturb or injure any pipe and/or structure against which the backfill is being placed. If any pipe or structure is damaged and/or displaced during backfilling, open up the backfill and make whatever repairs are necessary.
- L. Backfilling and clean-up operations shall closely follow pipe laying; failure to comply with this provision will result in the Owner requiring that the Contractor's other activities be suspended until backfilling and clean-up operations catch up with pipe laying.

3.04 TESTING OF GRAVITY SEWERS

A. TELEVISION INSPECTION

1. Upon completion of the construction or earlier if the Authority deems advisable, the Contractor shall provide for a visual inspection of the sewer by use of remote television camera. Immediately repair all leaks and defects found by such inspection.
2. Prior to televising, Contractor shall thoroughly clean the pipelines of debris, grease, roots, sediment or other obstructions that could retard the movement of the television camera.
3. Immediately after cleaning, 100% of the line segments shall be visually inspected by means of closed-circuit television to verify cleaning results, the condition of the line and to locate existing service connections. The Contractor shall furnish the mobile television inspection studio, all television equipment and other necessary types of equipment, and all materials, electricity, labor, technicians, etc., as may be needed to perform the closed circuit television inspection of the new sewer for the purpose of documenting deficiencies and lateral locations prior to acceptance and placement in service of the sewer. A recorded verbal narrative describing pipe conditions and lateral locations shall be placed on the video recording and coincide with the written comments on the videotape. No work is authorized under this Section unless the Authority's representative is present or has been notified 24 hours prior.

4. Sewer shall be built so as to remain true to line and grade. The inclining grade of the bottom of the sewer after completion shall be such that, after flooding, the flood water drains off so that no remaining puddle of water is deeper than $\frac{1}{2}$ inch on 36 inches internal diameter or smaller and $\frac{3}{4}$ inch on pipe larger than 36 inch internal diameter. Any section of pipe that does not comply with the specifications at any time previous to final acceptance of the work shall be replaced or re-laid at the Contractor's expense.
5. The contractor shall be held strictly responsible that all parts of the work bear the load of the backfill. If 0.01 inch cracks develop in the pipe within one (1) year from the date of final acceptance of the work, the Contractor shall be required to replace, at the Contractor's expense, all such cracked pipe. To this end, the Contractor is advised to purchase pipe under a guarantee from the manufacturer guaranteeing proper service of sewer pipe under local conditions established by the drawings, specification and local conditions at the site of the work.
6. Camera Requirements - The camera used for this inspection shall be color. The camera head shall be capable of at least 340 degrees axial rotation and 270 degrees lateral swing. The camera shall operate under a minimum scene illumination of 3 lux with a horizontal resolution of no less than 460 lines. Sufficient lighting shall be provided on the camera so that videotapes will show images that are clear and well illuminated.
7. The internal inspection shall be performed in one section of sewer at a time between adjacent manholes. The inspection shall be performed by pulling the television camera on a skid or by transporting the camera with a mechanical transport device through the section of the sewer along the axis of the pipe. The camera shall travel in the direction of the flow or from the upstream manhole to the downstream manhole unless an obstruction in the pipe requires video-taping upstream. The camera shall not pass through the sewer at a rate greater than $\frac{3}{4}$ ft/sec. The camera shall stop at each lateral and defect and rotate so that the lateral or defect is seen from a perpendicular field of view. Each lateral and defect shall be extensively filmed.
8. The sewer main shall be clean prior to televising. If the main is new or recently rehabilitated, cleaning may not be necessary. The camera operator shall take necessary precautions to prevent

“hanging” the camera in the sewer main. If the camera should get stuck in the main, the contractor will be responsible for removing the camera at his expense and making any above and below ground repairs. The Contractor shall exhaust all other means to retrieve the camera before excavating. A representative of the Authority must be notified before excavation takes place. The distance measured to defects and lateral shall be referenced to the center of the beginning manhole. Measurements to defects and laterals shall be accurate to within +/-1 foot.

B. Documentation

1. The Contractor shall keep a daily log or record covering the television inspection work and the information acquired there from. This daily log or record shall contain at least the following data:
 - a. Date and Time of Inspection
 - b. Contract Name and Number
 - c. Name of Contractor
 - d. Name of Internal Video Inspection Company (if different from Contractor)
 - e. Name of Street
 - f. Identification Number of Upstream and Downstream Manholes based on Authority numbering system.
 - g. Description of the Location
 - h. Direction of the Video
 - i. Size, Length, Depth, and Type of Pipe
 - j. Size, Depth, and Material of Manholes
 - k. Distance, Position on Periphery of Pipe in Clock Orientation, Type, and Description of all Laterals and Defects

1. Computer generated diagram of pipe and manholes which graphically provides information in “k” and “j” above.
 - m. An Index of Video System Codes and Abbreviations
2. Two copies of log or record with the diagrams and index, typed and bound, shall be delivered to the Authority.
3. The purpose of the video recordings shall be to supply a continuous visual and audio record of the inspection using a digital video recording (DVR) system. The Contractor shall submit all digital videos for each project on a labeled external hard drive in a format approved by the Authority. Video file names shall be labeled so that pipe runs are grouped in areas and submitted in sequential order relating to the area designation.
4. Warranty: The Contractor warrants the accuracy and completeness of the DVR data for a period of two years. If the Authority determines that the video does not meet the requirements as identified herein, the Contractor shall re-video the line segments for which the reporting was faulty. There shall be no discrepancies between the video and the written report.
5. A copy of any software required to view the digital video recordings shall be provided to the Authority at no additional charge.

C. AIR TESTING

1. Perform low pressure air testing as follows:
 - a. Furnish all equipment, facilities, and personnel necessary to conduct the test. The test shall be observed by a representative of the Engineer.
 - b. Make the air test after all services have been installed and backfilling has been completed and compacted.
 - c. Perform the first series of air tests after 1,000 linear feet but before 2,000 linear feet of sewer has been laid. The purpose of this first series of tests is to assure both the Contractor and the Engineer that the materials and methods of installation meet the intent of these specifications. Conduct the

remainder of the tests after approximately each 2,000 linear feet has been laid.

- d. Plug all tees and ends of sewer services with flexible joint plugs or caps securely fastened to withstand the internal test pressures. Such plugs or caps shall be readily removable, and their removal shall provide a socket suitable for making a flexible jointed lateral connection or extension.
- e. Prior to testing, check the pipe to see that it is clean. If not, clean it by passing a full gauge squeegee through the pipe. It shall be the Contractor's responsibility to have the pipe cleaned.
- f. Immediately following this check or cleaning, test the pipe installation with low pressure air. Supply the air slowly to the plugged pipe installation until the internal air pressure reaches 4.0 psi more than the average back pressure of any ground water that may submerge the pipe. Allow at least two (2) minutes for temperature stabilization. For air pressure correction due to groundwater, divide the average height of groundwater above the crown of pipe by 2.31 and add the result to 3.5 psig. The allowable drop in pressure is not changed by the additional air pressure correction. In no case should the starting test pressure exceed 9.0 psig.
- g. The pipeline shall be considered acceptable if the time shown in Table 1 for the designated pipe size and length, elapses before the air pressure drops 0.5 psig; then the section undergoing test shall have passed and shall be presumed free of defects. The test may be discontinued once the prescribed time has elapsed even though the 0.5 psig loss has not occurred.
- h. The pipeline shall be considered as unacceptable if the pressure drops 0.5 psig before the appropriate time shown in Table 1 has elapsed. If the test fails, the Contractor at his own expense shall determine the source(s) of failure and shall repair or replace all defective materials and/or workmanship to the satisfaction of the Authority.

Table 1 - Minimum Specified Time Required for a 0.5 PSIG Pressure Drop

Pipe Diameter (inches)	Min. Test Time (min:sec)	Length for Min. Time (ft)	Time for Longer Length (sec)	Minimum Test Time (min:sec) for Specific Length (L)						
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft
4	1:53	597	0.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51
8	3:47	298	0.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04
10	4:43	239	1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54
12	5:40	199	1.709L	5:40	5:40	5:42	7:08	8:33	9:58	11:24

2. Plugs used to close the sewer pipe for the air test must be securely braced to prevent the unintentional release of a plug, which can become a high velocity projectile. Locate gauges, air piping manifolds, and valves at the top of the ground. No one shall be permitted to enter a manhole where a plugged pipe is under pressure. Four (4) pounds per square inch air pressure (gauge) develops a force against the plug in a 12 inch pipe of approximately 450 pounds. Pipes more than 30 inches in diameter shall not be air tested because of the difficulty of adequately blocking the plugs. Provide a safety release device set to release at ten (10) psi between the air supply and the sewer under test.

3. All new pipe including new services will be required to be air tested. If existing sewage flow has been restored, temporary flow control will be required while air testing is performed. New services will be plugged at the curbside cleanout and tested at the same time as the main sewer line. Length of service lines can be ignored in the determination of line lengths noted in Table 1.

D. REPAIRS

1. Regardless of the outcome of any tests, repair any noticeable leak.

3.05 CLEANUP

- A. After completing each section of the sewer line, remove all debris, construction materials, and equipment from the site of the work, grade and smooth over the surface on both sides of the line, and leave the entire area in a clean, neat, and serviceable condition.

END OF SECTION

SECTION 3.02

SEWAGE FORCE MAIN

PART 1 - GENERAL

- 1.01 Wherever reaction blocking is necessary, it shall be considered an integral part of the force main work.
- 1.02 All contractors installing water or sewer infrastructure in any way related to the distribution of collections systems of the Authority, must be a licensed General Contractor in the State of Alabama. This license must also declare a major classification of Municipal and Utility (MU) and/or Municipal and Utility Specialty (MU-S). Work performed by any person or company not possessing the proper license will not be accepted into service for the water distribution and sewer collection system.
- 1.03 Refer to other sections for work related to that specified by this section. Coordinate this work with that required by other sections.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE

- A. Ductile Iron: with push-on joints conforming to ASTM A746, Class 350.
- B. Ductile Iron Pipe Joints: Gasket type joints for bell and spigot ductile iron pipe designed to meet the infiltration requirements of these specifications; jointing to comply with the applicable provisions of ANSI A21.11.
- C. Ductile Iron pipe shall be lined with an amine cured novalac epoxy containing at least 20% by volume of ceramic quartz pigment. Any request for substitution must be accompanied by a successful history of lining pipe and fittings for sewer service, a test report verifying the following properties, and a certification of the test results.
 1. A permeability rating of 0.00 when test according to Method A of ASTM E96, Procedure A with a test duration of 30 days.
 2. The following test must be run on coupons from factory lined ductile iron pipe:
 - a. ASTM B117 Salt Spray (scribed panel) – Results to equal 0.0 undercutting after two year.

- b. ASTM G95 Cathodic Disbondment 1.5 volts @ 77°F. Results to equal no more than 0.5mm undercutting after 30 days.
- c. Immersion Testing rated using ASTM D714.
 - i. 20% Sulfuric Acid - No effect after 2 years.
 - ii. 25% Sodium Hydroxide - No effect after 2 years.
 - iii. 160°F Distilled Water - No effect after 2 years.
 - iv. 120°F Tap Water (scribed panel) - 0.0 undercutting after 2 years with no effect.
- 3. An abrasion resistance of no more than 4 mils loss after one million cycles - European Standard EN 598: 1994 Section 7.8 Abrasion resistance.
- 4. The lining shall be applied by a competent firm with a successful history of applying linings to the interior of ductile iron pipe and fittings.
- 5. Prior to abrasive blasting, the entire area to receive the protective compound shall be inspected for oil, grease, etc. Any areas where oil, grease of any substance which can be removed by solvent is present shall be solvent cleaned using the guidelines outlined in DIPRA-1 Solvent Cleaning. After the surface has been made free of grease, oil or other substances, all areas to receive the protective compounds shall be abrasive blasted using compressed air nozzles with sand or grit abrasive media. The entire surface to be lined shall be struck with the blast media so that all rust, loose oxides, etc., are removed from the surface. Only slight stains and tightly adhering annealing oxide may be left on the surface. Any area where rust reappears before lining must be reblasted.
- 6. After surface preparation and within 8 hours of surface preparation, the interior of the pipe shall receive 40 mils nominal dry film thickness of Protecto 401. No lining shall take place when the ambient or substrate temperature is below 40 degrees Fahrenheit. The surface also must be dry and dust free.
- 7. Due to the tolerances involved, the gasket area and spigot end up to 6 inches back from the end of the spigot must be coated with 6 mils nominal, 10 mils maximum Protecto Joint Compound. The joint compound shall be applied by brush to ensure coverage. Care should be taken that the joint compound is smooth without excess buildup in the gasket seat or on the spigot ends. Coating of the gasket seat and spigot shall be done after the application of the lining.

8. The number of coats of lining material applied shall be as recommended by the lining manufacturer. However, in no case shall this material be applied above the dry thickness per coat recommended by the lining manufacturer in printed literature. The maximum or minimum time between coats shall be that time recommended by the lining material manufacturer. No material shall be used for lining which is not indefinitely recoatable with itself without roughening of the surface.
 9. Protecto Joint Compound shall be used for touch-up or repair in accordance with manufacturer's recommendations.
 10. Inspection
 - a. All ductile iron pipe and fittings shall be checked for the thickness using a magnetic film thickness gauge. The thickness testing shall be done using the method outlined in SSPC-PA-2, Film Thickness Rating.
 - b. The interior lining of all pipe barrels and fittings shall be tested for pinholes with a non-destructive 2500 volt test. Any defect found shall be repaired prior to shipment.
 - c. Each pipe joint and fitting shall be marked with the date of application on that date and records maintained by the applicator.
 11. The pipe or fitting manufacturer must supply a certificate attesting to the fact that the applicator met the requirements of this specification, and that the material used was as specified.
 12. Protecto 401 lined pipe and fittings must be handled only from the outside of the pipe and fittings. No forks, chains, straps, hooks, etc. Shall be placed inside the pipe or fittings for lifting, positioning of laying.
- D. For ductile iron pipe, pipe manufacturer is to furnish Engineer a certificate of inspection, sworn to by the factory inspector in the presence of a notary public, stating that pieces of pipe in the shipment were made and tested in accordance with ANSI A21.51 and that they were subjected to and withstood a hydrostatic pressure of 500 psi. Each statement is to give the number of pieces of pipe in shipment, length of each piece of pipe, and identification number of each piece of pipe making up the shipment. In addition, the weight of each individual piece of pipe making up the shipment is to be listed opposite the identification number of each pipe length and attached to the certificate of inspection.

- E. Standard and special fittings shall be ductile iron. Use compact mechanical joint fittings. All fittings shall conform to the specifications of ANSI A21.10/AWWA C153. All fittings for sewage application shall be epoxy-lined with Protecto 401 as specified above.

2.02 PVC PIPE

- A. All plastic pipe shall be made from Class 12454-B polyvinyl chloride plastic (PVC 1120) as defined by ASTM D1784.
- B. PVC pipe used to transport sewage shall be green in color.
- C. All Class 200, 250, or 315 pipe shall have NSF approval and be manufactured in accordance with ASTM D2241. The following tests shall be run for each size and type of piping being produced, as specified below:
 1. Flattening Test: once per shift in accordance with ASTM D2412. Upon completion of the test, the specimen shall not be split, cracked, or broken.
 2. Acetone Test (Extrusion Quality Test): once per shift in accordance with ASTM D2152. There shall be no flaking, peeling, cracking, or visible deterioration on the inside or outside surface after completion of the test.
 3. Quick Burst Test: once per 24 hours in accordance with ASTM D1599.

<u>SDR</u>	<u>Pressure Rating</u>	<u>Minimum Bursting Pressure, psi</u>
21	200	800

4. Impact Tests: For six (6) inches and larger, once per shift in accordance with ASTM D2444; for four (4) inches and smaller, once each two (2) hours in accordance with ASTM D2444.
 5. Wall Thickness and Outside Dimensions Tests: once per hour in accordance with ASTM D2122.
 6. Bell Dimension Test: once per hour in accordance with ASTM D3139.
- D. If any specimen fails to meet any of the above-mentioned tests, all pipe of that size and type manufactured between the test periods must be scrapped and a full set of tests rerun.

- E. Furnish a certificate from the pipe manufacturer stating that he is fully competent to manufacture PVC pipe of uniform texture and strength and in full compliance with these specifications and further stating that he has manufactured such pipe and done so in sufficient quantities to be certain that it will meet all normal field conditions. In addition, the manufacturer's equipment and quality control facilities must be adequate to ensure that each extrusion of pipe is uniform in texture, dimension, and strength. Also furnish a certificate from the manufacturer certifying that the pipe furnished for this project meets the requirements of these specifications.
- F. All pipe shall be manufactured in the United States of America. All pipe for any one project shall be made by the same manufacturer.
- G. All four (4) inches and six (6) inches pipe may be furnished in the manufacturer's standard laying lengths of 20 feet, 38 feet, or 40 feet. Pipe eight (8) inches and larger shall be furnished in 20 foot lengths. The Contractor's methods of storing and handling the pipe shall be approved by the Engineer. All pipe shall be supported within five (5) feet of each end; in between the end supports, there shall be additional supports at least every 15 feet. The pipe shall be stored away from heat or direct sunlight. The practice of stringing pipes out along the proposed routes shall not be allowed in advance of more than one (1) day.
- H. Certain information shall be applied to each piece of pipe. At the least, this shall consist of:
 - 1. Nominal size
 - 2. Type of material
 - 3. SDR or class
 - 4. Manufacturer
 - 5. NSF Seal of Approval
 - 6. Color of pipe shall be green
- I. Pipe that fails to comply with the requirements set forth in these specifications shall be rejected.
- J. The pipe shall have push-on joints designed with grooves in which continuous molded rubber ring gaskets can be placed. Gaskets shall be made of vulcanized natural or synthetic rubber; no reclaimed rubber will be allowed. Gasket materials shall meet the requirements of ASTM F477. The gaskets shall be of the manufacturer's standard design dimensions and of such size and shape as to provide a positive seal under all combinations of joint and gasket tolerance. The gasket and annular

groove shall be designed and shaped so that when the joint is assembled, the gasket will be radically compressed to the pipe and locked in place against displacement, thus forming a positive seal.

- K. The spigot end of each pipe shall be beveled so that it can be easily inserted into the gasket joint, which in turn shall be designed so that the spigot end may move in the socket as the pipe expands or contracts. The spigot end shall be striped to indicate the distance into which it is to be inserted into the socket. Each joint shall be able to accommodate the thermal expansions and contractions experienced with a temperature shift of at least 75 degrees F.
- L. Enough lubricant shall be furnished with each order to provide a coat on the spigot end of each pipe. This lubricant shall be nontoxic, impart no taste or smell to the water, have no harmful effect on the gasket or pipe material, and support or promote any bacterial growth. The lubricant containers shall be labeled with the manufacturer's name.
- M. Joints shall be manufactured in accordance with ASTM D3139 except that the thickness of the bell shall be, as a minimum, equal to that of the barrel. Joints shall be either integral bell and ring joints with rubber compression gaskets as manufactured by the Clow Corporation, Johns-Manville, or Vulcan Plastic Corporation; twin gasket couplings as manufactured by the Certain-Teed Products Corporation; or equal. However, the pipe and bell must be made by the same manufacturer.
- N. Standard and special fittings shall be ductile iron. Use compact mechanical joint fittings. All fittings shall conform to the specifications of ANSI A21.53/AWWA C153. The gaskets shall be ducked tipped transition gaskets for use with PVC pipe.
- O. All fittings for sewage application shall be epoxy lined with Protecto 401 as described in Paragraph 2.01.D.
- P. Fittings shall be in accordance with the standard mechanical joint fittings manufactured by the U.S. Pipe and Foundry Company, American Cast Iron Pipe Company, Clow Corporation, or equal.

2.03 HDPE PIPE

- A. Pipe: Pipe shall be DR -17 where pipe is installed in open-cut applications or DR - 11 where pipe is installed by HDD applications. Pipe shall be manufactured from a PE 3408 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D3350-02 with a minimum cell classification of PE345464C. Pipe O.D. sizes 4" to 24" shall be ductile iron pipe sizes (DIPS). Pipe shall have a manufacturing standard of ASTM D3035 and be manufactured by an ISO 9001 certified manufacturer. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects. All pipe shall feature a green stripe on the external surface of the pipe to identify it as sewer pipe.
- B. Fittings:
1. Butt Fusion Fittings: Butt fusion fittings shall be in accordance with ASTM D3261 and shall be manufactured by injection molding, a combination of extrusion and machining, or fabricated from HDPE pipe conforming to this specification. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe. Fabricated fittings shall be manufactured using a datalogger to record fusion pressure and temperature. A graphic representation of the temperature and pressure data for all fusion joints made producing fittings shall be maintained as part of the quality control. The fittings shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.
 2. Electrofusion Fittings: Electrofusion fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-02 and be the same base resin as the pipe. Electrofusion fittings shall have a manufacturing standard of ASTM F1055.
 3. Flanged and Mechanical Joint Adapters: Flanged and Mechanical Joint Adapters shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-02 and be the same base resin as the pipe. Flanged and mechanical joint adapters shall have a manufacturing standard of ASTM D3216. All adapters shall be pressure rated to provide a working pressure rating no less than that of the pipe.

4. Mechanical Restraint: Mechanical restraint for HDPE may be provided by mechanical means separate from the mechanical joint gasket sealing gland. The restrainer shall provide wide, supportive contact around the full circumference of the pipe and be equal to the listed widths. Means of restraint shall be machined serrations on the inside surface of the restrainer equal to or greater than the listed serrations per inch and width. Loading of the restrainer shall be by a ductile iron follower that provides even circumferential loading over the entire restrainer. Design shall be such that restraint shall be increased with increases in line pressure.
- a. Serrated restrainer shall be ductile iron ASTM A536-80 with a ductile iron follower; bolts and nuts shall be corrosive resistant, high strength alloy steel.
 - b. The restrainer shall have a pressure rating of, or equal to that of the pipe on which it is used or 150 psi which ever is lesser. Restrainers shall be JCM Industries, Sur-Grip or pre-approved equal.

Nominal Size	Restraint Width	Serrations/Inch
4", 6"	1-1/2"	8
8", 10" & 12"	1-3/4"	8

- c. Pipe stiffeners shall be used in conjunction with restrainers. The pipe stiffeners shall be designed to support the interior wall of the HDPE. The stiffeners shall support the pipe's end and control the "necking down" reaction to the pressure applied during normal installation. The pipe stiffeners shall be formed of 304 or 316 stainless steel to the HDPE manufacturers published average inside diameter of the specific size and DR of the HDPE. Stiffeners shall be by JCM Industries or pre-approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF FORCE MAIN

- A. Lay the force main to and maintain it at the lines and grades required by the drawings. All fittings shall be at the required locations and the spigots centered in the bells.

- B. Unless otherwise indicated by the drawings, all force main shall have at least 36 inches of cover. Ductile iron pipe shall be required when installed under sidewalks, storm drains, roadways and paved areas. Where these transitions occur between PVC/HDPE and ductile iron pipe, the detector wire shall be continuous where ductile iron pipe is required for crossings. No departure from this policy shall be made except with the approval of the Owner.
- C. For detection purposes, a 10 gauge solid strand copper, green clad tracing wire (shielded) shall be installed with the plastic force main pipe. Connections between wires shall be soldered or connected with wire nut fasteners and wrapped and sealed to be watertight.
- D. Any pipes strung out along the route of the proposed lines before the actual installation of those lines is due to take place shall not be lowered into the trench until they have been swabbed to remove any mud, debris, etc., that may have accumulated within them. Pipe shall be strung out a maximum of one (1) day ahead of pipe laying. Remove all unnecessary material from the bell and spigot end of each pipe. Before any pipe is laid, brush and wipe clean the outside of its spigot end and the inside of its bell and leave dry and oil-free.
- E. Place no debris, tools, clothing, or other materials in the pipe during laying operations.
- F. After a length of pipe has been placed in the trench, center the spigot end in the bell of the adjacent pipe, and insert to the depth specified by the manufacturer and bring to the correct line and grade. Secure the pipe in place by tamping an approved backfill material around it.
- G. Bell holes shall be large enough for ample room for the pipe joints to be properly made. Between bell holes, carefully grade the bottom of the trench so each pipe barrel rests on a solid foundation for its entire length.
- H. Whenever pipe laying is not in progress, close the open ends of pipe with a watertight plug. If the joints of any pipe in the trench cannot be completed until a later time, caulk them with packing in order to make them as watertight as possible; this shall be done not only at the end of each working day but also before work is stopped for lunch periods, bad weather, or any other reason. If there is water in a trench, leave this seal in place until the trench has been pumped completely dry.

- I. Cut pipe so that valves, fittings, or closure pieces can be inserted in a neat workmanlike manner without any damage to the pipe. Follow the manufacturer's recommendations concerning how to cut and machine the ends of the pipe in order to leave a smooth end at right angles to the pipe's axis.
- J. Lay pipe with the bell ends facing in the direction of laying unless otherwise directed by the Authority.
- K. Wherever pipe must be deflected from a straight line (in either the vertical or horizontal plane) in order to avoid obstructions or plumb stems, or wherever long radius curves are permitted, the amount of deflection shall not exceed that necessary for the joint to be satisfactorily made, nor that recommended by the pipe manufacturer.
- L. Lay no pipe in water or when trench conditions are unsuitable. If crushed stone is used to improve trench conditions or as backfill for bedding the pipe, its use is considered incidental to the project, and no separate payment will be made for its use.
- M. Joint all pipe in the exact manner specified by the manufacturer of the pipe and jointing materials.
- N. Install a sewage air release valve and / or an air and vacuum valve at all relative high points. Contractor shall adjust force main depth as needed to ensure air release manholes remain flush to grade.
- O. Force mains shall be connected to existing manholes by use of exterior drop connections as shown on the details. Interior drop connections shall only be used with permission of the Authority.

3.02 BEDDING AND BACKFILLING

- A. Begin backfilling after the line construction is completed and then inspected and approved by the Owner. In an earth trench, for PVC, HDPE or DIP pipe material, on each side of the line, from the bottom of barrel of pipe to 12 inches above the top of the pipe, the backfill material shall be select backfill consisting of fine, loose earth like sandy soil or loam or of granular material that is free from clods, vegetable matter, debris, stone, and/or other objectionable materials and that has a size of no more than 2 inches. Place this backfill simultaneously on either side of the pipe in even layers that, before compaction, are no more than 6" deep.

Thoroughly and completely tamp each layer into place before placing additional layers.

- B. In a rock trench, backfill shall be No. 67 crushed stone to a point 12-inches above the top of PVC, HDPE or DIP pipe.
- C. In all paved areas or roadways, all backfill for PVC, HDPE or DIP pipe shall be No. 67 crushed stone to a point within 8-inches of paved surface. The final 8-inches shall be crushed roadway base stone.
- D. If PVC, HDPE or DIP pipe is installed in a rock trench or paved area, install a 6" bedding of No. 67 crushed stone below the pipe.
- E. From 1' above the pipe upward (if outside paved area or roadway) the backfill material may contain broken stones that make up approximately 3/4 of the backfill total volume. However, if this type of backfill is used, there must be enough spalls and earth materials to fill all voids completely. The maximum dimension of individual stones in such backfill shall not exceed 6", and the backfill material shall be placed and spread in even layers not more than 12" deep. Tamp and thoroughly compact the backfill in layers that, before compaction, are 6" deep. In other areas, the backfill for the upper portion of the trenches may be place with out tamping but shall be compacted to a density equivalent to that of adjacent earth material as determined by laboratory tests. Use special care to prevent the operation of backfilling equipment from causing any damage to the pipe.

3.03 HDPE JOINING:

- A. BUTT FUSION: Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All field welds shall be made with fusion equipment equipped with a McElroy Data Logger. Temperature fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records.

- B. SIDEWALL FUSION: Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.
- C. MECHANICAL: Bolted joining may be used where the butt fusion method cannot be used. Flange joining will be accomplished by using a HDPE flange adapter with a ductile iron back-up ring. Mechanical joint joining will be accomplished using either a molded mechanical joint adapter or the combination of a Sur-Grip Restrainer and Pipe Stiffener as manufactured by JCM Industries, Inc. Either mechanical joint joining method will have a ductile iron mechanical joint gland.
- D. OTHER: Socket fusion, hot gas fusion, threading, solvents, and epoxies may not be used to join HDPE pipe.

3.02 HYDROSTATIC TESTS

- A. Pressure Test
 1. After pipe has been laid and backfilled as specified above, subject all newly laid pipe or any valved section thereof to a pressure of 100 psi. All services are to be laid prior to testing the main and tested as part of the test of the main
 2. The duration of each pressure test shall at least be one (1) hours.
 3. Slowly fill each valved section of pipe with water, and apply the specified test pressure (based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge) with a pump connected to the pipe in a manner satisfactory to the Authority. Furnish the pump, pipe, connections, gauges, and all necessary apparatus.
 4. Before applying the specified test pressure, expel all air from pipe. If hydrants or blow-offs are not available at high places, make the necessary taps at the points of highest elevation before testing, and insert plugs after the test has been completed.
 5. Carefully examine all exposed pipes, fittings, valves, and hydrants during the test. Remove any cracked or defective pipes, fittings, valves or hydrants discovered in consequence of this pressure test and replace with sound material in the manner specified. Repeat the test until the results are satisfactory to the Owner.
 6. No air testing of force mains will be permitted.

B. Leakage Test

1. Conduct the leakage test after the pressure test has been satisfactorily completed. Furnish the pump, pipe, connections, gauges, measuring devices, and all other necessary apparatus as well as all necessary assistance to conduct the test.
2. The duration of each leakage test shall be two (2) hours; during the test, subject the main to a pressure of 100 psi.
3. Leakage is defined as the amount of water which must be supplied to the newly laid pipe or any valved section in order to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.
4. No pipe installation shall be accepted until the leakage is less than the number of gallons per two (2) hour period listed below:

<u>Pipe Sizes</u>	<u>Gallons per 1,000 Feet of Pipe</u>
2 inches - 2 1/4 inches	0.15
3 inches	0.20
4 inches	0.27
6 inches	0.41
8 inches	0.54
10 inches	0.68

5. Should any section of pipe laid display leakage greater than that specified, the Contractor shall, at his own expense, locate and repair the defective joints until the leakage is within the specified allowance.

3.03 CLEANUP

- A. After completing each section of force main, remove all debris and all construction materials from the work site. Then grade and smooth over the surface of both sides of the line. Leave the entire area clean and in a condition satisfactory to the Authority.

END OF SECTION

SECTION 3.03

PRECAST MANHOLES AND WET WELLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Gravity sewer manholes shall be pre-cast with eccentric cone sections unless otherwise approved by the Authority. Wet wells shall have precast concrete flat tops with openings as defined on the drawings and as required by pump manufacturer requirements. Air release valve manholes shall have flat-top sections.
- B. Refer to other sections for items affecting manholes. Coordinate this work with that specified by other sections for timely execution.
- C. Section shall also apply to concrete wet wells.

1.02 QUALITY ASSURANCE

- A. Material Testing: All precast reinforced concrete manhole risers and tops specified herein shall be tested and inspected by a commercial testing laboratory approved by the Authority prior to delivery to the site, and all materials that fail to conform to these specifications shall be rejected. After delivery to the site, any materials that have been damaged in transit or are otherwise unsuitable for use in the work shall be rejected and removed from the site.
- B. The commercial testing laboratory shall be engaged and paid for by the Contractor.
- C. Manholes and wet wells shall be watertight and of high quality and meet the requirements of ASTM C478.

1.03 SUBMITTALS

- A. Shop drawings are required in accordance with Section 2.06, for castings, plastic gaskets, manhole steps, resilient pipe connection, and pre-cast manholes specified in this section.

- B. Supply certified copies in duplicate for the inspection and acceptance reports of the testing laboratory to the Authority before using the materials.
- C. Submit a certificate from the manufacturer of the castings indicating that they meet all applicable requirements of these specifications.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY

- A. Reinforced, meeting the applicable requirements of Section 5.01, Concrete for Utility Lines.

2.02 GRADE ADJUSTMENT RING (FOR CASTING ADJUSTMENT)

- A. Reinforced concrete adjustment rings shall be allowed. Adjustment casting by the use of adjustment rings in excess of 6 - inches in height shall not be permitted. No grade adjustment rings shall be utilized where top of pre-cast section is scheduled to remain above the existing grade.

2.03 MORTAR

- A. Composed of one (1) part Portland cement and two (2) parts sand (volumetric measure) thoroughly mixed in a tight box, with water added gradually and mixed continually until mortar has attained the proper consistency for use in the work; prepared only in such quantities as needed for immediate use. Mortar mixed for more than 30 minutes, re-tempered, or previously set shall not be allowed.

2.04 STANDARD FRAMES AND COVERS

- A. The standard frame and cover shall be traffic typed gray cast iron ASTM Designation A48 - Latest Revision, with a 24" (minimum) diameter opening weighing not less than 410 lbs. The covers shall be the solid self-sealing type with no holes except watertight pick notches. The surface between the cover and frame shall fit smoothly without rocking and shall be thoroughly cleaned. The gray iron castings shall be painted with a bituminous coating.
- B. Cover shall be of the solid indented type with the words "Sanitary Sewer" cast in raised letters thereon. Manhole frames and covers shall be John

Bouchard & Sons, Co., No. 1150; or East Jordan Iron Works, No. 1045 or approved equal.

- C. For shallow type manholes with measured depth of 4-feet or less, the cover shall be John Bouchard & Sons, Co., No. 1312; East Jordan Iron Works, No. 1320.

2.05 WATERTIGHT FRAMES AND COVERS

- A. The manhole frames shall be set in the same manner prescribed for standard frames except special attention shall be paid to securing a watertight connection to the manhole barrel.
- B. The watertight manhole frame and cover shall be a traffic type of grey cast iron ASTM A48-64 with a 24-inch diameter minimum clear opening weighing not less than 550 pounds and shall be of the two-cover design as shown on the Plans.
- C. The surface cover shall be the solid type with no holes except watertight pick notches or a heavy lifting ring. The surface between this cover and frame shall fit without rocking. The outer cover shall be marked "Sanitary Sewer" cast in raised letters thereon. The inner cover shall be of the solid type with no holes, shall have not less than two lifting handles and shall have a neoprene sealing gasket at least 3/8-inch diameter cross-section. The inner cover shall be mechanically sealed by means of a removable metal bar located over the inner cover with a centrally-located stainless steel tightening bolt. This bolt shall be fitted for a tee-handle or bent-handle for turning which shall be included with each cover. The bolt shall have Acme threads for durability. The inner cover shall have appropriate reinforcing ribs to prevent cracking or distortion when tightened. The inner cover shall have sufficient clearance to allow easy installation of the cover. Manhole frame and cover shall be John Bouchard & Sons, Co., No. 1123; East Jordan Iron Works, No. 1893 or approved equal.

2.06 JOINT SEALANT FOR PRECAST MANHOLES AND WET WELLS

- A. One strip of flexible plastic sealant for joints in pre-cast manhole sections shall be installed on the tongue and groove sections of the precast manholes to provide permanent flexible watertight joints which shall remain workable over wide temperature ranges and shall not shrink, harden, or oxidize upon aging. Two (2) strips of sealant shall be used on wet well joints. Material shall be butyl resin sealant ConSeal CS-102 or CS-202 as manufactured by Concrete Sealants, Inc. of New Carlisle, Ohio, RUB'R-

NEK L-T-M manufactured by K.T. Snyder Company, Inc. of Houston, Texas, or other approved equal.

2.07 EXTERNAL JOINT WRAP FOR MANHOLES AND WET WELLS

- A. Joint wrap, at all joints between riser sections, shall be installed in accordance with ASTM C909. Joint wrap shall be 6-inch minimum width, and as manufactured by Press-Seal Gasket Corporation of Ft. Wayne, Indiana, or equal.

2.08 MANHOLE STEPS

- A. Manhole steps shall be made of copolymer polypropylene plastic meeting the latest revision of ASTM D2146-82, Type II, Grade 16906 and shall have a ½ inch diameter Grade 60 reinforcing rod meeting the latest revision of ASTM A615 through its center. Each step shall be 12-inches in width and capable of carrying a load of 1,000 pounds in the center of the step when projected 6-inches from the wall. Each step shall be equipped with non-skid grooves.
- B. Manhole steps shall not be installed in the wet well or air release manholes.

2.09 MANHOLE INVERTS

- A. Manhole inverts shall be formed from 3,000 psi concrete. Inverts for "Straight-through" manholes may be formed by laying the pipe straight through the manhole, pouring the concrete invert and then cutting out the top half of the pipe. Curved inverts shall be constructed of concrete and shall form a smooth even, half-pipe section as shown on the Plans. The inverts shall be factory constructed when the manhole is being built.
- B. The bench or top portion of the invert shall slope to the flow line to prevent standing water.

2.10 RESILIENT PIPE CONNECTIONS

- A. Resilient pipe connectors shall be manufactured in accordance with ASTM C923 and shall provide a positive watertight joint and minimum of 7-degrees deflection in any direction. There shall be no water leakage through the connector when pipe is in its maximum deflected position. Connectors shall be manufactured of durable construction. Connectors shall be manufactured of durable rubber which offers superior resistance to water, sewage, oils, acid, ozone, weathering and aging.

1. Connections to new or existing manholes shall use a conical type flexible boot which shall be clamped securely to the cut out in the manhole wall and to the pipe by means of stainless steel clamps or bands. The flexible boot shall meet ASTM C923. Flexible connectors to manholes shall be Kor-N-Seal I Series 106/406 Toggle, or Wedge style, or ALok G3 Series.

2.11 PRE-CAST CONCRETE MANHOLES AND WET WELLS

- A. Pre-cast manholes and wet wells shall be constructed on a reinforced concrete foundation and shall be wet cast as modified herein. The bottom section of the manhole shall be pre-cast integrally with the pre-cast ring and shall be 4'-0" in interior diameter unless otherwise noted on the plans. All concrete used in connection with the construction of manholes shall be 4,000 psi concrete. Wet well bases shall have adequate weight and thickness to prevent flotation. A minimum of 12" of additional base width (anti-flotation collar) beyond the outside edge of the wet well wall shall be included. The field poured base of the wet well shall be interlocked with steel inserts to tie the precast section to the field-poured base section. Design Engineer shall provide flotation calculations to support the anti-flotation of the wet well. There shall be a factor of safety of at least 2.0 in the calculation. All gravity sewer manholes shall be constructed with a minimum of 0.2' of fall between the inlet and outlet.
- B. The precast manhole manufacturer shall use the additive Xypex Concentrate Admix C-2000/C-1000 at the rate of 2-3 percent by weight of cement in the concrete mix for all manholes. The Xypex Concentrate Admix must be added to the concrete at the time of batching as recommended by the manufacturer (Xypex Chemical Corporation, Richmond, British Columbia, Canada, local contact (615) 333-1000). Red colorant shall be added to show that Xypex has been used in the construction of the manhole. The Xypex additive is not required on manhole segments used to construct sewer air release valve structures. The Xypex additive is not required on pump station wet wells. Wet well shall be lined with cementitious linings in accordance with Section 3.04 of this document.
- C. Pre-cast concrete rings shall be constructed using standard forms and shall conform to ASTM C478 including steel reinforcement.
- D. Align all steps in each section so they are in straight vertical alignment.
- E. The pre-cast sections shall be manufactured and installed in a manner so that there is no visible leakage in the manholes. The manhole section shall

be manufactured in lengths such that a finished manhole will have the least possible number of joints. One section less than 4' in length will be allowed per manhole and that being the section required to bring the manhole to grade. The pre-cast rings shall be of the tongue and groove design sealed watertight, and the joint shall be grouted smooth on the inside of the manhole so that no crack is visible. A resilient pipe connection shall be utilized in the sewer line to manhole connection, unless specifically noted on the drawings. No resilient connector is required on air release manholes but the opening shall be sealed to a watertight condition.

- E. The manhole sidewall may be adjusted with concrete grade adjustment rings as required to bring the casting to grade. Grade ring adjustment in excess of 6 -inches will not be allowed. Where grade adjustment rings are used, a flexible manhole frame seal device shall be provided to seal between the manhole frame and the throat of the precast manhole.

2.12 INTERNAL MANHOLE FRAME SEAL

- A. Internal manhole frame seals shall be an internal flexible rubber frame seal extending from the frame casting down to the top of the manhole cone.
- B. The manhole frame seal shall be designed to prevent leakage of water through the chimney/frame area throughout a 50 year design life. The seal shall also be designed so that it can be installed in manholes where the diameters of the frame and chimney differ by up to 20%.
- C. The frame seal shall be capable of repeated vertical movement of not less than 2 inches and/or repeated horizontal movement of not less than ½ inch after installation and throughout its design life.
- D. Frame seals shall consist of a flexible internal rubber sleeve and stainless steel expansion bands conforming to the following requirements:
 - 1. Rubber sleeve - The flexible rubber sleeve shall be extruded or molded from a high grade rubber conforming to the material requirements of ASTM C923 with a minimum 1500 psi tensile strength, a maximum 18% compression set and a hardness (durometer) of 48±5. The sleeve shall be double, triple or quadruple pleated with a minimum unexpanded vertical height of 8-inches, 10-inches or 13-inches respectively and a minimum thickness of 3/16 inches. The top and bottom section of the sleeve that compresses against the manhole frame casting and the chimney/cone shall have

an integrally formed expansion band and a series of sealing fins to facilitate a watertight seal.

2. The top section of the extension shall have a minimum thickness of 3/32 inches and shall be shaped to fit into the bottom band recess of the sleeve under the bottom chimney seal band and the remainder of the extension shall contain an integrally formed expansion band recess and multiple sealing fins matching that of the rubber sleeve.
3. Expansion bands - The expansion bands used to compress the sleeve against the manhole shall be integrally formed from 16 gauge stainless steel conforming to the requirements of ASTM C923, Type 304 with no welded attachments and shall have a minimum width of 1-1/2 inches. The bands shall have a minimum adjustment range of 2-1/2 diameter inches and the mechanism used to expand the band shall have the capacity to develop the pressure necessary to make a watertight seal. The band shall be permanently held in place with a positive locking mechanism which secures the band in its expanded position after tightening.

- E. Internal manhole frame seals shall be Cretex Specialty products Internal Chimney Seals or approved equal.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Dewater sufficiently to maintain the ground water level at or below the bottom of the manhole foundation prior to and during placement of the foundation.
- B. Obtain an adequate foundation for all manhole structures by removing and replacing unsuitable material with well graded granular material, by tightening with coarse rock, or by such other means as provided for foundation preparation of the connected sewers or as directed by the Engineer. Wherever water is encountered at the site, place all cast-in-place bases or monolithic structures on a one-piece waterproof membrane to prevent any movement of water into the fresh concrete.

3.02 INSTALLATION

- A. When the foundation sub-grade has been prepared for pre-cast manholes, carefully block the base section above the prepared surface so that it is fully and uniformly supported in true alignment; make sure that all entering pipe can be inserted at proper grade. Then place the concrete foundation and invert under and upon this base section as shown in the standard drawings. A base section with monolithic foundation (bottom) shall be used.
- B. Thoroughly wet and then completely fill all interior and exterior lift holes and all joints between pre-cast elements with non-shrink grout. Smooth and paint them both inside and outside to ensure water tightness. Surface deficiencies noted by the Authority shall be filled with non-shrink grout and wiped flush.
- C. Place manhole joint sealant between riser sections and trim excess on interior walls.
- D. Align all steps in each section so they are in straight vertical alignment.
- E. Construct monolithic concrete manholes and bases of 4,000 psi concrete in accordance with the provisions of this section and applicable provisions of Section 03303, Concrete for Utility Lines. The manhole steps shall be cast in place. Carefully set the cast iron frame for the cover at the required elevation, and properly bond it to the masonry with two (2) strips of butyl sealant beneath the frame. A grout course shall be installed atop the frame. Wherever manholes are constructed in paved areas, tilt the top surface of the frame and cover so as to conform to the exact slope, crown, and grade of the existing adjacent pavement. Existing frames and covers reused for elevation adjustment shall be thoroughly cleaned before reinstallation.
- G. Use flexible watertight manhole couplings on all pipe at connections to manholes and wet wells. Connector shall meet the requirement of ASTM C923. Connector shall be as specified in Paragraph 2.10 of this section. Pipes entering and exiting the manholes shall be a minimum of 6 feet in length. No sections of pipe less than 6 feet will be permitted at the manhole connections. No flexible connections are required on air release manholes but openings shall be sealed to a watertight condition.
- H. Where the difference in the invert elevation of two or more lines intersecting in one manhole is 24 inches or more, construct a drop manhole. Drop manholes shall be similar in construction to standard manholes except that a drop connection of pipe and fittings of the proper sizes and

materials shall be constructed outside the manhole and supported by 3,000 psi concrete as indicated by the standard drawings.

- I. Place backfill by hand around the manhole and to a distance of at least one (1) pipe length into each trench, and tamp with selected material up to an elevation of twelve (12) inches above the crown of all entering pipes. Continue backfilling in accordance with the requirements for trench backfilling.
- J. Where force mains discharge into manholes, the manhole interior shall be lined with cementitious manhole waterproofing as set forth in Section 3.04. Where force mains discharge into manholes, exterior drop connections are required. Interior drop connections can only be used with the approval of the Authority's CEO and the Authority's Engineer.
- K. Air release manholes shall be set such that the flat-top and casting are at grade. The flat-top section of the manhole shall not extend above grade unless directed by the Authority. The frame of the air release manhole shall be cast integrally into the precast flat-top section. Contractor shall plan his pipe-laying activities for force mains in a manner such that additional depth of the pipe is achieved to allow for installation of the air release manhole casting and flat-top to be flush to grade.
- L. Vacuum Testing of New Manholes:
 - 1. This test is only applicable to pre-cast concrete manholes.
 - 2. All lifting holes and exterior joints shall be filled and pointed with an approved non-shrink mortar.
 - 3. Each manhole shall be vacuum tested immediately after installation or rehabilitation and prior to backfilling. No standing water shall be allowed in the manhole excavation which may affect the accuracy of the test.
 - 4. All pipes and other openings into the manhole shall be suitably plugged in such a manner as to prevent displacement of the plugs while the vacuum is drawn.
 - 5. Installation and operation of the vacuum equipment and indicating devices shall be in accordance with equipment specifications and instructions provided by the manufacturer.
 - 6. The test head shall be placed to include the manhole casting (frame).
 - 7. A vacuum of 10 inches of mercury shall be drawn. The time for the vacuum to drop to 9 inches shall be recorded.
 - 8. Acceptance for four (4) feet diameter manholes shall be defined as when the time to drop to 9 inches of mercury conforms to the table

below. Contractor shall keep a log of all tests which shall be submitted to the Engineer for approval.

<u>Manhole Depth</u>	<u>Time to Drop One (1) Inch</u>
10 feet or less	60 seconds
10.1 feet to 15 feet	75 seconds
15.1 feet to 25 feet	90 seconds

9. For manholes five (5) feet in diameter, add an additional 15 seconds. For manholes six (6) feet in diameter, add an additional 30 seconds.
10. If the manhole fails the test, necessary repairs shall be made and the vacuum test repeated until the manhole passes the test.
11. If the manhole joint mastic or gasket is displaced during the vacuum test, the manhole shall be disassembled, the seal replaced, and the manhole re-tested.
12. No additional payment will be made for testing and cost shall be merged into cost of manholes.

M. All manholes shall be set in such a manner that manhole casting is flush with the ground surface unless otherwise noted on plan. No manhole casting shall be lower than the surrounding existing ground surface. Contractor is responsible to confirm overall depth at time of fabrication to prevent the need for excessive grade adjustment rings. No grade rings in excess of 6-inches will be permitted. If grade rings are used, a flexible internal manhole frame seal shall be provided at no additional cost. Cone sections set above ground level shall only occur with the pre-approval of the Authority. No grade rings shall be utilized to adjust castings above finished grade. Above grade extensions if utilized shall be executed with solid precast sections.

3.03 ACCEPTANCE TEST FOR MANHOLE GRADE ADJUSTMENT

A. After the manhole has been adjusted to the proper grade, the manhole shall be visually inspected by the Contractor in the presence of the Authority. Any defects noted shall be corrected by the Contractor until the work is found satisfactory to the Authority. In addition, at the Authority's request, the Contractor may be required within one year to visually inspect the manholes that were adjusted. Any work that has become defective shall be redone by the Contractor at no additional expense to the Authority.

END OF SECTION

SECTION 3.05

SEWAGE VALVES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Installation of valves as specified below.
- B. Refer to other sections for work related to that specified under this heading.

PART 2 - PRODUCTS

2.01 PLUG VALVES

- A. All plug valves shall be eccentric, multi-directional plug valves with 100% full port unless otherwise specified.
- B. Valves shall be of the non-lubricated eccentric type with resilient faced plugs and shall be furnished with mechanical joint end connections.
- C. Valve bodies shall be of ASTM A126 Class B cast iron. Bodies in 4" and larger valves shall be furnished with a 1/8" welded overlay seat of not less than 90% pure nickel. Seat area shall be raised, with raised surface completely covered with weld to ensure that the plug face contacts only nickel. Screwed-in seats shall not be acceptable.
- D. Plugs shall be of ASTM A126 Class B cast iron. The plug shall have a cylindrical seating surface eccentrically offset from the center of the plug shaft. The interference between the plug face and body seat, with the plug in the closed position, shall be externally adjustable in the field with the valve in the line under pressure. Plug shall be resilient faced with neoprene or hycar, suitable for use with sewage.
- E. Valves shall have sleeve type metal bearings and shall be of sintered, oil impregnated, permanently lubricated Type 316 ASTM A743 Grade CF-8M or AISI Type 317L stainless steel. Non-metallic bearings shall not be acceptable.
- F. Valve shaft seals shall be of the multiple V-ring type and shall be externally adjustable and repackable without removing the bonnet or

actuator from the valve under pressure. Valves utilizing O-ring seals or non-adjustable packing shall not be acceptable.

- G. Valve pressure ratings shall be 175 psi through 12" and 150 psi for 14" through 72". Each valve shall be given a hydrostatic and seat test with test results being certified when required by the specifications.
- H. Non-buried manual valves shall have handwheel gear actuators. Buried valves shall be provided with tee wrenches and extension stems. Valves larger than 6" may be equipped with gear actuators, depending on Engineer's recommendations. All manual actuators shall be rated for the full pressure rating of the valve. All gearing shall be enclosed in a semi-steel housing and be suitable for running in a lubricant with seals provided on all shafts to prevent entry of dirt and water into the actuator. The actuator shaft and the quadrant shall be supported on permanently lubricated bronze bearings. Actuators shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque and to provide seat adjustment to compensate for change in pressure differential or flow direction change. All exposed nuts, bolts and washers shall be zinc plated.
- I. Valves and gear actuators for buried or submerged service shall have seals on all shafts and gaskets on the valve and actuator covers to prevent the entry of water. Actuator mounting brackets for buried or submerged service shall be totally enclosed and shall have gasket seals. All exposed nuts, bolts, springs and washer shall be stainless steel.
- J. All valves shall be as manufactured by DeZURIK Model PEF.

2.02 COMBINATION AIR VALVES

- A. All force mains shall have combination air valves installed as indicated on the plans.
- B. The body of the valves shall be conical shaped to maintain maximum air gap with the spring-loaded float and seal plug connection combining to ensure no contact between the sewage and the seal.
- C. The valve shall have a double float design with the upper float being enclosed in the upper section of the valve and shall be made of polypropylene.
- D. The lower float shall be in the main body of the valve and shall be constructed of 316 stainless steel.

minimum of 150 pounds for frame and 45 pounds for cover. Clean out boxes shall be John Bouchard No. 8006 or approved equal.

2.04 RUBBER FLAPPER STYLE SWING CHECK VALVE

- A. The check valve shall be a flanged, swing type, full body, domed access cover with Buna-N rubber flapper disc suitable for use with raw wastewater.
- B. The valve body shall be a one-piece ductile iron ASTM A536 Grade 65-45-12 with integral flanges. The flanges shall be faced and drilled in accordance with ANSI B16.1 Class 125. the valve body shall be full flow equal to nominal pipe diameter at all points through the valve. Valve shall be capable of passing a 3-inch sphere. The seating surface shall be on a 45 degree angle to minimize disc travel. A threaded port with pipe plug shall be provided on the bottom of the valve to allow for field installation of a backflow actuator, without special tools or removing the valve from the line.
- C. The top access port shall be full size, allowing removal of the disc without removing the valve from the line. The access cover shall be domed in shape to provide flushing action over the disc for operating in lines containing high solids content. A threaded port with pipe plug shall be provided in the access cover to allow for field installation of a mechanical, disc positioner indicator.
- D. The disc shall be of one-piece construction, precision molded with an integral o-ring type sealing surface and contain alloy steel and nylon reinforcement in the flexible hinge area. The flex portion of the disc shall be warranted for twenty-five years. Non-slam closing characteristics shall be provided through a short 35 degree disc stroke and a memory disc return action.
- E. The valve disc shall be cycle tested 1,000,000 times in accordance with AWWA C508 and show no signs of wear, cracking or distortion to the valve disc or seat and shall remain drop tight at both high and low pressures. Tests shall be independently certified.
- F. A mechanical indicator shall be provided to indicate open/closed position. The indicator shall have continuous contact with the disc under all operating conditions to insure accurate disc indication.

- G. All valves shall be hydrostatically tested and seat tested to demonstrate zero leakage. The interior and exterior of the valve shall be coated with an ANSI/NSF 61 approved fusion bonded epoxy.
- H. The valve shall be a Valmatic Series 500, or APCO Series 100.

2.05 OUTSIDE LEVER AND WEIGHT SWING CHECK VALVE

- A. The check valve shall be a flanged, counterweighted, rubber seated swing check valve. The valve shall permit flow in one direction only and shall close tightly without slamming when the discharge pressure exceeds the inlet pressure. The cushioned swing check valve shall be installed with the flow direction either horizontally or vertically up and shall function to prevent reverse flow. The valve shall provide a full equivalent pipe area when open fully.
- B. The valve body shall be a one-piece cast iron or cast steel casting with integral flanges. The flanges shall be faced and drilled in accordance with ANSI B16.1 Class 125.
- C. The hinge shaft shall be located completely above the waterway and shall be constructed of stainless steel with the disc arm and counterweight arm keyed there on. The hinge shaft shall be one piece and shall extend through both sides of the valve body.
- D. The body seat shall be bronze or stainless steel, and the disc shall be cast iron conforming to ASTM A126 Class B. The seat ring shall be a resilient field replaceable ring that can be replaced without the use of special tools.
- E. A lever and adjustable weight shall be provided to initiate closure.
- F. The valve shall be a Golden Anderson Model 250, or APCO Series S-6000.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Valves shall be installed per manufacturer's recommendations.
- B. Buried plug valves shall be installed with a cast iron valve box. Flanged plug valves shall be installed with removable, operating lever.
- C. Buried valves shall include mechanical joint ends. All valves for aboveground or vault installation shall include flanged ends.

- D. Valves shall be plumbed for level installation so as not to place end connection in a bind.
- E. Valves shall be installed plumb. Valves installed outside paved areas shall include a concrete collar around the valve lid at ground surface.
- F. Clean out assemblies shall be installed with a cast iron clean out box over the top of the assembly. Box shall be flush with the finished ground surface. Top of clean out assembly shall be at least 3-inches below the inside surface of the box lid.
- G. All check valves shall be mounted in a horizontal position in a valve vault. No check valves shall be installed in the wet well.
- H. Air Release/Vacuum Valves shall be installed in a 4-foot diameter precast concrete manhole with vented cover in accordance with the details of the Limestone County Water and Sewer Authority. Valves shall be located at high points or as directed by the Owner. Additional force main depth may be required to allow for height of valve body inside the manhole. Manhole cover shall be flush with existing grade. Valve body shall be adequately supported and braced inside the manhole and not solely dependent upon support by the pipe nipple. All pipe nipples shall be bronze. A cut-off valve with handwheel or lever shall be included to isolate the air valve from the force main. Combination air valves shall be mounted with a tapping boss or tapping saddle with bronze isolation valve with handwheel. No galvanized piping shall be used.

END OF SECTION

SECTION 3.06

FLOW CONTROL OF SEWER LINES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section includes all materials, labor, and equipment required to provide bypass flow control for sanitary sewer lines construction, upgrade, or rehabilitation.
- B. Also, furnish all power, maintenance, etc. to implement the bypass flow control and diversion pumping to divert the existing flow around the work area for the work's duration.
- C. The design, installation, and operation for the temporary bypass pumping system shall be solely the Contractor's responsibility.

1.02 PERFORMANCE AND PENALTIES

- A. The Contractor shall ensure:
 - 1. All temporary sewer bypass pumping activities for the work are completed in full compliance with the Owner's, local and State requirements and no water quality or quantity compliance issues are encountered.
 - 2. No illicit pollutant discharges to (or to a location that would create contaminated water runoff to) a storm sewer, a stormwater conveyance, or a water body within the State.
 - 3. All temporary sewer bypass pumping activities for the work are completed in full compliance with the Alabama Department of Environmental Management and the U.S. EPA regulations, and no water quality or quantity compliance issues are encountered.
- B. No discharge of sewage or debris shall be released to the environment. Should the Contractor's actions cause a sewage or debris overflow or bypass to the environment, site cleanup will be the Contractor's responsibility consistent with Owner and State regulators directions. All overflow or bypass environmental cleanup activities shall be immediately commenced and prosecuted continuously by the Contractor. Any associated fines or penalties enacted by the Alabama Department of Environmental Management, the U.S. EPA, and/or any other regulatory groups or programs will be borne solely by the Contractor.

1.03 SUBMITTALS

- A. At least two weeks prior to commencing work including plugging any line, bypass pumping, or similar actions, the Contractor shall submit to the Owner a detailed Bypass Sewage Pumping Plan (Plan), as further described in these specifications, for review and approval. Any Plan approval does not relieve the Contractor from any responsibility for the Plan's adequacy or proper execution. The Contractor is responsible for conducting his work in a manner which will not cause overflows or system backups that could damage private and/or public property.
- B. Submit the following in accordance with Section 2.06.
 - 1. *Bypass Sewage Pumping Plan*. Plan shall contain, at minimum, the following:
 - a. Staging areas for pumps
 - b. Sewer plugging method and plug types
 - c. Size and location for manholes or access points for suction and discharge hose or piping
 - d. Size for pipeline or conveyance system to be bypassed
 - e. Number, size, material, location, and method for installing suction piping
 - f. Number, size, material, location, and method for installing discharge piping
 - g. Provide bypass pump sizes, capacity, number of each size to be on site, and power requirements. Pump sizing shall clearly indicate compliance with requirements in this Section.
 - h. Calculations for static lift, friction losses, and flow velocity (pump curves showing pump operating range)
 - i. Standby power generator size, location, and spill prevention and control measures
 - j. Downstream discharge plan
 - k. Method to protect discharge manholes or structures from erosion and damage
 - l. Thrust and restraint block sizes and locations
 - m. Sections showing suction and discharge pipe depth, embedment, select fill, and special backfill

- n. Noise control method for each pump and/or generator
- o. Any temporary pipe supports and anchoring required
- p. Design plans and computations for access to bypass pumping locations indicated on the Drawings
- q. Calculations for selecting bypass pumping pipe size
- r. Schedule for installing and maintaining bypass pumping lines
- s. Plan indicating selection for bypass pumping line locations
- t. All items related to testing, inspection, maintenance, and monitoring as described in this Section
- u. All other incidental items necessary and/or required to ensure facilities are properly protected including protecting the access and bypass pumping locations from damage due to the discharge flows and compliance with the requirements and permit conditions specified in the Contract Documents
- v. For sewer rehabilitation by lining methods, generic plans may be developed for typical situations and various sizes to be implemented.

PART 2 - PRODUCTS

2.01 BYPASS EQUIPMENT

- A. All equipment used for bypass pumping shall be specifically designed for intended purpose. All piping, pumps, etc. in contact with sanitary sewage shall be manufactured with materials designed for use in a sewage environment.
- B. All pumps used shall be fully automatic self-priming units which do not require foot valves or vacuum pumps in the priming system.
- C. The pumps shall be electric, hydraulic, or diesel powered.
- D. All pumps used shall be constructed to allow dry running for long time periods to accommodate effluent flows cyclical nature.
- E. Above-ground pumps and/or power units shall be located inside a temporary portable berm to contain any fuel or sewage that may spill during the normal course of operation.
- F. Hard discharge piping shall be butt-welded HDPE with a minimum pressure rating of 2.5 times the total dynamic pump head.

- G. Under no circumstances will irrigation type piping or glued PVC pipe be allowed.
- H. Discharge hose may be allowed on rehabilitation projects for short-term setups (less than or equal to 48 hours) on short sections with approval from the Owner. Hoses shall have no leaks, and all couplings shall be quick connecting with gaskets.
- I. The multiple pump header system shall check valves to facilitate pump removal, service, and/or replacement while the system remains operational.
- J. All above ground pumps and/or power units shall be equipped with sound attenuation measures which reduce noise levels to 75-decibels maximum at a 30-foot distance from the equipment during all operation periods. If equipment is operated between 8:00 PM and 6:00 AM, this equipment shall also be provided with a sound attenuation 3-sided enclosure including a roof constructed of 2 X 4 lumber frame with 1/2-inch plywood sheathing and 2-inch extruded polystyrene foam panels attached to the inside of the entire enclosure. The enclosure shall be portable to allow the enclosure to be moved when bypass pumping equipment is moved.
- K. The discharge location (the point where the bypass main reenters the gravity sewer system) shall be constructed with adequate sealant materials to minimize sewer gas and odor release to the maximum extent possible.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Provide bypass sewage pumping, as required, around the section in which work is to be performed. Bypass pumping shall be the Contractor's full responsibility. The bypass system shall be a sufficient capacity to handle 2.0 times the peak flow of the pipeline section being bypassed. At least two weeks prior to the desired start date of construction requiring bypass pumping, submit a detailed description of the method proposed for bypass pumping to the Owner for review and approval. The description shall include all materials and equipment to be used, personnel, spare equipment, and sketches showing proposed pump-around setups. No work shall commence until the Owner approves.
- B. Bypass pumping equipment shall include pumps, conduits, engines, and related equipment necessary to divert sewage flow around the section in which work is to be performed. Backup pumps shall be online and isolated from the primary system by valves. Include 100% mechanical redundancy installed online with a float or ultrasonic type system to switch to the standby system automatically if the primary system fails.

- C. Piping redundancy may be required for relatively long bypass piping lengths or large diameter bypass pipes as deemed necessary by the Owner. Special design considerations shall be made for pump suction lifts greater than 23 feet.
- D. Make all arrangements for bypass pumping when the main is shut down for any reason. The system shall overcome any existing force main pressure on discharge.
- E. Suction and discharge points shall only be located at manholes.
- F. If at any time the Contractor is unable to properly bypass pump the sewage, construction will be stopped until the Contractor can continue work in an acceptable manner. Additional contract time for delays caused by improper equipment, labor, or breakdowns will not be considered.
- G. Service shall be maintained at all times. Surcharges due to plugging the sewer line for bypass pumping shall be maintained to prevent service backups and overflows at any point in the system.
- H. For rehabilitation projects, hose may be used for short runs with the Owner's approval. If the anticipated bypass time exceeds 48-hours, use hard piping only. If using hose and the bypass time reaches 48-hours, the Contractor may either install hard piping to accomplish the bypass or restore flow until an approved bypass method can be employed.
- I. The bypass or diversion pumping system shall be able to pump all the sewage in the existing line under all weather and seasonal conditions. All pumping equipment to be used shall be submitted to the Owner for review and approval.
- J. Bypass pumping systems are required to be operated and continuously monitored 24-hours per day for flow diversion.
- K. The bypass pumping must be done one manhole upstream and continue for one manhole downstream of the line being rehabilitated in order to use flow through plugs at the insertion and end points. The liner bag may not be used as part of the bypass pumping system or as a plug in the line.
- L. For bypass or diversion pumping in overnight operations greater than 2 days, provide and maintain portable lighting systems as needed for monitoring and operation activities at the bypass pumping site(s).
- M. The temporary diversion pumping system shall be placed in operation prior to the commencement of work in the areas being bypassed. Minimum times of operation prior to the commencement of work are 1 hour for small diameter CIPP lining and 4 hours for any other major system work such as trunk sewer diversion, large diameter sewer lining, or pumping station work.

- N. Protect the bypass lines from damage in the areas of backhoe and excavation operations.
- O. Provide the necessary stop/start controls and a visual alarm indicating a pump malfunction for each pump. Each pump shall have a 0-30 inch Hg vacuum gauge on the inlet and a 0-60 psi pressure gauge on the outlet.

3.02 PERFORMANCE REQUIREMENTS

- A. It is essential for operating the existing system being bypassed that no interruptions in the flow occur throughout the project's duration. Provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (primary and backup units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the incoming flow before it reaches the point where it would interfere with the work, carry it past the work area, and return it to the existing system downstream of the work.
- B. The temporary pumping system's design, installation, and operation shall be the Contractor's responsibility. The bypass system shall meet all codes and requirements for regulatory agencies having jurisdiction.
- C. Provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the sewer main flows under any circumstances.
- D. No flow diversion around the work area shall be performed in a manner that will cause damage to or surcharging of Owner's system. The diversion shall protect public and private property from damage and flooding.
- E. Protect water resources, wetlands, and other natural resources.

3.03 FIELD QUALITY CONTROL AND MAINTENANCE

- A. Testing: Prior to actual operation, test the bypass pumping discharge hard piping system for leaks and pressure using clean water. Bypass hard piping shall be hydrostatically tested following each setup and prior to flow diversion or bypass to a minimum pressure 2.5 times the pump(s) total dynamic head. The Owner shall be given a 24-hour notice prior to testing.
- B. Inspection: Inspect the bypass pumping system on a continuous basis to ensure the system is working properly. A daily checklist for physically inspecting the piping shall be required. The checklist shall contain all bypass pumping system components and shall be specifically developed to address aspects for the individual project. The daily checklist shall be submitted to and approved by

the Owner. The completed daily checklists will be maintained, available for review, and on-site for the project's duration. A sample checklist is included in this Section.

- C. Maintenance Service: Ensure the temporary bypass pumping system is properly maintained and that a responsible operator shall be readily available at all times when pumps are operating.
- D. Monitoring
 - 1. During bypass pumping, continuously monitor all bypass pumping system components.
 - 2. A telemetry system or designated personnel to maintain 24-hour onsite monitoring shall be required to alert the Contractor to system malfunctions or high liquid levels in manholes.
- E. Additional Materials
 - 1. Spare parts for pumps and piping shall be kept on site as required.
 - 2. Adequate hoisting equipment for each pump and accessories shall be maintained on site.
 - 3. Keep an HDPE fusion machine on site for the duration of bypass pumping to facilitate immediate repairs to hard piping.
- F. Preparations and Precautions
 - 1. Locate any existing utilities in the area selected for the bypass pipelines. Locate the bypass pipelines to minimize any disturbance to existing utilities and obtain approval for the pipeline locations. Pay all costs associated with relocating utilities and obtaining all approvals.
 - 2. During all bypass pumping operations, protect the Metro system (pumping station, conveyance system, etc.) as applicable from damage inflicted by any equipment. The Contractor is responsible for all physical damage to the system caused by human or mechanical failure.
- G. Installation and Removal
 - 1. Remove manhole sections or make connections to the existing conveyance system. Construct temporary bypass pumping structures only at the access location(s) indicated on the Drawings and as may be required with Owner's approval to provide adequate suction conduit.
 - 2. Plugging or blocking flows shall incorporate a primary or secondary plugging device. When plugging or blocking is no longer needed for work performance and acceptance, it is to be removed in a manner that permits

the sewage flow to slowly return to normal without surge flows to prevent surcharging or causing other major disturbances downstream.

3. When working inside manholes, sewers, or force mains, exercise caution and comply with all applicable OSHA requirements.
4. Bypass pipeline installation is prohibited in all wetland areas. The pipeline shall be located, if possible, off streets and sidewalks and on road shoulders. If in easements, the bypass pipeline shall be within the easement area acquired for the project.
5. When the bypass pipeline crosses local streets and private driveways, place the bypass pipelines in trenches and cover with temporary pavement. Obtain any property owner approvals for placing the temporary pipeline.

3.04 CLEANUP

- A. Upon acceptance of the installation work and testing, restore the project area affected by the operations to a condition at least equal to that existing prior to the work.

3.05 CLOSEOUT ACTIVITIES

- A. Provide in accordance with Section 2.10.

END OF SECTION

SECTION 4.01

WATER LINES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. All contractors installing water or sewer infrastructure in any way related to the distribution or collections systems of the Owner, must be a licensed General Contractor in the State of Alabama. This license must also declare a major classification of Municipal and Utility (MU) and/or Municipal and Utility Specialty (MU-S). Work performed by any person or company not possessing the proper license will not be accepted into service for the water distribution and sewer collection system.
- B. Contractor shall be responsible for safely storing materials needed for work that have been accepted by him until they have been incorporated into the completed project. Keep the interiors of all pipes, fittings, and other accessories free from dirt and foreign matter at all times.
- C. Trenching includes excavating, backfilling, compacting, disposing of surplus material, and all other work incidental to the construction of trenches for utilities and buried appurtenances, including additional excavation which may be required for structures forming a part of the pipe line.
- D. Excavation includes removal of quicksand, hardpan, boulders, clay, rubbish, unforeseen obstacles, underground conduits, pipe, drain tile, trees, root, timber or masonry structures, pavements, sidewalks, and all other obstacles encountered. No claim for additional payment will be accepted because of the character of the ground in which the excavation is made. Excavation will be classified with separate payment for rock excavation.
- E. Reaction blocking is required at all fittings. It shall be considered an integral part of the water line work, and no separate payment shall be made for it.

1.02 RELATED SECTIONS

- A. Section 2.14 Trenching, Backfilling and Compaction for Utilities
- B. Section 2.15 Unclassified Excavation for Utilities
- C. Section 4.02 Valves Hydrants and Blowoffs

PART 2. PRODUCTS

2.01 MATERIALS

- A. Bedding and backfill material shall be size No. 67 in accordance with the Alabama Department of Transportation's Standard Specifications for Road and Bridge Construction or satisfactory soil materials of clay, rock or gravel, free of debris, waste, frozen materials, vegetable and other deleterious matter that has a size of no more than 2" as specified herein and/or as shown on the plans.
- B. Portland cement, ASTM C150, Type I.
- C. Steel bar reinforcing, ASTM A615, Grade 60.
- D. Concrete aggregate, ASTM C33.

2.02 DUCTILE IRON PIPE AND FITTINGS

- A. **All new pipe in developments shall be ductile iron.**
- B. Ductile cast iron pipe shall be made of good quality ductile iron that meets the requirements for modular iron castings of ASTM E8. It shall be plain end ductile iron pipe with push-on, single gasket joints. The design thickness shall be that specified by ANSI A21.50/AWWA C150, except that all pipe with a diameter of 12" or less shall have a wall thickness of class 350.
- C. Ductile iron pipe shall be centrifugally cast in metal or sand-lined molds and shall conform to the specifications of ANSI A21.51/AWWA C151. It shall be made and tested in accordance with ASTM A339 and shall be subjected to and able to withstand a hydrostatic pressure of 500 psi. The maximum depth of pits shall be half that allowed in the AWWA specifications.

- D. The length of each individual piece of ductile iron pipe shipped must be plainly marked on that piece of pipe.
- E. The push-on, single gasket joints shall be either Fastite (manufactured by American Cast Iron Pipe Company), Tyton (U. S. Pipe and Foundry Company), Super Bell-Tite (Clow Corporation), or other joints of similar type and equal quality. They shall be able to withstand 200 psi of operating pressure.
- F. The bell of each pipe shall have a tapered annular opening and a cast or machined retaining groove for the gasket. The gasket groove shall have a flared design so that maximum deflection will be provided. The plain spigot end of the pipe shall be beveled in order to simplify its entry into and centering within the bell and the compression of the gasket.
- G. The gasket shall be of high quality vulcanized rubber made in the form of a solid ring to exact dimensions. The design of the gasket groove in the bell of the pipe and the design, hardness, and other properties of the gasket itself shall be such that the joint is liquid tight for all pressures from a vacuum to a maximum rating of 350 psi of internal liquid pressure.
- H. Enough lubricant shall be furnished with each order to provide a thin coat on the spigot end of each pipe. This lubricant shall be nontoxic, impart no taste or smell to the water, and have no harmful effect on the rubber gasket. It shall have a consistency that will allow it to be easily applied to the pipe in either hot or cold weather and that will enable it to adhere to either wet or dry pipe.
- I. Fittings shall be ductile iron. Use compact mechanical joint fittings (4"-12"). All fittings shall conform to the specifications of either ANSI A21.53/AWWA C153. Tees at fire hydrants shall be anchor-style or hydrant tees. Connections between hydrant valves and the hydrant shall be ductile iron anchor couplings. No PVC pipe will be permitted in fire hydrant assemblies.
- J. Where noted on the plans and for restraint purposes, restraint gaskets may be used. Gaskets shall be FieldLok 350® by U.S. Pipe Co.; Fastgrip® by American Cast Iron Pipe Co.; or approved equal.
- K. Pipe and fitting shall be lined with enameline or a thin cement lining as specified in ANSI A21.4/AWWA C104. In addition, a bituminous

seal coat or asphalt emulsion spray coat approximately one (1) mil thick shall be applied to the cement lining in accordance with the pipe manufacturer's standard practices.

L. The pipe manufacturer shall furnish the Owner a certificate of inspection, sworn to by the factory inspector in the presence of a notary public, stating that the pieces of pipe in the shipment were made and tested in accordance with ANSI A21.51 and that they were subjected to and withstood a hydrostatic pressure of 500 psi. Each statement is to give the number of pieces of pipe in the shipment, the length of each piece of pipe, and the serial number of each piece of pipe making up the shipment. In addition, the weight of each individual piece of pipe making up the shipments to be listed opposite the serial number of each pipe length and attached to the certificate of inspection.

2.03 PVC PIPE

A. **All new pipe in developments shall be ductile iron. PVC pipe shall only be used where approved by the Authority's CEO.**

B. All plastic pipe shall be made from Class 12454-B polyvinyl chloride (PVC 1120) as defined by ASTM D1784.

C. SDR pipe Class 200 pipe shall have NSF approval and be manufactured in accordance with ASTM D2241. The following tests shall be run for each size and type of piping being produced, as specified below:

- 1. Flattening Test: once per shift in accordance with ASTM D2412. Upon completion of the test, the specimen shall not be split, cracked, or broken.
- 2. Acetone Test (Extrusion Quality Test): once per shift in accordance with ASTM D2152. There shall be no flaking, peeling, cracking, or visible deterioration on the inside or outside surface after completion of the test.
- 3. Quick Burst Test: once per 24 hours in accordance with ASTM D1599.

<u>SDR</u>	<u>Pressure Rating</u>	<u>Minimum Bursting Pressure, psi</u>
21	200	800

4. Impact Tests: For six (6) inches and larger, once per shift in accordance with ASTM D2444; for four (4) inches and smaller, once each two (2) hours in accordance with ASTM D2444.
 5. Wall Thickness and Outside Dimensions Tests: once per hour in accordance with ASTM D2122.
 6. Bell Dimension Test: once per hour in accordance with ASTM D3139.
- D. If any specimen fails to meet any of the above mentioned tests, all pipe of that size and type manufactured between the test periods must be scrapped and a full set of tests rerun.
- E. Furnish a certificate from the pipe manufacturer stating that he is fully competent to manufacture PVC pipe of uniform texture and strength and in full compliance with these specifications and further stating that he has manufactured such pipe and done so in sufficient quantities to be certain that it will meet all normal field conditions. In addition, the manufacturer's equipment and quality control facilities must be adequate to ensure that each extrusion of pipe is uniform in texture, dimension, and strength. Also furnish a certificate from the manufacturer certifying that the pipe furnished for this project meets the requirements of these specifications.
- F. All pipe shall be manufactured in the United States of America. All pipe for any one project shall be made by the same manufacturer.
- G. All four (4) inch and six (6) inch pipe may be furnished in the manufacturer's standard laying lengths of 20 feet, 38 feet, or 40 feet. Pipe eight (8) inches and larger shall be furnished in 20 feet lengths. The Contractor's methods of storing and handling the pipe shall be approved by the Owner. All pipe shall be supported within five (5) feet of each end; in between the end supports, there shall be additional supports at least every 15 feet. The pipe shall be stored away from heat or direct sunlight.
- H. Certain information shall be applied to each piece of pipe. At the least, this shall consist of:
1. Nominal size
 2. Type of material

3. SDR/DR or class
 4. Manufacturer
 5. NSF Seal of Approval
 6. Pressure Class
- I. Pipe that fails to comply with the requirements set forth in these specifications shall be rejected.
 - J. The pipe shall have push-on joints designed with grooves in which continuous molded rubber ring gaskets can be placed. Gaskets shall be made of vulcanized natural or synthetic rubber; no reclaimed rubber will be allowed. Gasket materials shall meet the requirements of ASTM F477. The gaskets shall be of the manufacturer's standard design dimensions and of such size and shape as to provide a positive seal under all combinations of joint and gasket tolerance. The gasket and annular groove shall be designed and shaped so that when the joint is assembled, the gasket will be radially compressed to the pipe and locked in place against displacement, thus forming a positive seal.
 - K. The spigot end of each pipe shall be beveled so that it can be easily inserted into the gasket joint, which in turn shall be designed so that the spigot end may move in the socket as the pipe expands or contracts. The spigot end shall be striped to indicate the distance into which it is to be inserted into the socket. Each joint shall be able to accommodate the thermal expansions and contractions experienced with a temperature shift of at least 75 degrees F.
 - L. Enough lubricant shall be furnished with each order to provide a coat on the spigot end of each pipe. This lubricant shall be nontoxic, impart no taste or smell to the water, have no harmful effect on the gasket or pipe material, and support or promote any bacterial growth. The lubricant containers shall be labeled with the manufacturer's name.
 - M. Joints shall be manufactured in accordance with ASTM D3139 except that the thickness of the bell shall be, as a minimum, equal to that of the barrel. Joints shall be either integral bell or ring joints with rubber compression gaskets as manufactured by the Vulcan Plastic Corporation; or equal. However, the pipe and bell must be made by the same manufacturer.
 - N. Fittings shall be ductile iron. Use standard mechanical joint fittings. All fittings shall conform to the specifications of ANSI A21.53/AWWA

C153. The gaskets shall be ducked tipped transition gaskets for use with PVC pipe.

- O. Fittings shall be lined with enameline or a thin cement lining as specified in ANSI A21.4/AWWA C104. In addition, a bituminous seal coat or asphalt emulsion spray coat approximately one (1) mil thick shall be applied to the cement lining in accordance with the pipe manufacturer's standard practices.
- P. Fittings shall be in accordance with the compact mechanical joint fittings manufactured by the U.S. Pipe and Foundry Company, American Cast Iron Pipe Company, Clow Corporation, or equal.

2.04 COPPER WIRE FOR DETECTION

- A. **All** water lines (**DIP or PVC**) shall be installed with a 10 gauge, blue coated copper wire, installed directly above the pipe. Adequate wire shall be terminated inside valve boxes for connection to line detection equipment.

2.05 MECHANICAL JOINT RESTRAINT DEVICES

A. Mechanical Joint Restraint Devices:

1. Restraint devices shall consist of multiple gripping wedges incorporated into a follower gland meeting the requirements of ANSI/AWWA C110/A21.10.
2. Devices shall have a working pressure rating of 350 psi for 3 - 16 inch and 250 psi for 18 inch and larger. Ratings are for water pressure and must include a minimum safety factor of 2:1.
3. Restraint devices shall have torque bolts.
4. Megalug Series 1100 produced by EBAA Iron, Inc., TufGrip Series 1000S by Tyler Union, SIGMA One-Lok Series D-SLDE or approved equal for ductile iron pipe lines. Megalug Series 2000PV produced by EBAA Iron Inc., TufGrip Series 2000 by Tyler Union, Sigma One-Lok Series D-SLCE or approved equal for PVC pipe lines.

B. Restraint Devices - General:

1. Gland body, wedges and wedge activating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
2. Installation shall be performed using conventional tools and installation procedures AWWA C600 while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly. Proper activation of the gripping wedges shall be ensured with torque-limiting twist-off nuts.

PART 3. EXECUTION

3.01 EXCAVATION FOR PIPELINE TRENCHES

- A. Excavation for pipelines shall consist of the excavation necessary for the construction of water lines and their appurtenances (including valves, fittings, collars, concrete saddles, and pipe protection) that are called for by the drawings. It shall include clearing and grubbing where necessary, backfilling and tamping pipe trenches and around structures, and disposing of waste materials, all of which shall conform to the applicable provision set forth elsewhere in these specifications.
- B. The Contractor may, if he chooses, use a motor powered trenching machine. If he does, however, he shall be fully responsible for the preservation or repair of existing utility service connections.
- C. Unless the construction of lines by tunneling, jacking, or boring is called for by the drawings or specifically authorized by the Engineer, make excavation for pipelines in open cut and true to the lines and grades shown on the drawings or established by the Engineer on the ground. Cut the banks of trenches between vertical parallel planes equidistant from the pipe centerline. The horizontal distance between the vertical planes (of, if sheeting is used, between the inside faces of that sheeting) shall vary with the size of the pipe to be installed, but shall not be more than the distance determined by the following formula: $4/3d + 15''$, where "d" represents the internal diameter of the pipe in inches. When approved in writing by the Engineer, the banks of trenches from the ground surface down to a depth not closer than 1' above the top of the pipe may be excavated to non-vertical and non-parallel plans, provided the excavation below that depth is made with vertical and parallel sides equidistant from the pipe centerline in accordance with the formula given above. Any cut made in excess of the formula $4/3d + 15''$ shall be at expense of the Contractor and may

be cause for the Engineer to require that stronger pipe and/or a higher class of bedding be used at no cost to the Owner.

- D. For all pipe in non-rock trenches, shape the bottom of all trenches to provide uniform bearing for the bottom of the pipe barrel.
- E. Excavate bell holes for bell and spigot pipe at proper intervals so that the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper jointing of the pipe. Do not excavate bell holes more than 2 joints ahead of pipe laying.
- F. Do not excavate pipe trenches more than 200' ahead of the pipe laying, and not more than two hundred (200) feet of open ditch shall be left behind the pipe laying, and perform all work so as to cause the least possible inconvenience to the public. Construct temporary bridges or crossings when and where the Engineer deems necessary to maintain vehicular or pedestrian traffic.
- G. In all cases where materials are deposited along open trenches, place them so that in the event of rain no damage will result to the work and/or to adjacent property.
- H. Refer to Section 2.15, Unclassified Excavation for Utilities, paragraph 3.06, for sheeting, shoring and bracing requirements.

3.02 INSTALLATION OF WATER LINES

- A. Lay water lines to and maintain at the lines and grades required by the drawings. All fittings, valves, and hydrants shall be at the required locations, the spigots centered in the bells, and all valves and hydrant stems plumb.
- B. Unless otherwise indicated by the drawings, all water pipes shall have at least 36 inches of cover when located outside the roadway and at least 36 inches of cover when located inside the roadway. Water line shall be installed under sidewalks inside residential areas. Water lines shall be installed on the opposite side of road from underground primary electrical lines. Separation between water lines and electrical, gas and telecommunication utilities shall be five (5) feet measured edge to edge. Water lines shall not be installed in the bottom of ditches. No departure from this policy shall be made except with the approval of the Owner.

- C. Provide and use tools and facilities that are satisfactory to the Owner and that will allow work to be done in a safe and convenient manner. All pipe, fittings, valves, and hydrants are to be unloaded from the trucks using suitable tools and equipment. Use a derrick, ropes, or other suitable tools or equipment to lower all pipe, fittings, valves, and hydrants into the trench one (1) piece at a time. Lower each piece carefully so that neither it nor any protective coating or lining it may have shall be damaged. Under no circumstances drop or dump water line materials into the trench.
- D. Any pipes strung out along the route of the proposed lines before the actual installation of those lines is due to take place shall not be lowered into the trench until they have been swabbed to remove any mud, debris, etc., that may have accumulated within them. PVC pipe shall be strung out a maximum of one (1) day ahead of pipe laying. Remove all unnecessary material from the bell and spigot end of each pipe. Before any pipe is laid, brush and wipe clean the outside of its spigot end and the inside of its bell, and leave dry and oil-free.
- E. Take every precaution to keep foreign material from getting into the pipe while it is being placed in the line. If the crew laying the pipe cannot put it into the trench and in place without allowing earth to get inside, then place a heavy, tightly woven canvas bag or plug of suitable size over each end of the pipe, and leave in place until it is time to connect that pipe to the adjacent pipe.
- F. Place no debris, tools, clothing, or other materials in the pipe during laying operations.
- G. After a length of pipe has been placed in the trench, center the spigot end in the bell of the adjacent pipe, and insert to the depth specified by the manufacturer and bring to the correct line and grade. Secure the pipe in place by tamping an approved backfill material around it.
- H. Bell holes shall be large enough so that there is ample room for the pipe joints to be properly made. Between bell holes, carefully grade the bottom of the trench so each pipe barrel rests on a solid foundation for its entire length.
- I. Whenever pipe laying is not in progress, close the open ends of pipe either with a watertight plug or by other means approved by the

Owner. If there is water in a trench, leave this seal in place until the trench has been pumped completely dry.

- J. Cut pipe so that valves, fittings, or closure pieces can be inserted in a neat workmanlike manner without any damage to the pipe. Follow the manufacturer's recommendations concerning how to cut and machine the ends of the pipe in order to leave a smooth end at right angles to the pipe's axis.
- K. Lay pipe with the bell ends facing in the direction of laying unless otherwise directed by the Owner.
- L. Wherever pipe must be deflected from a straight line (in either the vertical or horizontal plane) in order to avoid obstructions or plumb stems, or wherever long radius curves are permitted, the amount of deflection shall not exceed that necessary for the joint to be satisfactorily made, nor that recommended by the pipe manufacturer, and shall be approved by the Owner.
- M. Lay no pipe in water or when it is the Owner's opinion that trench conditions are unsuitable. If crushed stone is used to improve trench conditions or as backfill for bedding the pipe, its use is considered incidental to the project, and no separate payment will be made for its use unless prior written approval is obtained from Owner.
- N. Where a water line crosses over a sanitary sewer, use a full joint of pipe with a standard mechanical joint, and center over the sewer. Where a water line is to be parallel to a sanitary or storm sewer, lay it at least ten (10) feet from the sewer. If it is not practical for the water and sewer lines to be separated as described above, then lay the water line at least 18 inches above the top of the sewer.
- O. Joint all pipe in the exact manner specified by the manufacturer of the pipe and jointing materials.
- P. As an attempt to verify quality of the PVC water pipe prior to installation of all pipe, the following procedure will be required. After the Contractor has laid between two to three thousand feet of pipe, said pipe shall be pressure tested in accordance with these specifications. Only upon satisfactory completion of the testing will the Contractor be allowed to continue laying pipe. If the quality of the pipe becomes suspect at any other point in the project, testing will be required prior to continuation of the pipe laying.

Q. Connecting to Existing Lines

1. Connections of new lines to existing lines shall be as shown on the Plans and/or directed by the Owner. This work is the responsibility of the Contractor and is not a separate pay item. Where tees are cut into existing water line and new water valves are added on either side of the run of tee and for new line on the branch line to a new water valve, the pipe shall either include ductile iron anchor couplings (for 6-inch) or runs of ductile iron pipe (8-inch and greater). No PVC line will be permitted between tees and valves.
2. The Contractor shall be completely responsible for determining existing pipeline materials, ordering proper fittings for the connection, and making the connection in an approved manner.

3.03 BEDDING AND BACKFILLING

- A. Begin backfilling after the line construction is completed and then inspected and approved by the Owner. In an earth trench, for PVC or DIP pipe material, on each side of the line, from the bottom of barrel of pipe to 12 inches above the top of the pipe, the backfill material shall be select backfill consisting of fine, loose earth like sandy soil or loam or of granular material that is free from clods, vegetable matter, debris, stone, and/or other objectionable materials and that has a size of no more than 2 inches. Place this backfill simultaneously on either side of the pipe in even layers that, before compaction, are no more than 6" deep. Thoroughly and completely tamp each layer into place before placing additional layers.
- B. In a rock trench, backfill shall be No. 67 crushed stone to a point 12-inches above the top of PVC or DIP pipe.
- C. In all paved areas or roadways, all backfill for PVC or DIP pipe shall be No. 67 crushed stone to a point within 8-inches of paved surface. The final 8-inches shall be crushed roadway base stone.
- D. If PVC or DIP pipe is installed in a rock trench or paved area, install a 6" bedding of No. 67 crushed stone below the pipe.
- E. From 1' above the pipe upward (if outside paved area or roadway) the backfill material may contain broken stones that make up approximately 3/4 of the backfills total volume. However, if this type of backfill is used, there must be enough spalls and earth materials to

fill all voids completely. The maximum dimension of individual stones in such backfill shall not exceed 6", and the backfill material shall be placed and spread in even layers not more than 12" deep. Tamp and thoroughly compact the backfill in layers that, before compaction, are 6" deep. In other areas, the backfill for the upper portion of the trenches may be placed without tamping but shall be compacted to a density equivalent to that of adjacent earth material as determined by laboratory tests. Use special care to prevent the operation of backfilling equipment from causing any damage to the pipe.

- F. Copper Wire for Detection: The Contractor shall furnish and install a 10 gauge blue coated copper wire over all **DIP and PVC** pipe. Where two sections of wire connect a 12 inch minimum twisted overlap is required with adequate bare wire connection for continuity. The bare wire connection shall extend up into all valve boxes so it is accessible for connection to locating equipment. At uncased road crossings the Contractor shall install the copper wire onto the top of the water line. Leave at least 36-inches of detector wire coiled in the valve boxes so it can be accessed for location.
- G. If earth material for backfill is, in the opinion of the Owner, too dry to allow thorough compaction, then add enough water so that the backfill can be properly compacted. Do not place earth material the Owner considers too wet or otherwise unsuitable.
- H. Wherever excavation has been made within easements across private property, the top 1' of backfill material shall consist of fine loose earth free from large clods, vegetation matter, debris, stone, and/or other objectionable materials.
- I. Wherever trenches have been cut across or along existing pavement, temporarily pave the backfill of such trenches by placing Class A, Grade D, crushed stone as the top 8" of the backfill. Maintain this temporary pavement either until the permanent pavement is restored or until the project is accepted by the Owner.
- J. Wherever pipes have diameter of 15" or less, do not use power operated tampers to tamp that portion of backfill around the pipe with 1' above the pipe.
- K. Perform backfilling so as not to disturb or injure any pipe and/or structure against which the backfill is being place. If any pipe or

structure is damaged and/or displaced during backfilling, open up the backfill and make whatever repairs are necessary.

- L. Backfilling and clean-up operations shall closely follow pipe laying; failure to comply with this provision will result in the Owner's requiring that the Contractor's other activities be suspended until backfilling and clean-up operations catch up with pipe laying.

3.04 PRESSURE TESTS

- A. After pipe has been laid and backfilled as specified above, subject all newly laid pipe or any valved section thereof to a pressure of 150% of normal operating pressure. All pipe shall be tested within two (2) weeks of installation.
- B. Conduct a pressure test for at least two (2) hours on uncovered pipe and six (6) hours on covered pipe.
- C. Slowly fill each valved section of pipe with water, and apply the specified test pressure (based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge) with a pump connected to the pipe in a manner satisfactory to the Owner. Furnish the pump, pipe, connections, gauges, and all necessary apparatus.
- D. Before applying the specified test pressure, expel all air from pipe. If hydrants or blow-offs are not available at high places, make the necessary taps at the points of highest elevation before testing, and close taps after the test has been completed.
- E. Carefully examine all exposed pipes, fittings, valves, and hydrants during the test. Remove any cracked or defective pipes, fittings, valves or hydrants discovered in consequence of this pressure test, and replace with sound material in the manner specified. Repeat the test until the results are satisfactory to the Owner.
- F. Prepare reports of all pressure test activities. Pressure tests shall be conducted utilizing a recording device and paper circular pressure chart. A copy of the pressure chart shall be provided to the Owner upon completion of satisfactory testing.

3.05 LEAKAGE TEST

- A. Conduct the leakage test after the pressure test has been satisfactorily completed. Furnish the pump, pipe, connections, gauges, measuring devices, and all other necessary apparatus as well as all necessary assistance to conduct the test.
- B. The duration of each leakage test shall be two (2) hours; during the test, subject the main to a pressure of 150 psi.
- C. Should any test of pipe laid disclose leakage greater than that specified the Contractor shall, at his own expense, locate and repair the defective joints until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of amount of leakage.
- D. Leakage defined: Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe or any valved section thereof in order to maintain pressure within 5psi of the specified test pressure after the pipe has been filled with water and the air expelled. Leakage shall not be measured by a drop in pressure in a test section over a period of time.
- E. Allowable Leakage: No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

1. Ductile Iron Pipe:
$$L = \frac{SD\sqrt{P}}{133,200}$$

Where: L = allowable leakage, in gallons per day.
S = length of pipe tested, in feet.
D = nominal diameter of the pipe, in inches.
P = average test pressure during the leakage tests, in per square inch (gauge).

Ductile Iron Pipe

Avg. Test Pressure psi	4	6	8	10	12
200	0.43	0.64	0.85	1.06	1.28
175	0.40	0.59	0.80	0.99	1.19
150	0.37	0.55	0.74	0.92	1.10

* If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

$$2. \text{ PVC Pipe: } L = \frac{ND\sqrt{P}}{7,400}$$

Where: L = allowable leakage, in gallons per hour
 N = number of joints in the length of pipeline tested
 D = nominal diameter of the pipe, in inches
 P = average test pressure during the leakage tests, in pounds per square inch (gauge)

PVC Pipe

Avg. Test Pressure psi	4	6	8	10	12
200	0.38	0.57	0.76	0.96	1.15
175	0.36	0.54	0.72	0.89	1.07
150	0.33	0.50	0.66	0.83	0.99

* If pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

When testing against closed metal-seated valves, an additional leakage enclosed valve of 0.0078 gal/h/in of nominal valve size shall be allowed. When hydrants are in the test section, the test shall be made against the closed main valve in the hydrant. All visible leaks are to be repaired regardless of the amount of leakage.

3.06 DISINFECTION

- A. During construction, take precautions to protect pipe interiors, fittings, and valves against contamination. When pipe laying is not in progress (e.g., at the end of the day's work), place watertight plugs in the ends of all pipe already in the trench; if water accumulates in the

trench, leave the plugs in place until the trench is dry. Complete the joints of all pipe in the trench before stopping work for any reason.

- B. Prior to placing the installed water line in service, the new pipe and all exposed sections and appurtenances of existing pipelines shall be cleaned and disinfected in accordance with ANSI/AWWA C651 unless otherwise specified. Pipelines shall be flushed follow completion of disinfecting procedures. Disposal or neutralization of disinfection water shall comply with applicable regulations.
- C. Make water flow from the existing distribution system or some other source approved by the Engineer into the newly laid pipeline, and add chlorine to it. Feed water into the pipe, and chlorine into the water, at constant, measured rates so proportioned that the chlorine concentration in the water in the pipe is kept at a minimum of 50 mg/l available chlorine.
- D. Table 3 shows how much chlorine is needed for each 100 feet of line for pipes of various diameters. A 1% chlorine solution may be prepared either with one (1) pound of calcium hypochlorite for each 8.5 gallons of water or with sodium hypochlorite.

TABLE 3 CHLORINE REQUIRED TO PRODUCE A 50 MG/L CONCENTRATION IN 100 FEET OF PIPE, BY DIAMETER		
Pipe Size (inches)	100% Chlorine (pounds)	1% Chlorine Solutions (gallons)
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88
16	0.320	3.96

- E. While the chlorine is being applied, manipulate valves so that the treatment dosage will not flow back into the line that is supplying the water. Continue the application of chlorine until the entire line being treated is filled with the chlorine solution. Then retain the chlorinated water in the line for at least 24 hours, during which time all valves and hydrants in the line being treated shall be operated so that appurtenances can also be disinfected. After 24 hours, the treated

water shall have a chlorine concentration of at least 25 mg/l throughout the line.

- F. Final flushing shall be conducted in accordance with AWWA C651. After applicable retention period, flush heavily chlorinated water from line until chlorine concentration in water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/l. Perform such flushing only at approved sites. If no approved point of discharge is available, neutralizing chemicals must be applied to the water in order to neutralize the chlorine residual. The amount of chemicals required to neutralize various residual chlorine concentrations in 100,000 gallons of water are shown in Table 4.

TABLE 4 Amounts of Chemicals Required to Neutralize Various Residual Chlorine Concentration in 100,000 Gallons of Water								
Chemical Required								
Residual Chlorine Concentration	Sulfur Dioxide (SO ₂)		Sodium Bisulfite (NaHSO ₃)		Sodium Sulfate (Na ₂ HSO ₃)		Sodium Thiosulfate (Na ₂ S ₂ O ₃ ·5H ₂ O)	
	mg/L	lb.	(kg)	lb.	(kg)	lb.	(kg)	lb.
1	0.8	(.36)	1.2	(.54)	1.4	(.64)	1.2	(.54)
2	1.7	(.77)	2.5	(1.13)	2.9	(1.32)	2.4	(1.09)
10	8.3	(3.76)	12.5	(5.67)	14.6	(6.62)	12.0	(5.44)
50	41.7	(18.91)	62.6	(28.39)	73.0	(33.11)	60.0	(27.22)

- G. The velocity of the water used to flush a line shall be at least 2.5 fps. The flow rates required to produce this velocity in various sizes of pipe are shown in the following Table 5:

<p style="text-align: center;">TABLE 5 REQUIRED OPENINGS TO FLUSH PIPELINES (40 PSI RESIDUAL PRESSURE)</p>					
Pipe Size (inches)	Flow Required to Produce 2.5 fps Velocity (gpm)	No. of Taps on Pipe	Size of Tap	Hydrant Outlet Nozzles	
4	100	1	1"	1	2-1/2
6	220	1	1-1/2"	1	2-1/2
8	390	3	2 @ 1-1/2" 1 @ 2"	1	2-1/2
10	610	5	3 @ 1-1/2" 2 @ 2"	1	2-1/2
12	880	2	2"	1	2-1/2

- H. Once a line has been flushed, test to make certain that the residual chlorine in the water is within acceptable limits.
- I. It must be noted that flushing is no substitute for taking preventative measures before and during the laying of water lines. Certain contaminants -- especially those in caked deposits-- are difficult or even impossible to remove by flushing, no matter how high the velocity. Furthermore, in pipes with diameters of 16 inches or more, it can be difficult to achieve even the minimum recommended flushing velocity of 2.5 fps.

3.07 BACTERIOLOGICAL TESTS

- A. After a water line has undergone final flushing but before it is placed into service, contractor shall collect a sample for bacteriological testing from the end of that line. In the case of extremely long lines, take additional samples if the Authority so directs. A bacteriological sample shall be taken from each dead-end line or at least 1,200 feet whichever is greater. Tests shall be in accordance with AWWA C651.
- B. Contractor shall collect these samples in sterile bottles treated with sodium thiosulfate. Do not use a hose or fire hydrant to collect samples. One suggested sampling method is to install a standard corporation cock in the line with a copper tube gooseneck assembly; after the samples have been taken, the gooseneck assembly can be

removed and retained for later use. Authority will provide the sample bottles. Authority representative must be present during sample collection.

- C. The Authority representative will take the samples collected to the their laboratory to be tested for bacteriological quality in order to determine if they contain any coliform organisms. If the initial disinfection fails to produce satisfactory samples, repeat disinfection until satisfactory samples are obtained.
- D. When the samples tested are found to be satisfactory, the water line may be placed in service. Provide the Authority with copies of the final bacteriological tests.

3.08 DISINFECTION PROCEDURE AFTER CUTTING INTO OR REPAIRING EXISTING LINES.

- A. The procedures outlined above apply primarily to cases in which the lines are wholly or partially dewatered.
- B. However, leaks or breaks that are repaired with clamping devices while the lines remain full of water under pressure present little danger of contamination and require no disinfection.
- C. When an existing line is opened, whether by accident or design, the excavated area could be wet and contaminated because of the presence of sewers nearby. The danger of contamination from such pollution can be lessened if liberal quantities of hypochlorite are applied to the open trenches. It is better to use tablets for disinfection in such cases because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation site.
- D. Where practical, treat the lines by the slug method in accordance with AWWA C651.
- E. The following disinfection procedure is considered the minimum that may be used when existing lines are repaired:
 - 1. Swab the interior of all pipes and fittings (particularly couplings and tapping sleeves) that are to be used in repairing an existing line with a solution of 5% hypochlorite before installing them.

2. The most practical means of removing contamination introduced into a line during repairs is to give the line a thorough flushing. If the locations of valves and hydrants make it possible, flushing in both directions is recommended. Start flushing as soon as repairs are completed, and continue until all discolored water is eliminated.

3.09 FINAL WATER LINE ACCEPTANCE

- A. After completing each section of water line, remove all debris and all construction materials from the work site. Then grade and smooth over the surface of both sides of the line. Leave the entire area clean and in a condition satisfactory to the Owner.

END OF SECTION

SECTION 4.02

WATER VALVES, HYDRANTS, AND APPURTENANCES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Installation of fire hydrants, valves, and related accessories as specified below.
- B. Refer to other sections for work related to that specified under this heading.

PART 2 - PRODUCTS

2.01 GATE VALVES

- A. Valves on water lines 12 inches and smaller shall be of the resilient seat, iron body, bronze mounted type designed to work equally well with pressure on either side of the gate. All gate valves shall be in accordance with or exceed AWWA C515. Working pressure shall be 200 psi.
- B. Valves shall be supplied with O-ring seal stuffing boxes and shall open to the left. Valves shall be Mueller, M&H, America Darling, Clow, or equal, with mechanical joints.

2.02 TAPPING VALVES AND TAPPING SLEEVES

- A. Tapping valves shall meet all the requirements of 2.01 above.
- B. Stainless steel tapping sleeves shall be two-piece, Mueller H-304, Ford FTSS, JCM 432 or approved equal. Outlet flange dimensions shall comply with AWWA C207, ANSI Class D 150# drilling. Stainless steel tapping sleeves shall be rated for 250 psi working pressure (4"-12") and comply with NSF 61. Internal gasket shall be SBR or Buna-N providing 360° pipe coverage.
- C. Ductile iron body tapping sleeves shall be two-piece, Mueller H-615 or equal and have outlet flange dimensions complying with ANSI B16.1, Class 125 and certified for NSF 61. Ductile body tapping sleeves shall be rated for 20 psi working pressure.
- D. All tapping sleeves shall include a 3/4" NPT test plug.

2.03 VALVE BOXES

- A. All valve box castings shall be made accurately to the required dimensions, and shall be sound, smooth, clean, and free from blisters and other defects. Defective castings which have been plugged or otherwise treated to remedy defects shall be rejected. Contact surfaces of frames and covers shall be machined so that the covers rest securely in the frames with no rocking and with the cover in contact with the frames for the entire perimeter of the contact surface. All castings shall be thoroughly cleaned subsequent to machining and before rusting begins, painted with a bituminous coating so as to present a smooth finish, tough and tenacious when cold, but not tacky with no tendency to scale. Install valve boxes on each proposed valve in accordance with the details shown on the standard drawings.

2.04 FIRE HYDRANTS

- A. Fire hydrants shall comply in all respects with AWWA C502 and shall be of the compression type, with the main valve opening against the pressure and closing with the pressure. The main valve opening shall be not less than 5-1/4 inches in diameter. The main valve facing of the hydrant shall be made of balata or similar material especially suited and proven for the services intended. The bottom stem threads of the main valve rod shall be fitted with an acorn nut or suitable means for sealing the threads away from the water. Hydrants shall be connected to the main by a 6 inch mechanical joint shoe, unless otherwise shown on the drawings, and fitted with strapping lugs. For full service fire hydrants, two 2-1/2 inch hose nozzles and one 4-1/2 inch steamer nozzle shall be threaded and screwed into the nozzle section and then pinned to prevent turning.
- B. Operating nut shall be provided with convenient means to afford lubrication to ensure ease of operation and the prevention of wear and corrosion.
- C. Hydrant shall be the dry barrel type, and hydrant shoe shall have two positive acting non-corrodible drain valves that drain the hydrant completely by opening as soon as the main valve is closed and by closing tightly when the main valve is open. Drain valves operated by springs or gravity will not be acceptable.
- D. The packing gland located in the bonnet shall be solid bronze, and gland bolts shall steel with bronze nuts. A double O-ring seal may be used in lieu of conventional stuffing box.

- E. The hydrant shall open by being turned to the left and be so marked on the bonnet in cast letters with an arrow.
- F. Threads on hose and steamer nipples, operating nut, and cap nuts shall conform to local Water Department standards.
- G. Bury depth shall be 48 inches so that a 36 inch minimum cover is maintained above water line. All hydrants shall stand plumb. Install the hydrant so that the bottom flange is a minimum of 4 inches above finished grade.
- H. Hydrants shall be M&H, Model 129 or American-Darling Model B84-B. Color shall be red.

2.05 AIR RELEASE VALVES

- A. Air release vales shall be manual type and as set forth in the Limestone County Water and Sewer Authority Standard Specifications and Details.

2.06 BLOW-OFF ASSEMBLIES

- A. Blow-off assemblies shall be complete assembly and as set forth in the Limestone County Water and Sewer Authority Standard Specifications and Details.

2.07 DUAL CHECK VALVE ASSEMBLY

- A. A 1-inch dual check valve assembly shall be installed in the meter box on the discharge side of the water meter assembly. Dual check valve assembly shall be A.Y. McDonald, Model 7311-3JM or Apollo Model DUCLF4N-MRF (no lead). Device shall be certified to NSF 61 and NSF 372 Standards. Brass components in contact with portable water shall conform to ASTM B584 and identified with "NL". Device shall be rated for 175 psi water pressure.
- B. Dual check valve assembly shall be provided at each new residential service connection.

2.08 YARD HYDRANT

- A. A 1-inch frost-proof yard hydrant shall be installed at each pump station site or at locations otherwise shown on the plans. Hydrant shall be Model YH-3 lead free –with a bury depth of 36 inches, as manufactured by Campbell Manufacturing, Inc. Hydrant shall include a locking hasp to prevent unauthorized usage.

PART 3 - EXECUTION

3.01 SETTING VALVES AND APPURTENANCES

- A. General: Set valves, fittings, plugs, and caps and joint to pipe in the manner heretofore specified for cleaning, laying, and jointing pipe.
- B. Tapping sleeves shall be separately pressure tested before connection to the new water line. The Authority must witness the tapping saddle pressure test. The tapping sleeves must be rated for the anticipated working pressure. Care must be used to assure that all bolts are equally tightened. The tapping valve is to be solidly supported with brick or block and carefully bedded to prevent shifting due to settling back fill.
- C. The Authority will perform taps for water lines for all water lines up to 8-inches in size. The cost of the Authority performing the water line tap is \$100/in-dia. The Contractor will be required to excavate for installation of the tapping saddle and tapping valve and install both devices in preparation for the Authority to tap. The aforementioned pressure test shall already be completed. Taps on lines above 8-inches in diameter shall be performed by the Contractor at their own expense by a tapping sub-contractor approved by the Authority. The coupon from large taps shall be provided to the Authority.
- D. Location of Valves: Valves in water mains shall, where possible, be located on the street property lines extended unless otherwise shown on the drawings. Valves shall not be located in paved areas without prior approval of the Authority.
- E. Valve Boxes: Provide a valve box for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the wrench nut of the valve, with the box cover flush with the surface of the finished pavement or such other level as may be directed by the Owner. No PVC pipe will be allowed as a valve box.
- F. Provide a concrete collar around each valve located in unpaved areas.
- G. Provide a 4-inch thick, wire reinforced concrete slab beneath backflow preventer enclosures.
- H. All gate valves shall include a restraint device (Mega-Lug or equal) on each side of the valve.

3.02 SETTING HYDRANTS

- A. Location: Locate hydrants as shown on the drawings or as directed by the OWNER and in a manner that will provide complete accessibility and also minimize the possibility of damage from vehicles or injury to pedestrians.
- B. Position: All hydrants shall stand plumb. Install hydrants so that bottom flange is 4 inches minimum above finished grade and 36 inch minimum cover is maintained above water line. Minimum hydrant bury length shall be 48-inches.
- C. Connection to Main: Connect each hydrant to the main with a ductile iron hydrant anchor tee and 6 inch gate valve. Pipe between valve and hydrant shoe shall be ductile iron anchor couplings or ductile iron pipe with pipe restraint devices (Mega-lug or equal). No PVC pipe will be permitted on hydrant connections.
- D. Hydrant Drainage: Provide drainage at the base of the hydrant by placing coarse gravel or crushed stone from the bottom of the trench to at least 6 inches above the waste opening in the hydrant to a distance of 1 foot around the elbow. Connect no drainage system to a sewer.
- E. Anchorage for Hydrants: Brace the shoe of each hydrant against undisturbed earth at the end of the trench with stone slabs or concrete blocking. Insure that the drain in the hydrant shoe is not blocked to allow for the hydrant to drain upon closure.

END OF SECTION

SECTION 4.03

WATER SERVICE ASSEMBLIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. All new residential service assemblies shall be $\frac{3}{4}$ -inch unless otherwise approved by the Owner.
- B. Service assembly requirements shall be as directed by the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All service assembly components in contact with potable water shall be certified No Lead or Lead Free.
- B. The service assembly shall include a corporation cock, copper service pipe gooseneck, meter, meter box, and tapping saddle as required.
- C. CORPORATION COCK: The corporation cock shall be of solid bronze suitable for a compression flange on the service pipe and for tapping into the water main at a vertical angle. This cock shall be similar to Ford F-1000. The threads on the corporation cock shall be Ford.
- D. SERVICE PIPE: Service pipe shall be 1 inch HDPE DR 9 service line.
- E. METER VALVES: Meter valves shall be Ford, straight ball with CTS joints.
- F. WATER METERS: The Owner will supply all water meters required of this Contract.
- G. METER BOXES: Boxes shall be jumbo sized 13" by 20". Meter box and cover shall be injection molded of structural foam polyolefin material with coloring and UV stabilizers added. Box design shall be tapered and have a minimum wall thickness of 0.25" and include one pipe slot. The body shall have a double wall at the top cover seat area with a minimum thickness of 0.187". The cover seat area shall have 16 structural support ribs on the underside of the seat, each with a minimum thickness of $\frac{3}{16}$ ". The bottom of the body shall have a 1" flange. The cover shall have an average

thickness of 0.25". The cover shall be drop-in with a recessed area designed to accommodate the Owner's MTU units.

- H. TAPPING SADDLES: Tapping saddles shall be used for tapping all PVC pipe and shall be Ford S70 series, and shall be AWWA threaded to accept the corporation cock specified above. Tapping saddle body and strap shall be made of brass alloy and shall be joined together with stainless steel pin. No taps larger than 1 inch shall be made in any size pipe without approval by the Owner.
- I. DUAL CHECK VALVES: Each residential water service shall include a dual check valve. The dual check backflow preventer shall meet the domestic requirements of NSF 61 and be lead free. It shall be bronze-bodied. A brass identification tag indicating direction of flow shall be securely attached to the body by corrosion-resistant mechanical fasteners. The dual check shall be A.Y. McDonald, Model 7311-3JM or Apollo Model DUCLF4N-FMRF1.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Make no taps on dry lines without approval from the Owner. Taps in newly installed water line shall be made by the Contractor. Taps on existing water lines shall be made by the Owner.
- B. Contractor shall make all service taps on new lines.
- C. The service line shall have a minimum of 18 inches cover. Prior to connecting meter, blow any accumulated trash out of the pipe.

3.02 INSTALLATION

- A. All service lines to be installed under paved county or state roads will be bored and jacked. A 2-inch schedule 40 PVC casing pipe shall be provided for bored 1" services or new 1" services under roadways. Service line casing shall extend to a point 2 feet behind the sidewalk on each side of the roadway. No couplings shall be used on new service lines.
- B. In general, install the meter box as near the property lines as possible in the street right-of-way. Set plumb approximately 1 inch above the existing or proposed grade and so that surface drainage will not enter it. Fill from the existing or proposed grade to the top of the meter box at a slope of 1 inch in 12 inches. When the cut or fill slopes on streets extend beyond the street

right-of-way, install the meter box at the top or toe of slope, as applicable, or as directed by the Owner. Meter boxes damaged by home builder will be responsibility of the home builder to reset or replace.

- C. The service main shall not be taut from stop to cock. A gooseneck shall be left at the connection to the water main.
- D. The dual zone backflow preventer shall be mounted directly behind the meter on the house side of the service line.

END OF SECTION

SECTION 03303

CONCRETE FOR UTILITY LINES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Furnishing and installing concrete blocking, cradles, anchors, caps, pipe protection, and/or encasement at the locations directed by the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete work shall conform to ACI 301, latest revision, as modified by the supplemental requirements below:
 - 1. Strength: The strength of concrete shall be 4,000 psi unless otherwise shown on the drawings.
 - 2. Durability: All concrete exposed to weather shall be air entrained.
 - 3. Slump: Concrete shall be proportional and produced to have a slump of three (3) inches with a one (1) inch tolerance.
 - 4. Admixtures: Air entrainment, mandatory for concrete exposed to weather, may be used. A water reducing admixture (retarding, normal, or accelerating, depending on placing temperature), may be used if approved by the Owner.
 - 5. Reinforcing Steel: Yield strength of reinforcing steel shall be 60,000 psi.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Perform concrete work in accordance with recommendations of ACI-301.

END OF SECTION

APPENDIX

STANDARD CONSTRUCTION DETAILS

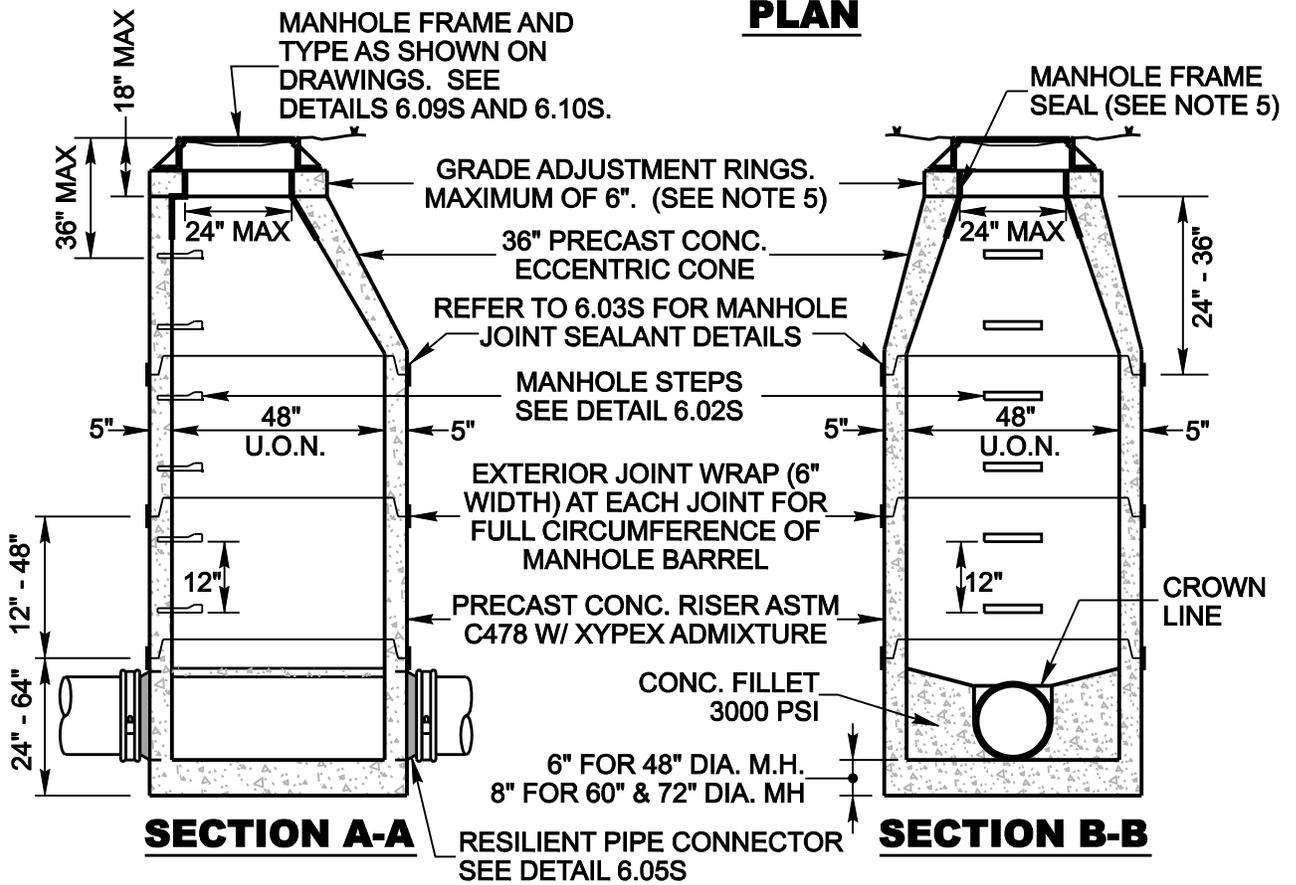
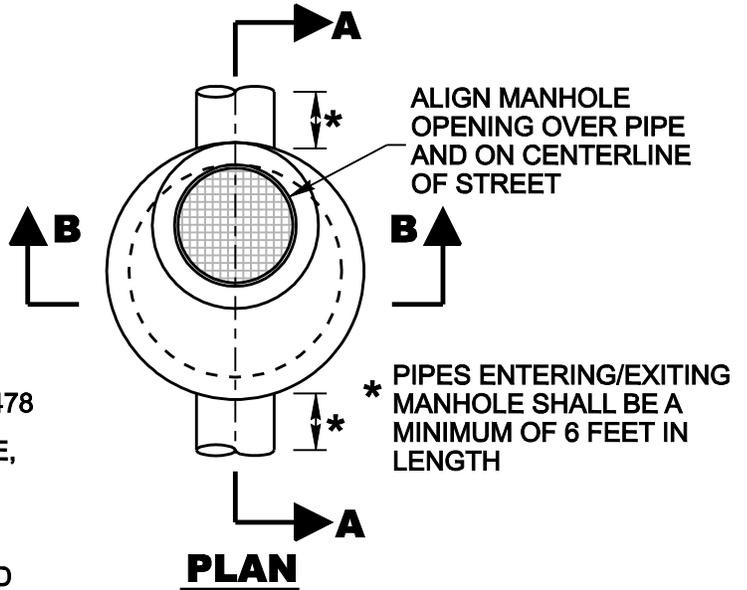
Standard Sewer Details 6.01S – 6.21S

Standard Water Details 6.01W – 6.19W

Miscellaneous Details 6.01M – 6.08M

NOTES:

1. DO NOT USE GRADE RINGS WHERE MH EXTENDS ABOVE GRADE.
2. PLACE 2 STRIPS OF BUTYL RUBBER SEALANT BETWEEN TOP OF CONCRETE AND BOTTOM OF MANHOLE FRAME. GROUT FRAME AND COVER TO MANHOLE.
3. MONOLITHIC MANHOLE SIDEWALL TO BE 5" THICK
4. ALL PRECAST MANHOLE SEGMENTS TO MEET REQUIREMENTS OF ASTM C478
5. WHERE GRADE ADJUSTMENT IS DONE, A MANHOLE FRAME SEAL SHALL BE PROVIDED.



REV.:	01/2015
REV.:	02/2012
DATE:	08/2010

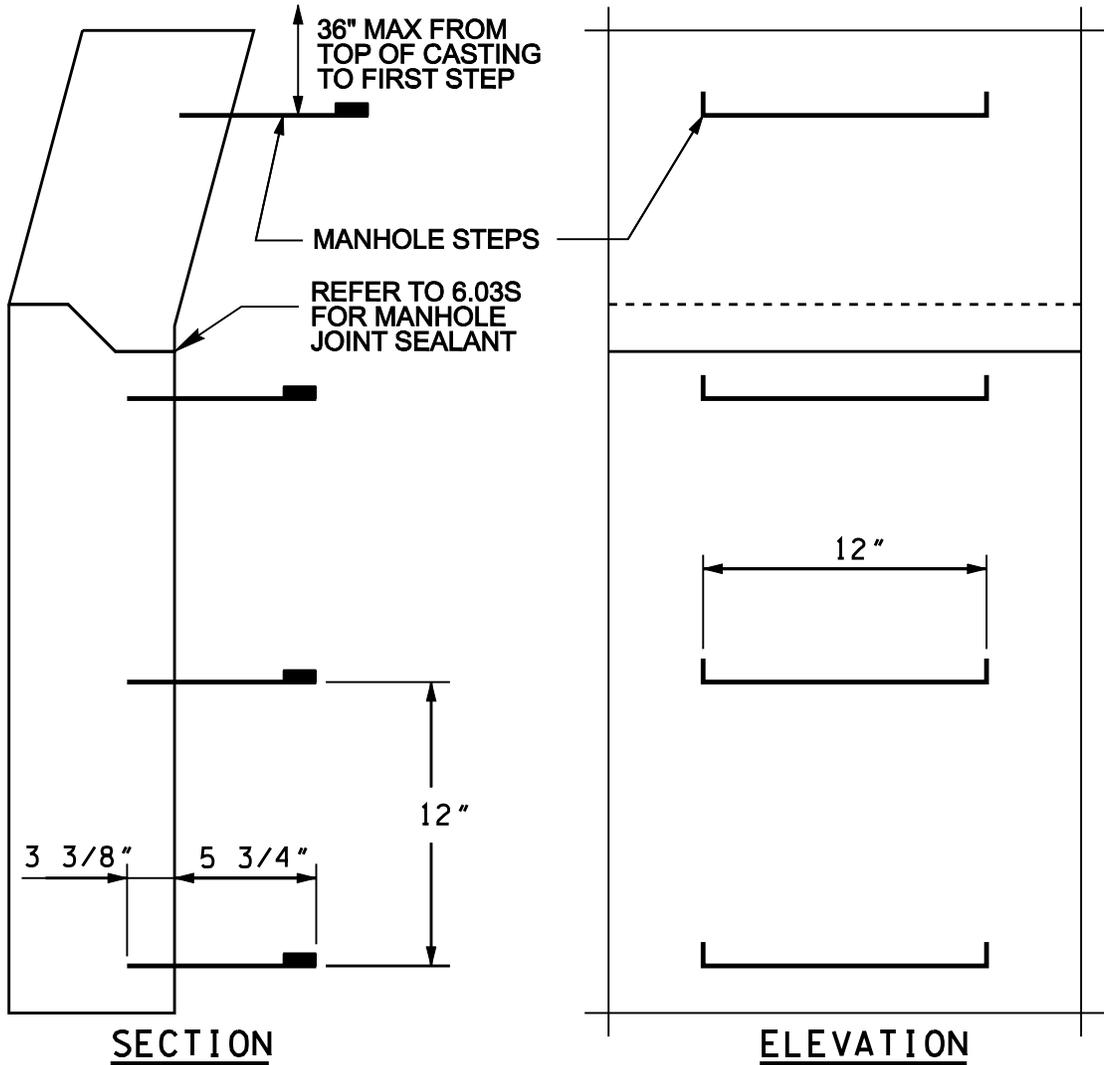
NOT TO SCALE

TYPICAL SANITARY SEWER MANHOLE

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

NOTE:
**3/8" STEEL REINFORCED ROD ENCAPSULATED
 IN POLYPROPYLENE PLASTIC**



1. STEPS TO BE INTEGRALLY CAST INTO MANHOLE SECTION.
2. STEPS TO BE ALIGNED VERTICALLY THROUGHOUT EACH MANHOLE SECTION
3. STEPS TO BE ALIGNED WITH OUTLET PIPE DIRECTION
4. LAST STEP TO BE 12" ABOVE PIPE

REV. 01/2015

DATE: 08/2010

NOT TO SCALE

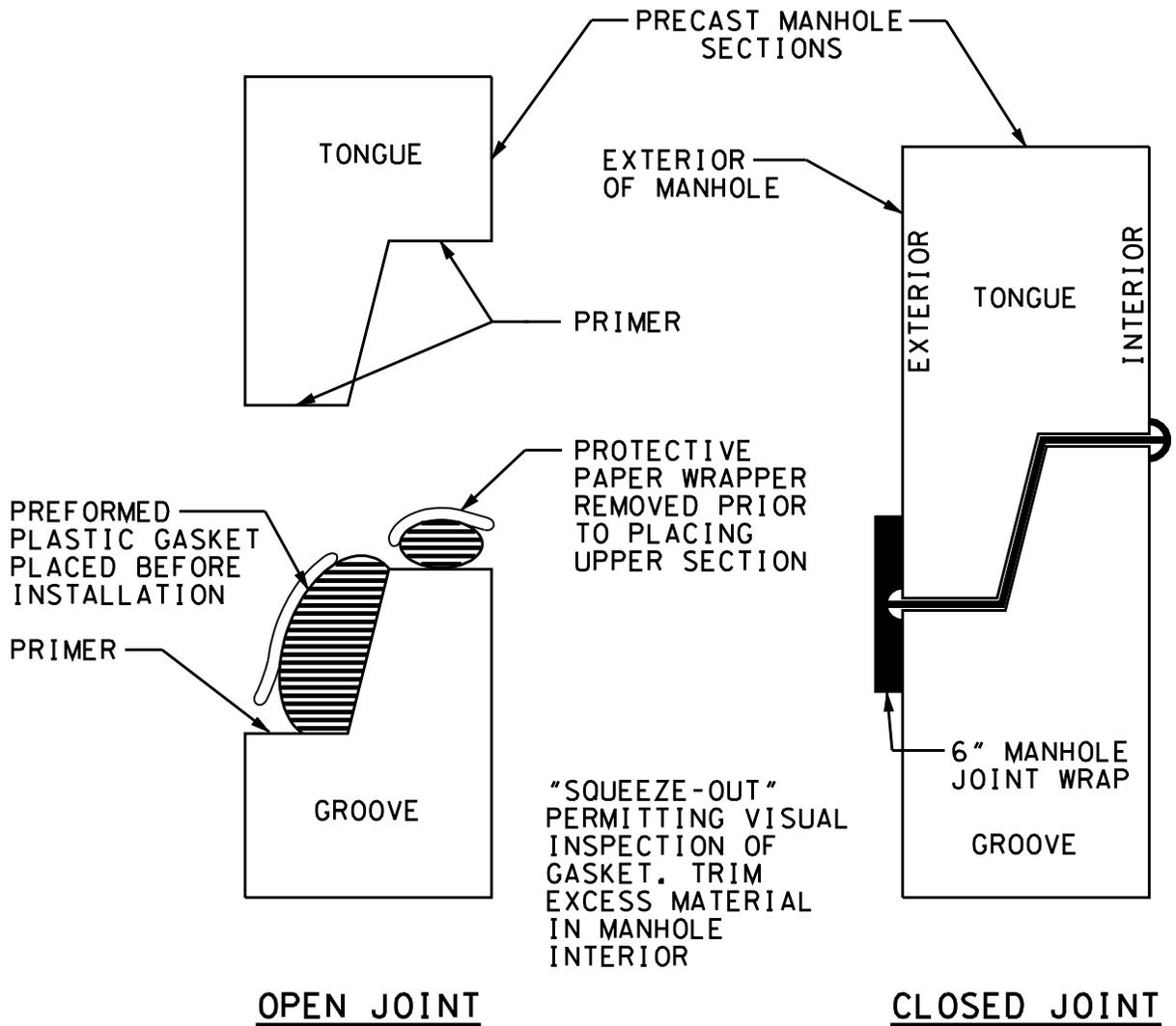
MANHOLE STEPS DETAIL

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
 LIMESTONE COUNTY, ALABAMA

NOTE:

WHERE MASTIC DOES NOT PROTRUDE, EITHER INSIDE OR OUTSIDE, POINT UP JOINT WITH GROUT



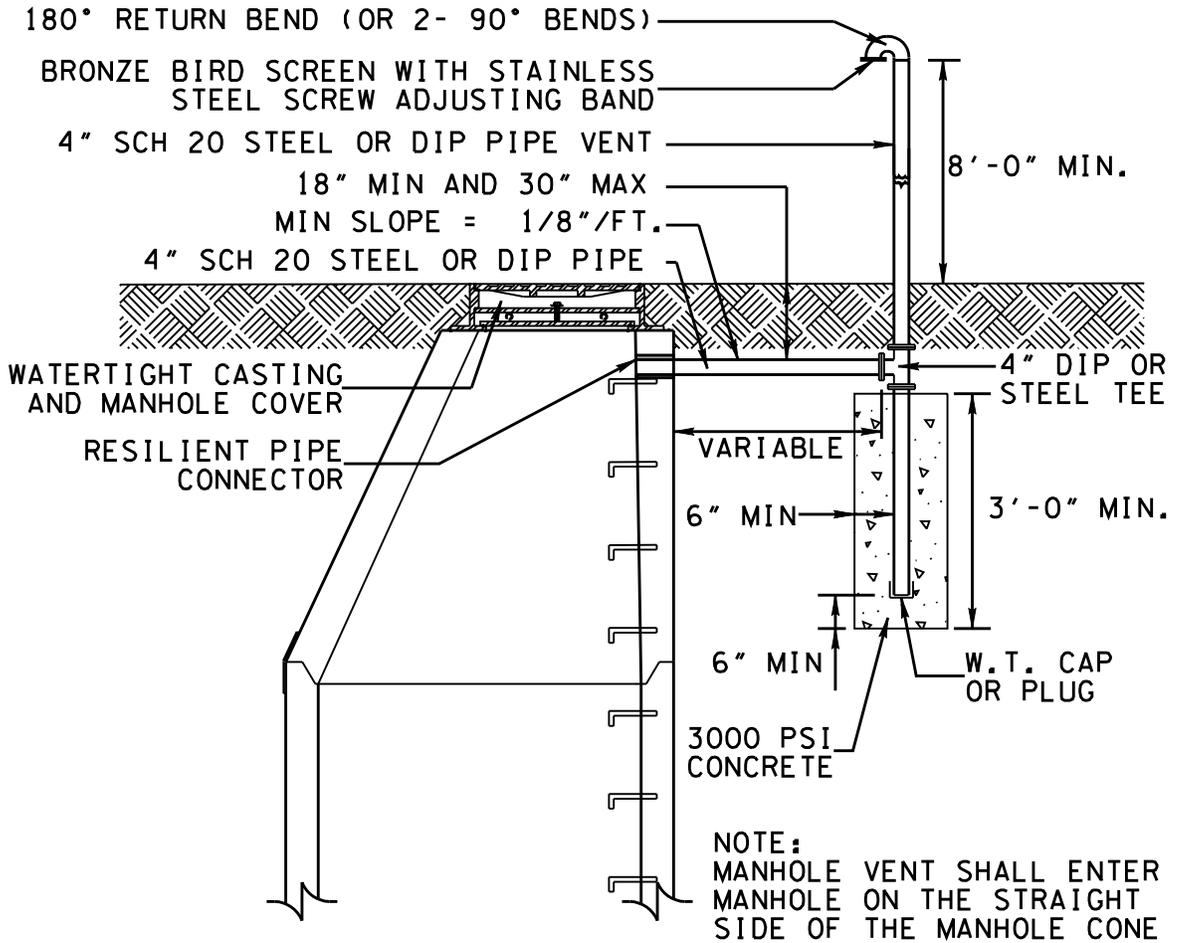
DATE: 08/2010

NOT TO SCALE

MANHOLE JOINT SEALANT DETAIL

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. PIPE TO BE PAINTED WITH ONE COAT OF PRIMER, AND TWO COATS OF SAFETY GREEN ENAMEL.
2. TOP OF VENT TO BE MINIMUM OF 8'-0" ABOVE GRADE OR HIGHER IF ELEVATION IS SHOWN ON PLANS.

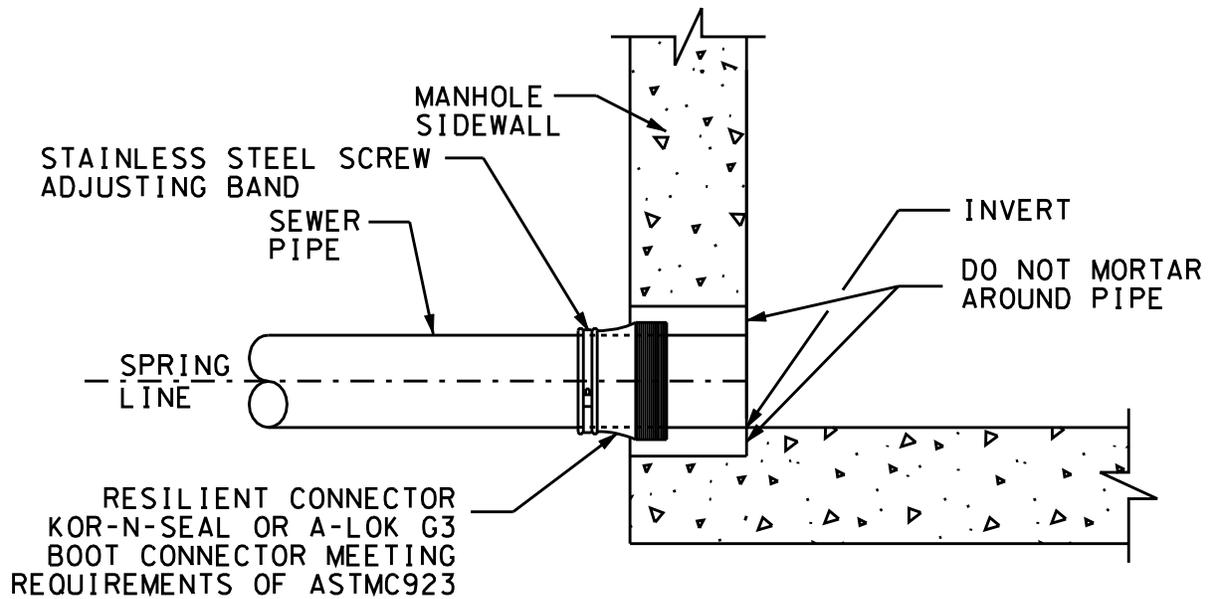
DATE: 08/2010

NOT TO SCALE

MANHOLE VENT DETAIL

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTE:

1. PIPES ENTERING/EXITING MANHOLES SHALL BE A MINIMUM OF 6 FT IN LENGTH

REV.: 02/2012
DATE: 08/2010

NOT TO SCALE

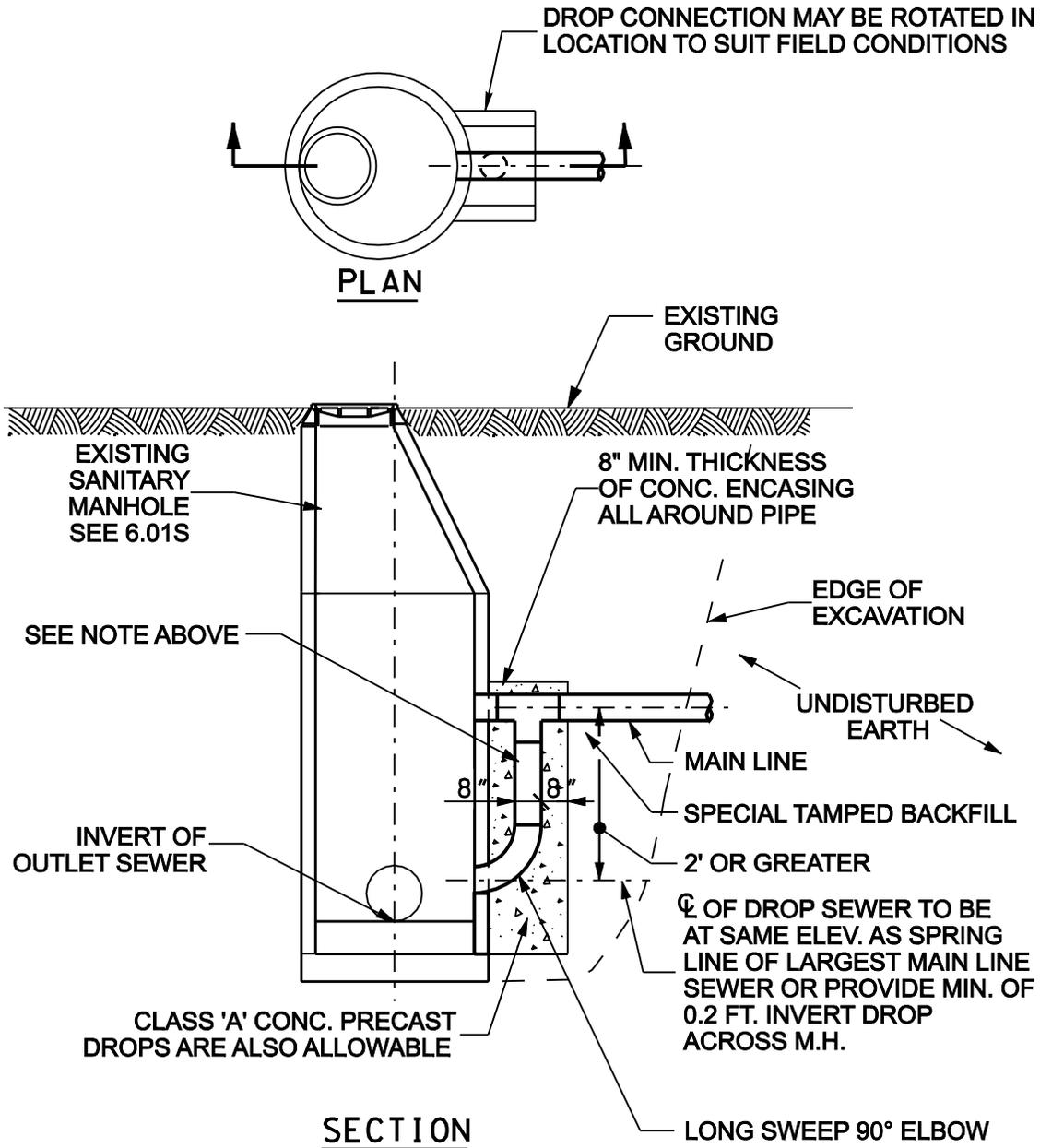
FLEXIBLE MANHOLE PIPE CONNECTION DETAIL

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

DROP SIZE NOTE:

FOR GRAVITY SEWERS, DROP SIZES SHALL BE 8" FOR MAIN LINE UP THROUGH 12"; 10" FOR MAIN LINE 15" AND LARGER. FOR FORCE MAINS, DROP SIZES SHALL BE MINIMUM OF 6". FOR FORCE MAIN LARGER THAN 6", MATCH REQUIREMENTS FOR GRAVITY SEWERS.



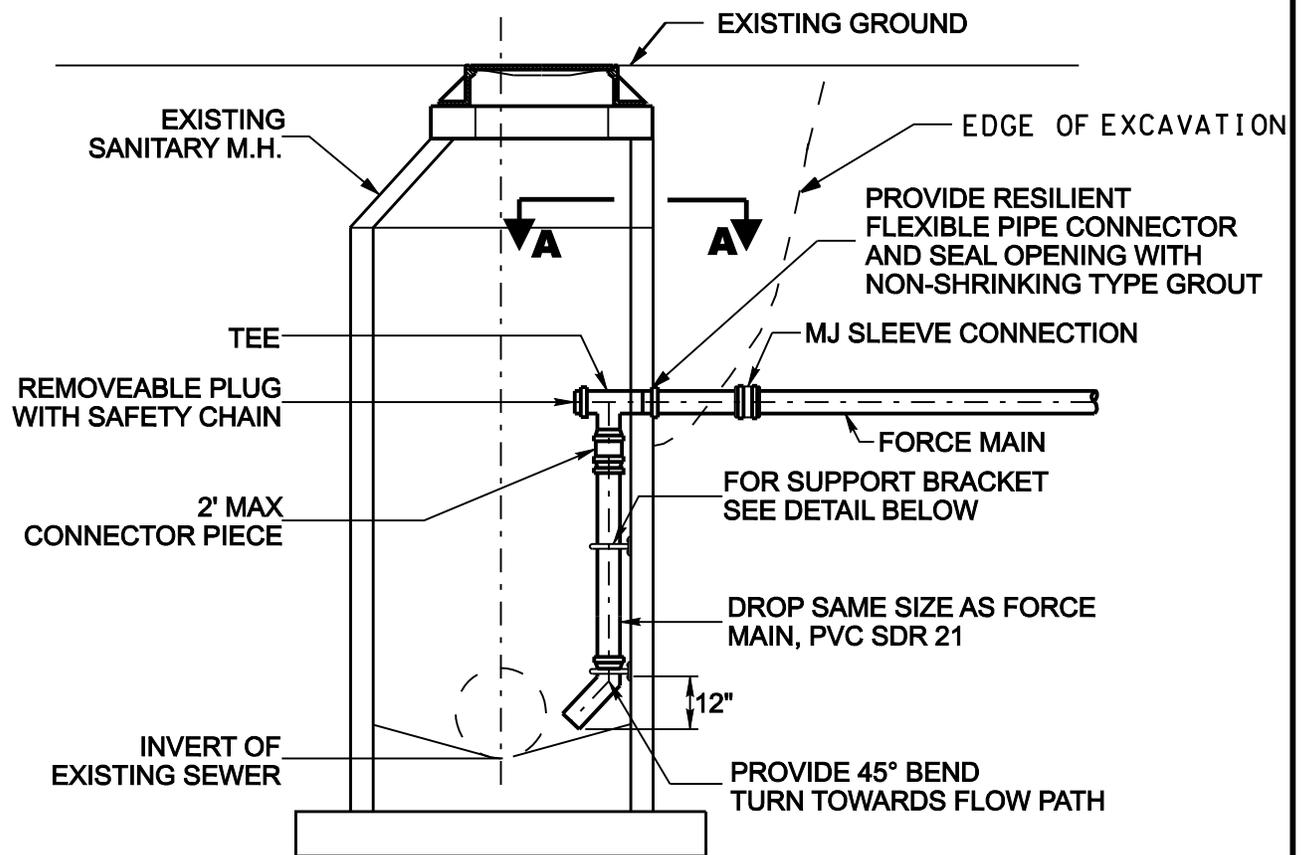
REV. 01/2015
DATE: 08/2010

NOT TO SCALE

**EXTERIOR DROP MANHOLE DETAIL
(GRAVITY LINE ONLY)**

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



SECTION

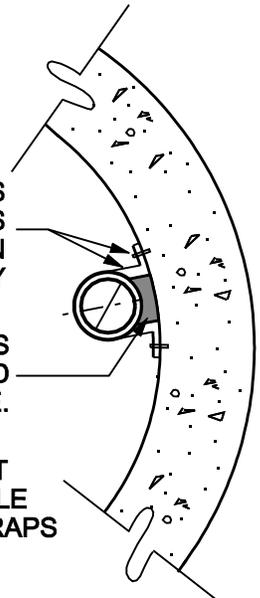
NOTES:

1. THIS DETAIL TO BE USED ONLY WITH PERMISSION OF LCWSA GENERAL MANAGER AND LCWSA BOARD ENGINEER.
2. STRONG-SEAL HIGH PERFORMANCE MIX MS2C SHALL BE APPLIED TO EXISTING MANHOLE. REFER TO SPECIFICATION 3.04
3. INTERIOR PIPING TO BE SAME SIZE AS FORCE MAIN PIPING.

3/16" x 1" ALUMINUM STRAPS WITH 1/2" DIA. x 2" LG. STAINLESS STEEL BOLT AND EXPANSION ANCHORS SET IN EPOXY

NEOPRENE RUBBER BLOCKS CUT TO CONTOUR AT MH AND PIPE FOR BELL CLEARANCE.

PROVIDE STRAP ASSEMBLY AT TOP AND BOTTOM OF MANHOLE WITH MIN. (2) ADDITIONAL STRAPS SPACED AT 24" C/C MAX.



SECTION A-A

REV. 01/2015

DATE: 08/2010

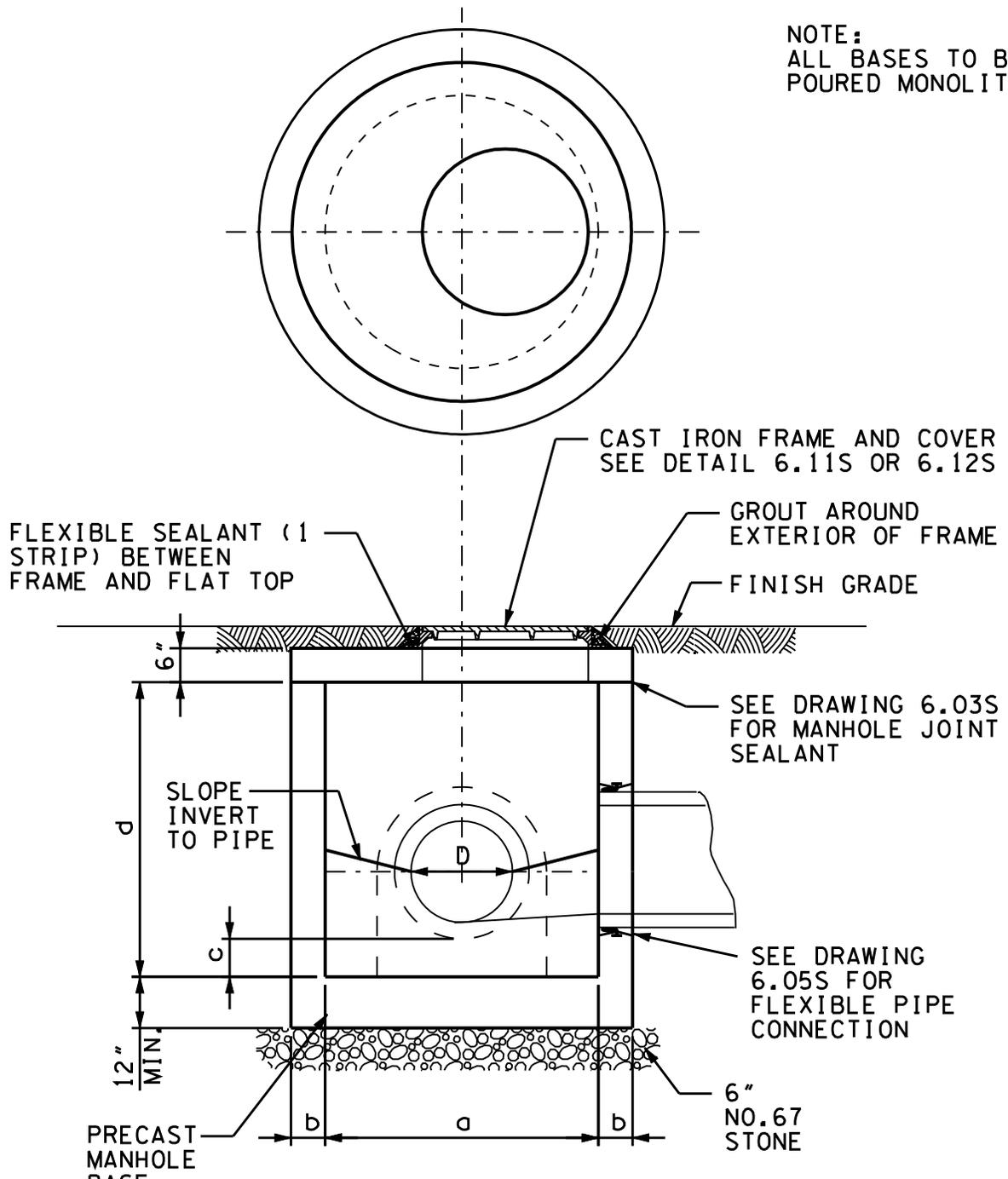
NOT TO SCALE

INTERIOR DROP MANHOLE DETAIL (FORCE MAIN CONNECTION ONLY)

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

NOTE:
ALL BASES TO BE
POURED MONOLITHIC.



PIPE DIAMETER	MANHOLE DIAMETER	WALL THICKNESS	BASE THICKNESS	MIN. RISER HEIGHT	MAX. RISER HEIGHT
D	a	b	c	d	d
< 24"	4'-0"	5"	8"	2'-6"	5'-8"

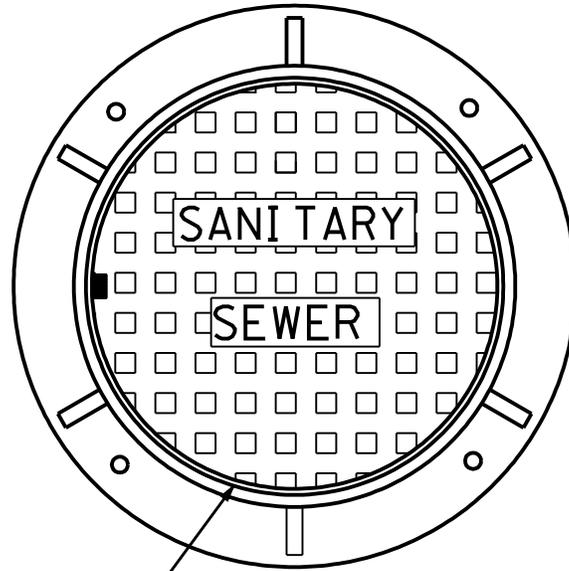
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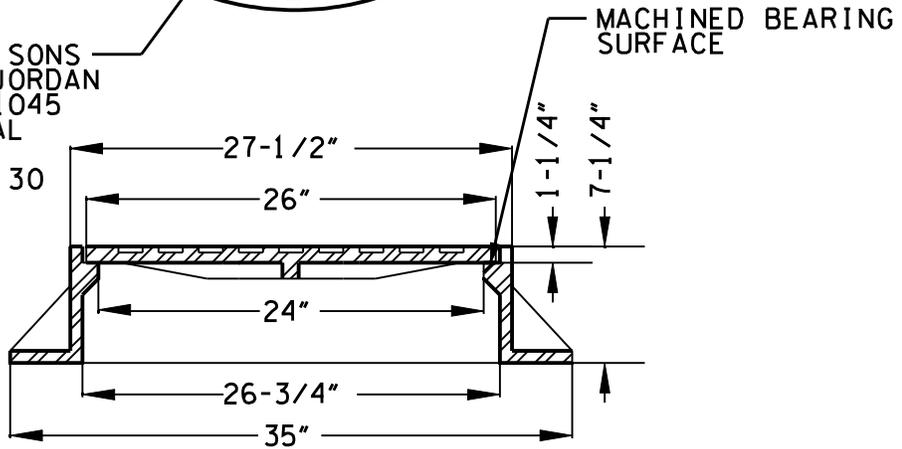
SHALLOW MANHOLE DETAIL

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



JOHN BOUCHARD & SONS
 NO. 1150, EAST JORDAN
 IRON WORKS NO. 1045
 OR APPROVED EQUAL
 TRAFFIC DUTY
 ASTM A48, CLASS 30

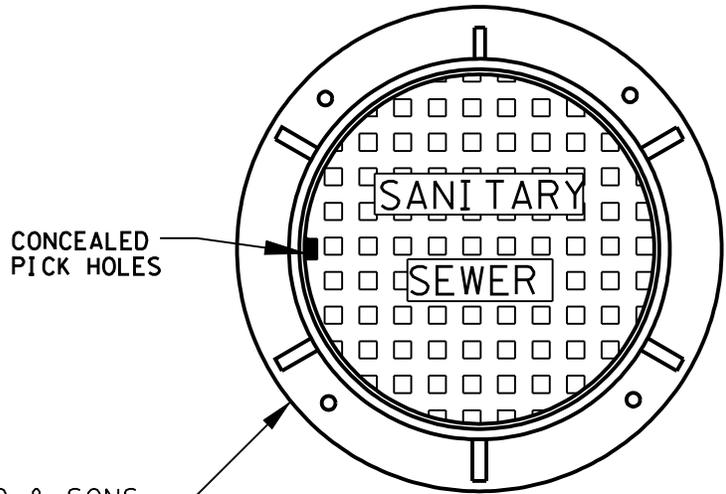


DATE: 08/2010

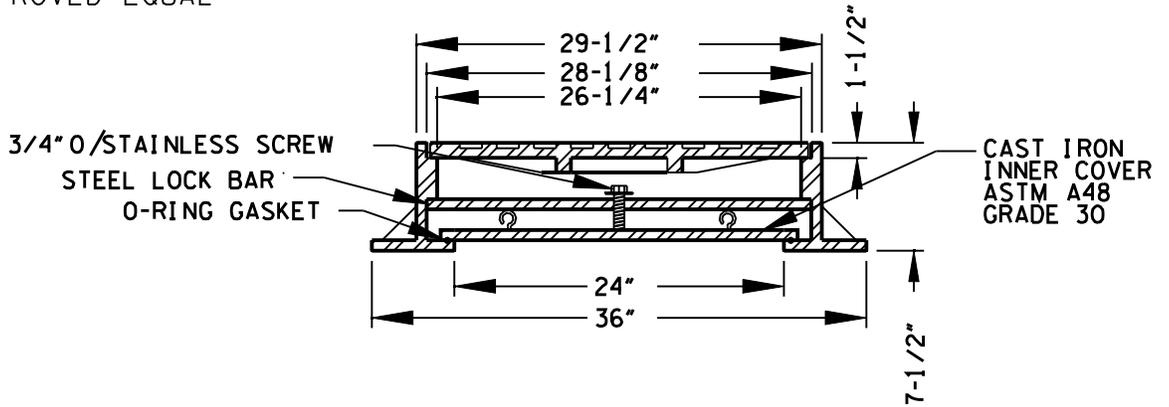
NOT TO SCALE

TRAFFIC TYPE MANHOLE FRAME AND COVER

STANDARD DETAILS
 LIMESTONE COUNTY WATER AND SEWER AUTHORITY
 LIMESTONE COUNTY, ALABAMA



JOHN BOUCHARD & SONS
 NO. 1123, EAST JORDAN
 IRON WORKS NO. 1893,
 OR APPROVED EQUAL



DATE: 08/2010

NOT TO SCALE

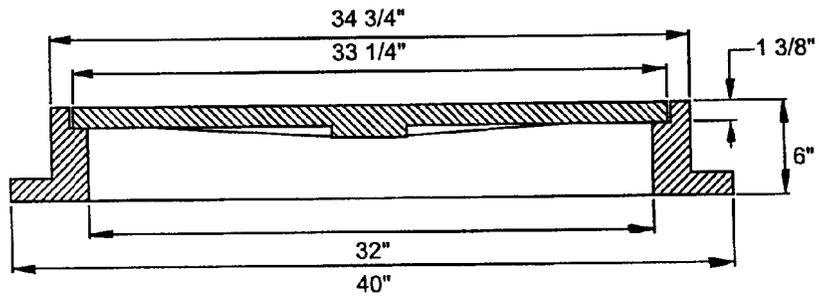
WATERTIGHT MANHOLE FRAME AND COVER

STANDARD DETAILS
 LIMESTONE COUNTY WATER AND SEWER AUTHORITY
 LIMESTONE COUNTY, ALABAMA



JOHN BOUCHARD & SONS
 NO. 1312, EAST JORDAN
 IRON WORKS NO. 1320
 OR APPROVED EQUAL
 ASTM A48, GRADE 30

CONCEALED PICK HOLE



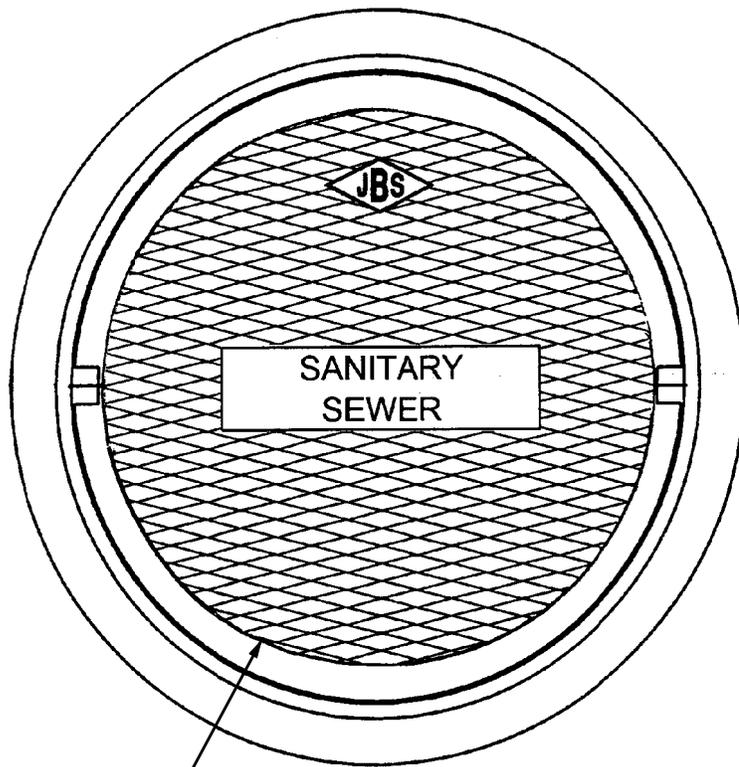
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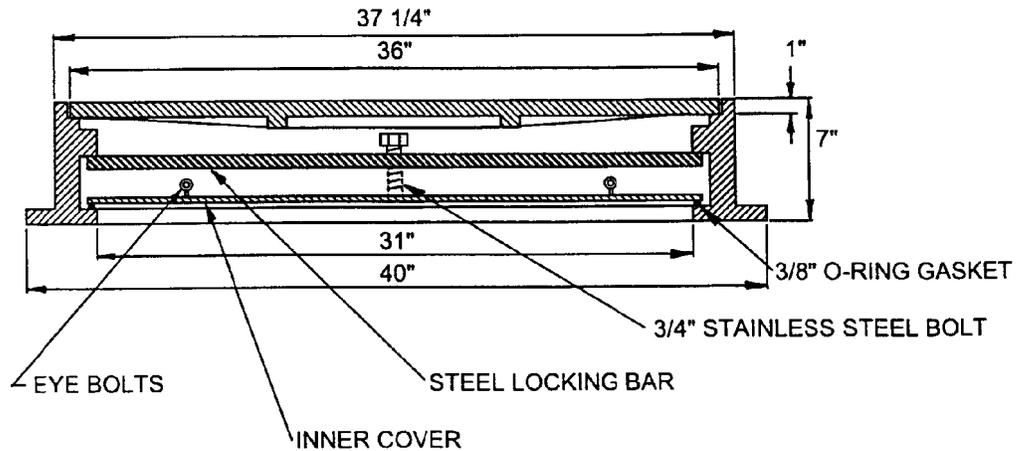
SHALLOW MANHOLE FRAME AND COVER

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
 LIMESTONE COUNTY, ALABAMA



JOHN BOUCHARD & SONS
 NO. 1125 OR APPROVED
 EQUAL



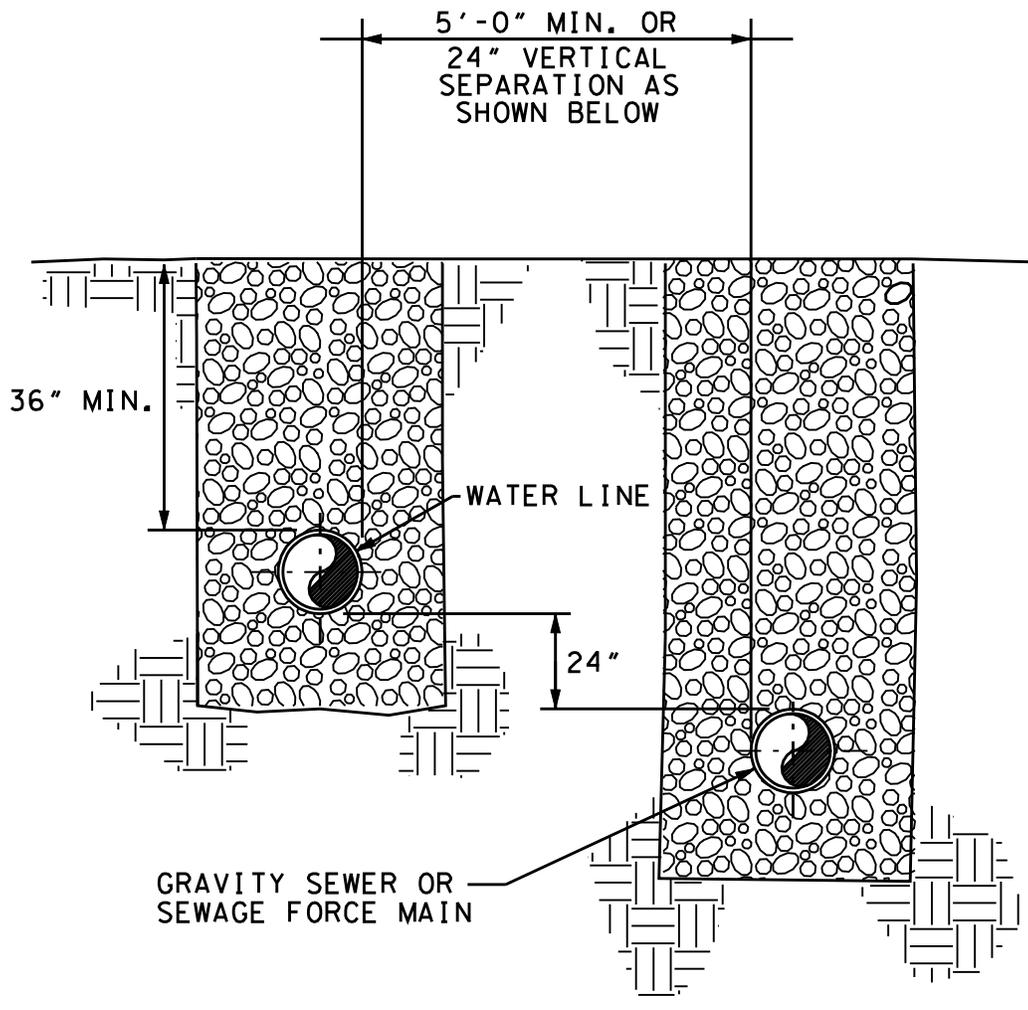
DATE: 08/2010

NOT TO SCALE

SHALLOW WATERTIGHT MANHOLE FRAME AND COVER

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
 LIMESTONE COUNTY, ALABAMA



NOTE: IF SEPARATION CANNOT BE MAINTAINED, THE SEWER PIPE SHALL BE ENCASED A DISTANCE OF 5 FEET EITHER SIDE OF THE POINT OF CROSSING

DATE: 08/2010

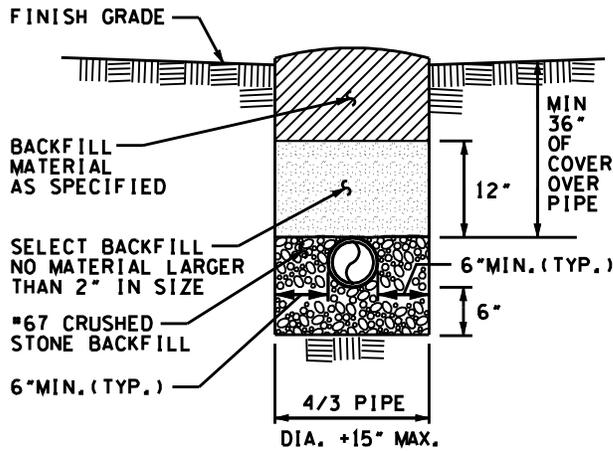
NOT TO SCALE

TYPICAL WATER AND SANITARY SEWER SEPARATION

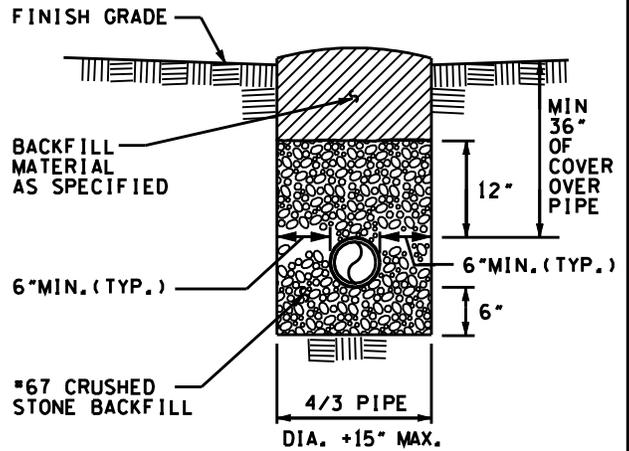
STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

NOTE:
SEE SPECIFICATIONS FOR
DEPTH REQUIREMENT
OF SEWER PIPE

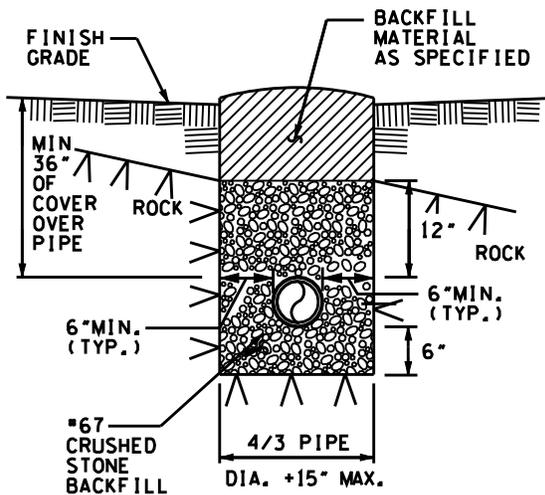


**DUCTILE IRON PIPE
IN EARTH**

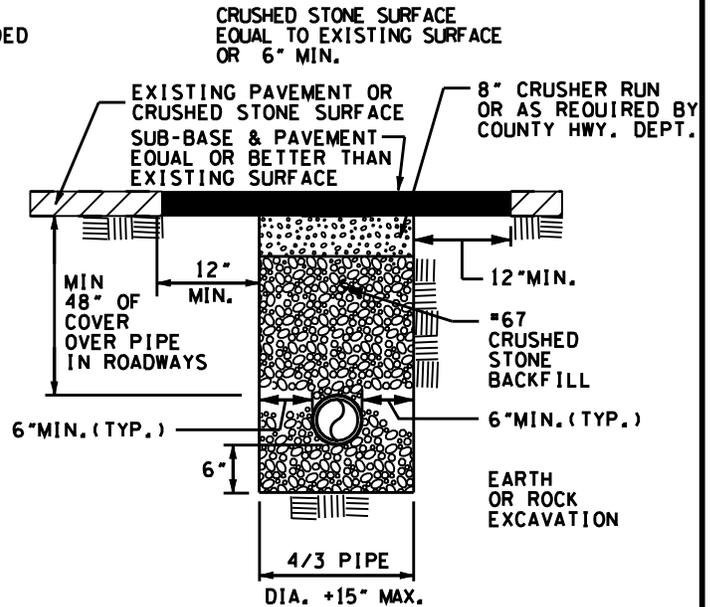


**PVC PIPE
IN EARTH**

NOTE:
UNTIL REPAVING IS COMPLETED, USE A DENSE GRADED
STONE FOR THE TOP 6\"/>



**ALL PIPE
IN ROCK**



**ALL PIPE
IN TRAFFIC AREAS**

DATE: 08/2010

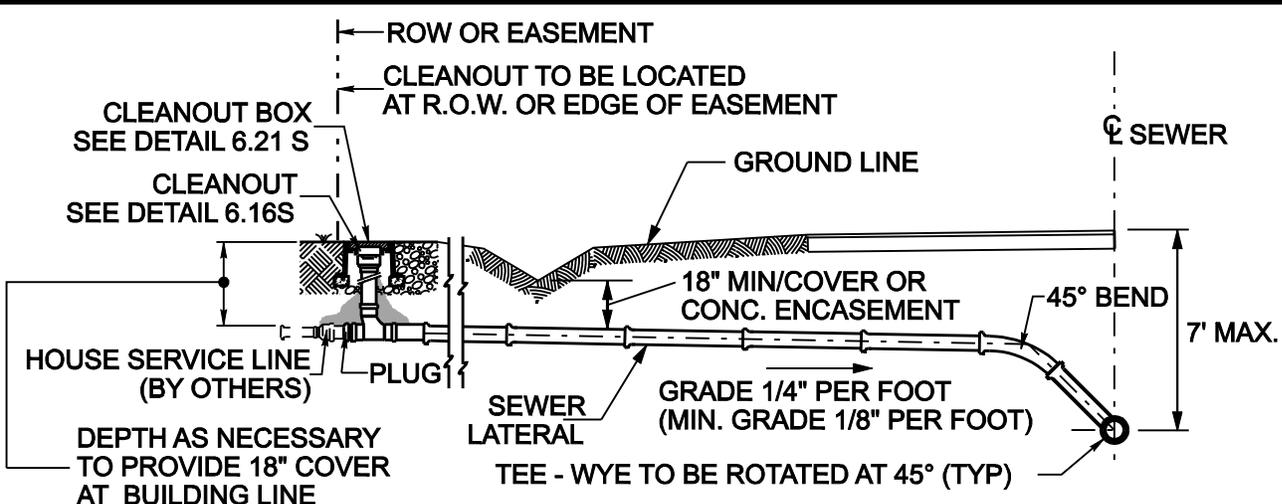
REFER TO DETAIL 6.08W FOR SEWER FORCE
MAIN BEDDING AND BACKFILLING DETAILS

NOT TO SCALE

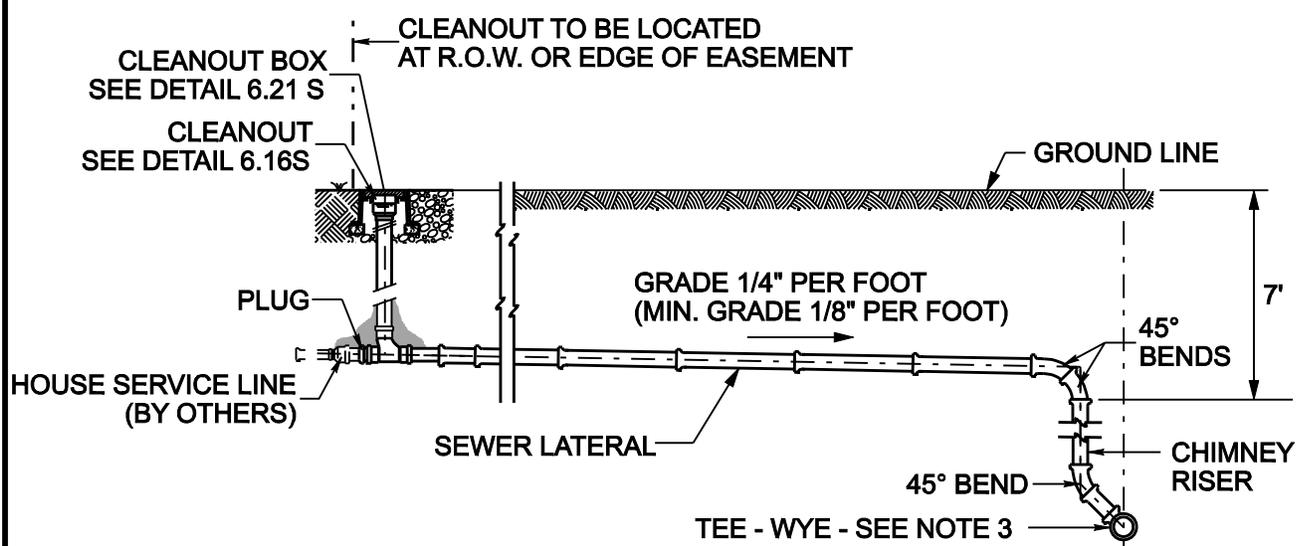
GRAVITY SANITARY SEWER BEDDING AND BACKFILL DETAILS

STANDARD DETAILS

**LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA**



TEE BRANCH FOR SEWER DEPTHS LESS THAN 7'



TEE BRANCH FOR SEWER DEPTHS OF 7' OR MORE

NOTES:

1. SERVICE MATERIAL TO BE SCH. 40 PVC. BACKFILL FOR SERVICE LINE TO BE SAME AS FOR SEWER LINE.
2. LATERAL SIZE TO BE 4" FOR RESIDENTIAL SERVICES; 6" FOR COMMERCIAL OR INDUSTRIAL SERVICES UNLESS OTHERWISE NOTED.
3. TEES SHALL BE SDR 26 WITH GASKETED BRANCHES. 8" x 4" SERVICES SHALL TRANSITION TO SCH. 40 PVC AT THE TEE. 8" x 6" TEE WILL REQUIRE A SECTION OF SDR 26 PIPE AND SLEEVE TO TRANSITION TO SCH. 40 PVC.
4. ALL FITTINGS PAST THE TEE SHALL BE SOLVENT WELD GLUE JOINT FITTINGS.
5. TEES SHALL NOT BE ORIENTED IN THE 12 O'CLOCK (STRAIGHT UP) POSITION.
6. TEES SHALL NOT BE PLACED BACK-TO-BACK. CONSECUTIVE TEES MUST BE SEPARATED BY AT LEAST 6 FT OF MAIN LINE PIPE.

DATE: 08/2010	REVISED 11/2010	REVISED 02/2012	NOT TO SCALE
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SANITARY SEWER LATERALS

STANDARD DETAILS

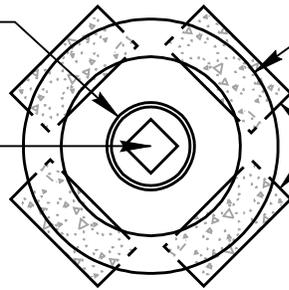
LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

CLEANOUT ADAPTER WITH FEMALE THREADS

HANDHOLE RING AND FC COVER SEE DETAIL 6.21S

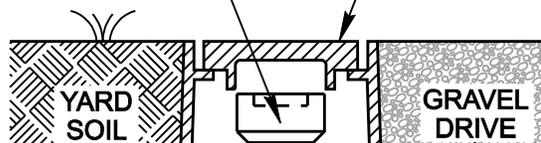
THREADED PLUG W/ 2" SQUARE DRIVER

SOLID MANHOLE BRICK MIN. 4 REQUIRED



PVC CLEANOUT ADAPTER HUB AND THREADED PLUG WITH 2" SQUARE DRIVER

HANDHOLE RING AND FC COVER SEE DETAIL 6.21S



YARD SOIL

GRAVEL DRIVE

PVC SCH. 40 SEWER PIPE
PVC TEE WYE (MOLDED)

PROPERTY LINE AT R.O.W. OR EDGE OF EASEMENT (TYP)

CAP
COUPLING AS NEEDED (BY OTHERS). FERNCO PROFLEX TYPE W/ STAINLESS STEEL SHIELD OR APPR. EQUAL

GRAVEL BACKFILL

HOUSE SERVICE LINE BY OTHERS. PVC SCH. 40

FLOW

FLOW

APPROPRIATE PIPE BEDDING MATERIAL

12"

SERVICE LINE FROM MAIN - 4" FOR RESIDENTIAL SERVICE, 6" FOR COMMERCIAL / INDUSTRIAL APPLICATION UNLESS OTHERWISE NOTED. SERVICE LINE MATERIAL SHALL BE PVC SCH. 40 WITH SOLVENT WELD GLUED FITTINGS.

REVISED: 11/2010

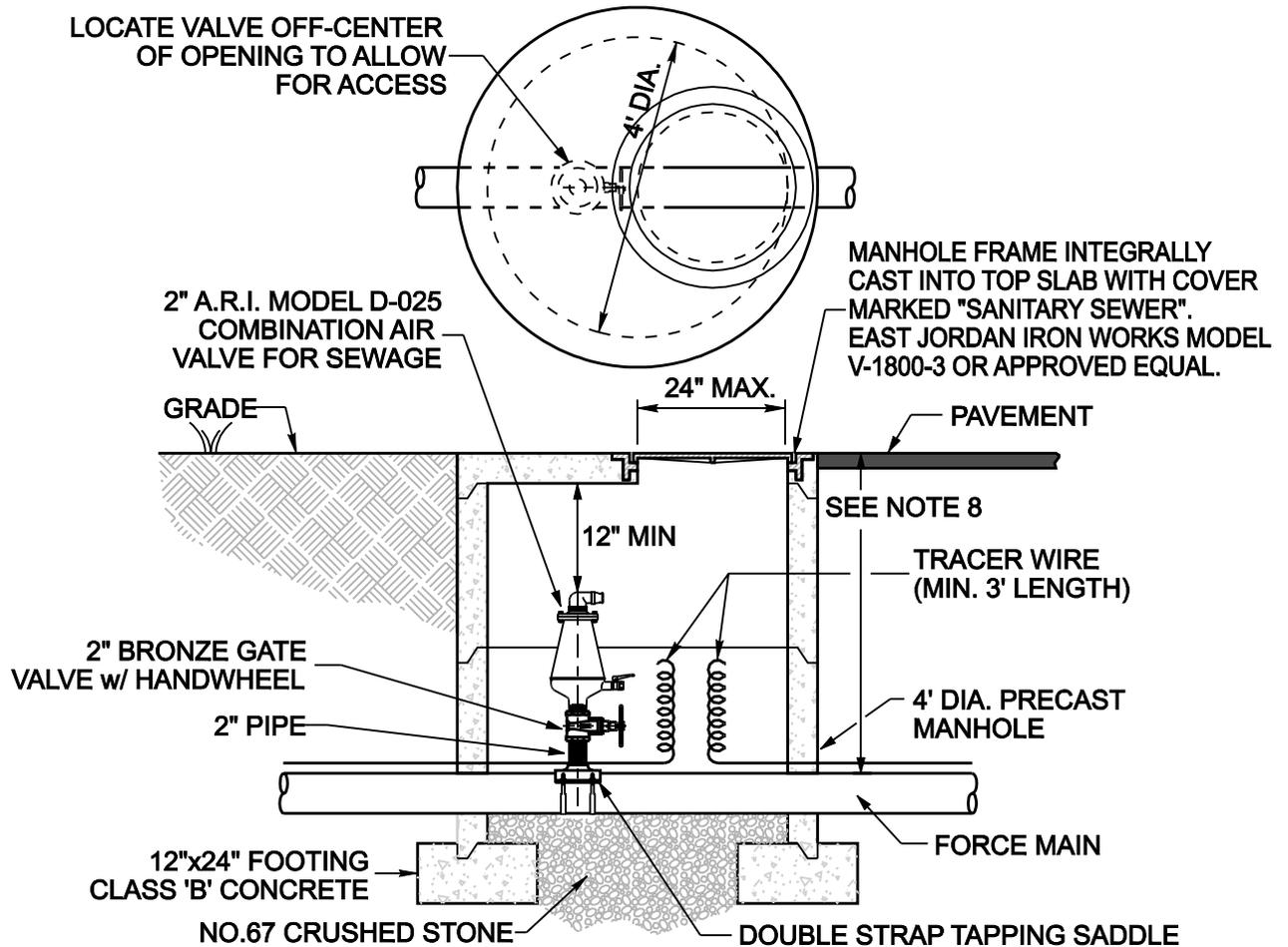
DATE: 08/2010

NOT TO SCALE

SANITARY SEWER SERVICE CLEANOUT ASSEMBLY

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. COMBINATION AIR VALVE TO BE INSTALLED AT ACTUAL HIGH POINT OF LINE. CONTRACTOR SHALL COORDINATE LOCATION WITH INSPECTOR
2. ALL PIPING FOR COMBINATION AIR VALVE SHALL BE BRASS OR STAINLESS STEEL.
3. CONTRACTOR SHALL ADJUST THE DEPTH OF THE FORCE MAIN AT ALL HIGH POINTS TO ACCOMMODATE THE INSTALLATION OF THE COMBINATION AIR VALVE.
4. VALVE BODY SHALL BE RESTRAINED AND SUPPORTED BY BRACING TO INTERIOR WALL OF MH.
5. TERMINATE TRACER WIRE INSIDE VALVE VAULT.
6. APPLY GROUT AS NEEDED AT PIPE-TO-MANHOLE CONNECTION TO PREVENT SEDIMENTATION INSIDE MANHOLE.
7. DEPTH OF ARV MANHOLE SHALL BE OF SUFFICIENT DEPTH SO THAT FLAT-TOP SECTION AND CASTING ARE FLUSH WITH GRADE. CONTRACTOR SHALL MODIFY PIPE DEPTH AS NEEDED DURING INSTALLATION TO ACCOMMODATE DEPTH OF STRUCTURE.

REV. 01/2015

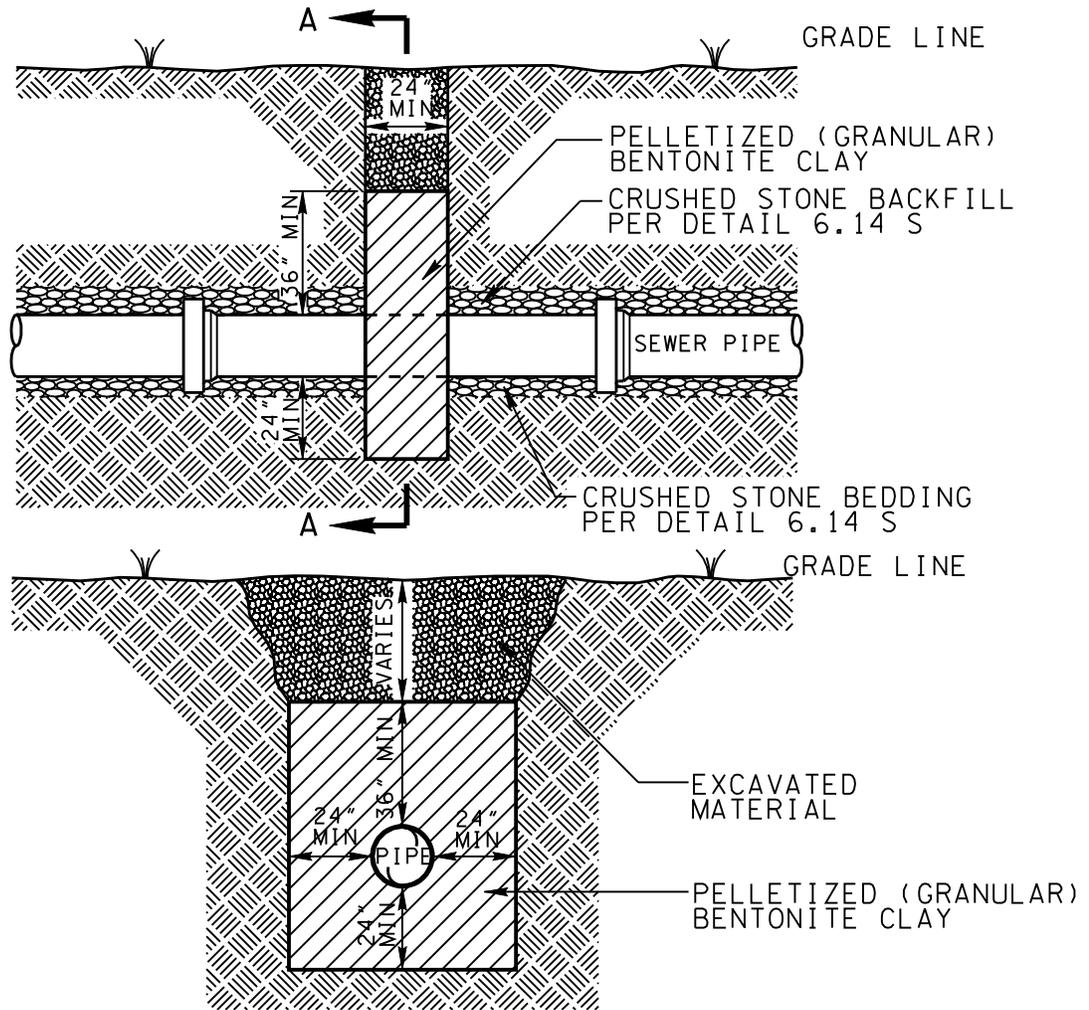
DATE: 08/2010

NOT TO SCALE

TYPICAL SEWAGE AIR/ VACUUM RELEASE VALVE

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



SECTION A-A

NOTE:

A 24" KEYWAY SHALL BE CUT IN DIRT EXCAVATION. FRACTURED AND SHOT ROCK SHALL BE REMOVED TO CLEAN SOLID ROCK IN ROCK TRENCHES. THIS IS REQUIRED ON SIDES IN ADDITION TO BOTTOM. IF BOTTOM IS OVERSHOT, IT MUST BE CLEANED TO SOLID UNFRACTURED ROCK.

DATE: 08/2010

NOT TO SCALE

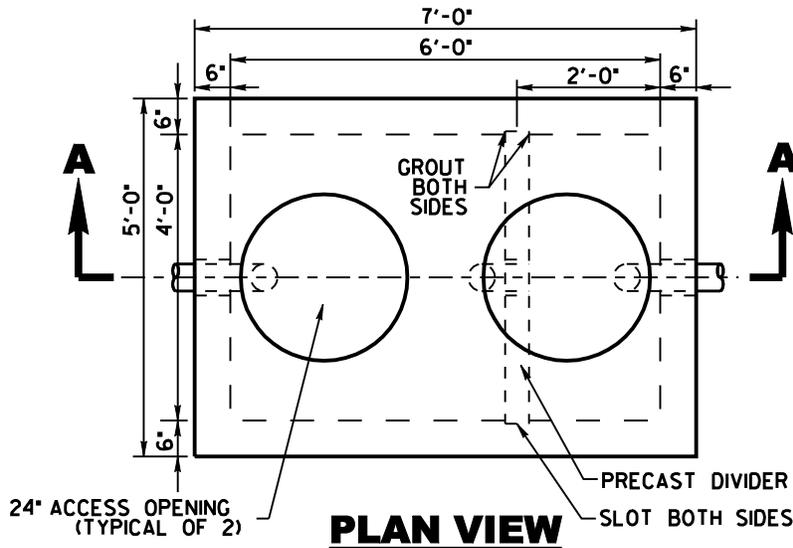
CHECK DAMS FOR SANITARY SEWER LINES

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

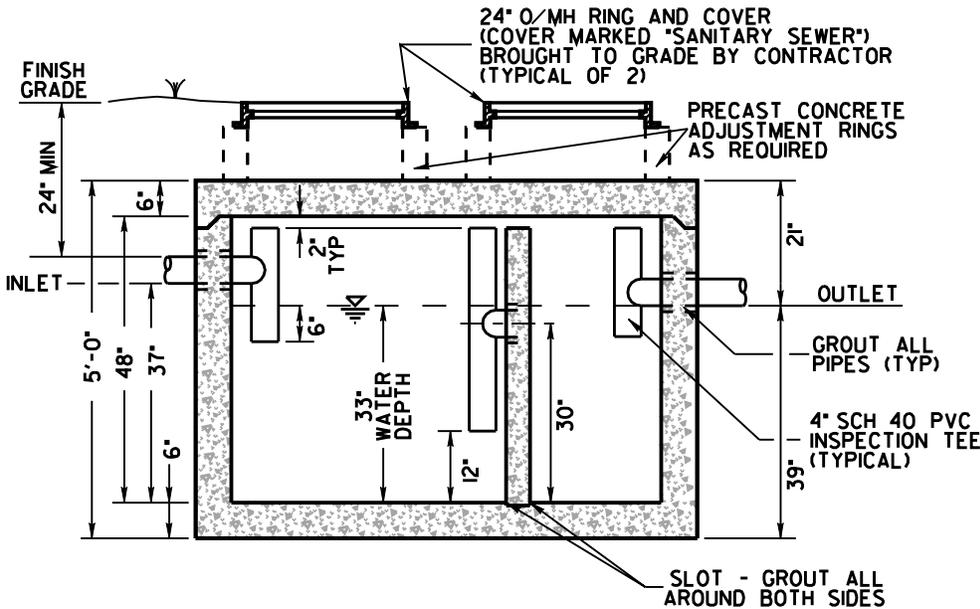
GENERAL NOTES

- 1) CONCRETE: 28 DAY COMPRESSIVE STRENGTH $f'c = 4,500$ PSI
- 2) REINFORCEMENT: ASTM A-615 GRADE 60
- 3) LOADS: H-20 TRUCK WHEEL WITH 30% IMPACT PER AASHTO
- 4) BUTYL RUBBER JOINT SEALANT SS-S-00210
- 5) CONTRACTOR TO:
 - SUPPLY AND INSTALL ALL PIPING AND SAMPLING TEES
 - GROUT ALL PIPES AND WEIRS
 - FILL WITH CLEAN WATER PRIOR TO "START-UP" OF SYSTEM



24" ACCESS OPENING (TYPICAL OF 2)

PLAN VIEW



SECTION A-A

NOTE:

A 500 GALLON GREASE TRAP IS SHOWN HERE, HOWEVER THE SIZE NECESSARY IS TO BE DETERMINED BASED ON DESIGN CRITERIA AND THE FOLLOWING FORMULA:

$$\text{NUMBER OF MEALS PER PEAK HOUR} \times \text{WASTE FLOW RATE} \times \text{RETENTION TIME} \times \text{STORAGE FACTOR} = \text{CAPACITY IN GALLONS}$$

SIZES LARGER THAN SHOWN HERE ARE AVAILABLE AND MAY BE REQUIRED. CONFIRM SIZING WITH LCWSA FOG POLICIES.

REV. 01/2015

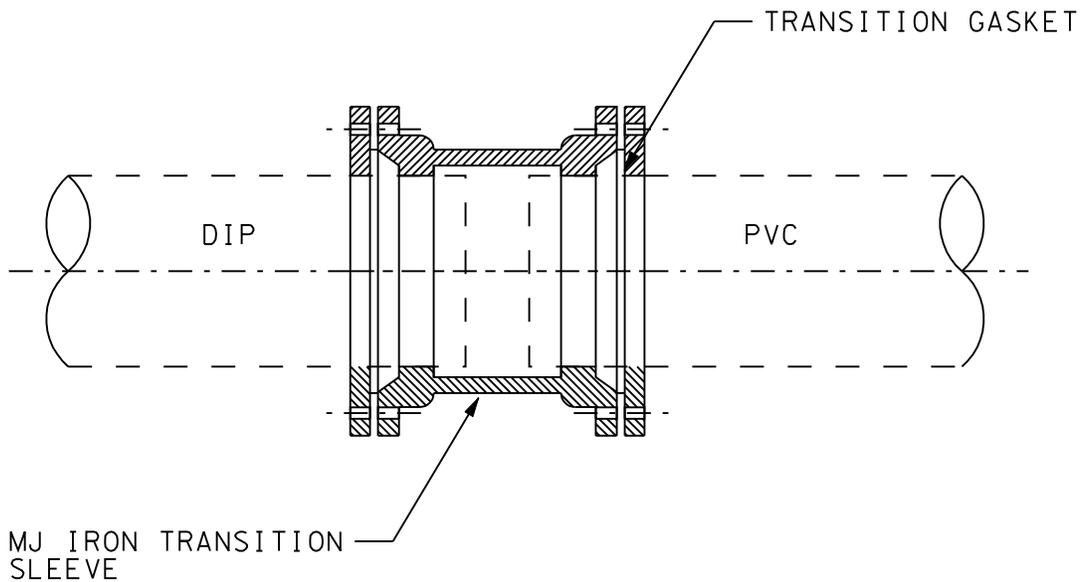
DATE: 06/2011

NOT TO SCALE

500 GALLON GREASE TRAP

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. TRANSITION SLEEVES SHALL BE SOLID, MECHANICAL JOINT, LONG PATTERN FITTINGS. AWWA C153
2. LCWSA SHALL APPROVE ALTERNATE TRANSITION METHODS.

SOLID SLEEVE TRANSITION

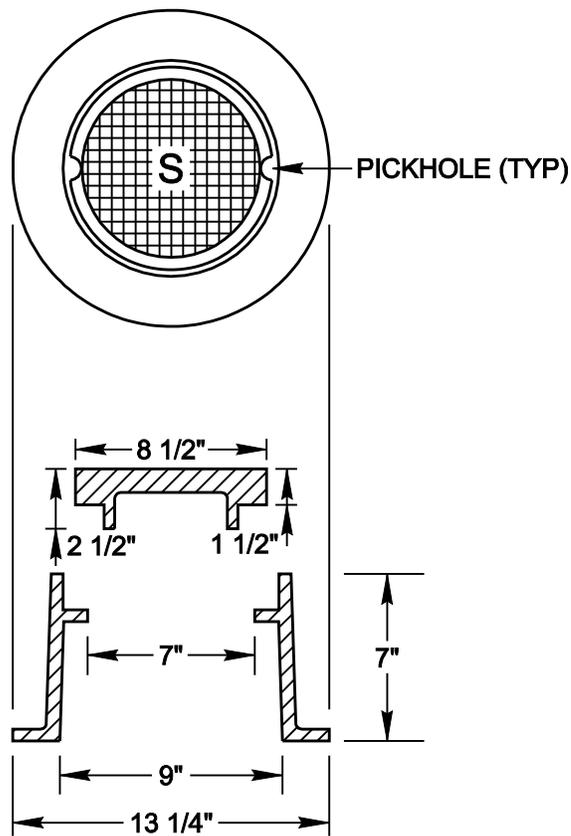
DATE: 08/2010

NOT TO SCALE

TYPICAL SEWER LINE REPAIR TRANSITION

STANDARD DETAILS

**LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA**



NOTES:

1. CASTING TO BE U.S. FOUNDRY, NO. 7610 OR EQUAL
2. COVER TO BE MARKED WITH LETTER "S"

REVISED: 11/2010

DATE: 08/2010

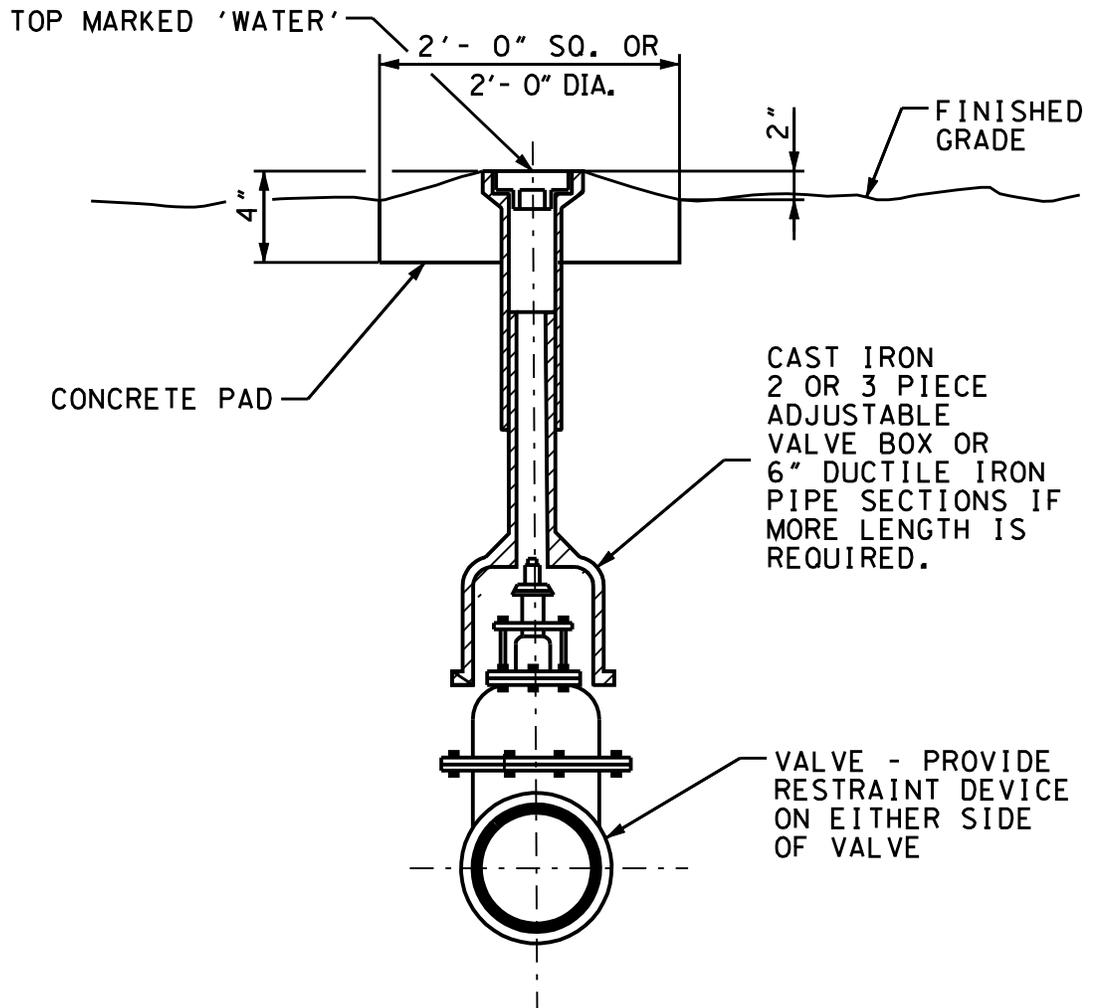
NOT TO SCALE

SMALL CAST IRON CLEANOUT BOX FRAME AND COVER

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

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NOTE:

CAST AROUND THE TOP OF EACH VALVE BOX A CONCRETE DISK 2'-0" IN DIAMETER OR 2'-0" SQUARE AND 4" THICK WHEN VALVES ARE LOCATED IN UNPAVED AREAS. NOT REQUIRED IN PAVED AREAS. PAD MAY BE PRECAST.

REVISED: 01/2015

DATE: 08/2010

NOT TO SCALE

TYPICAL VALVE BOX SETTING

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

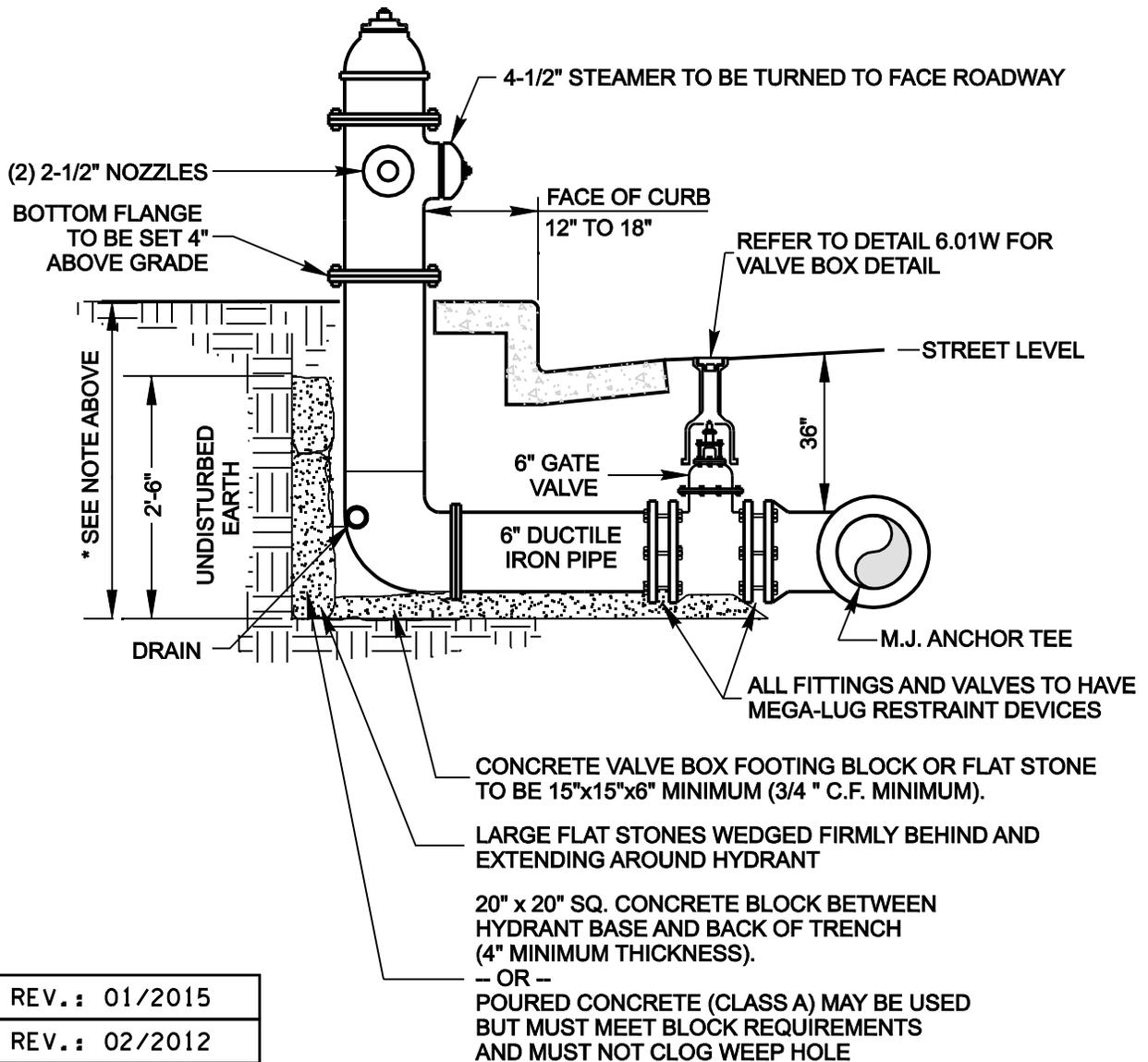
* HYDRANT BURY SHALL BE 48" MINIMUM WITH 36" COVER ABOVE WATER LINE AND BOTTOM FLANGE OF HYDRANT SET 4" ABOVE GRADE.

NOTE:
FIRE HYDRANT SHALL NOT SIT CLOSER THAN 5' FROM EDGE OF ANY POWER AND/OR LIGHT POLE.

HYDRANT SHALL BE SET ON CONCRETE VALVE BOX FOOTING BLOCK. CONCRETE BLOCK OR POURED CONCRETE (CLASS A) SHALL BE WEDGED FIRMLY BEHIND AND EXTENDING AROUND HYDRANT TO UNDISTURBED EARTH.

CARE SHALL BE USED TO SET HYDRANT PLUMB. THE FIRE HYDRANT SHALL BE LOCATED NOT LESS THAN 12 INCHES OR MORE THAN 18 INCHES FROM FACE OF CURB TO FRONT OF HYDRANT PROTECTION CASE.

A MINIMUM OF 2 CU. FT. OF CRUSHED STONE SHALL BE PLACED AROUND LEAD ADJOINING BLOCKING FOR DRAINAGE FROM WASTE OPENING.



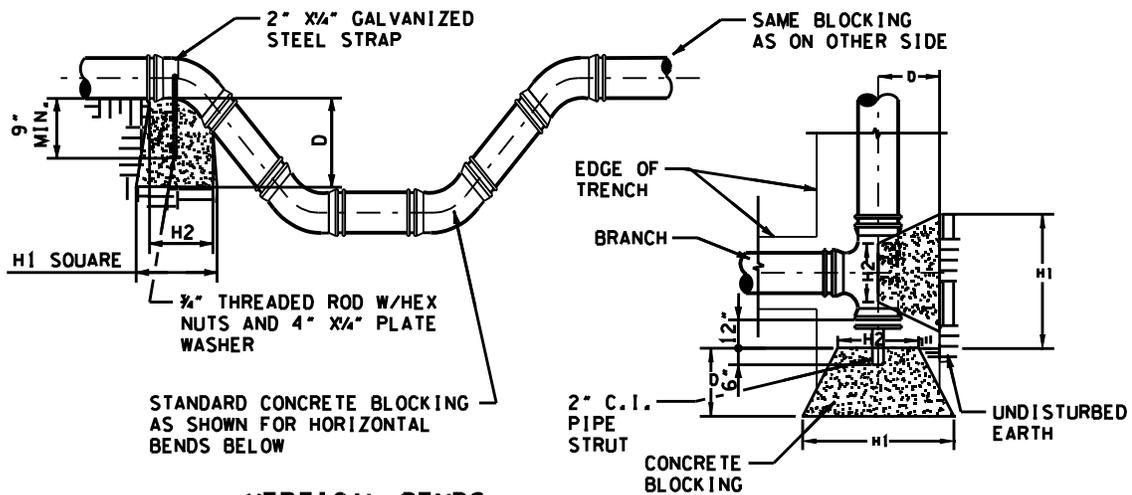
REV. : 01/2015
REV. : 02/2012
DATE : 08/2010

NOT TO SCALE

TYPICAL FULL SERVICE FIRE HYDRANT SETTING

STANDARD DETAILS

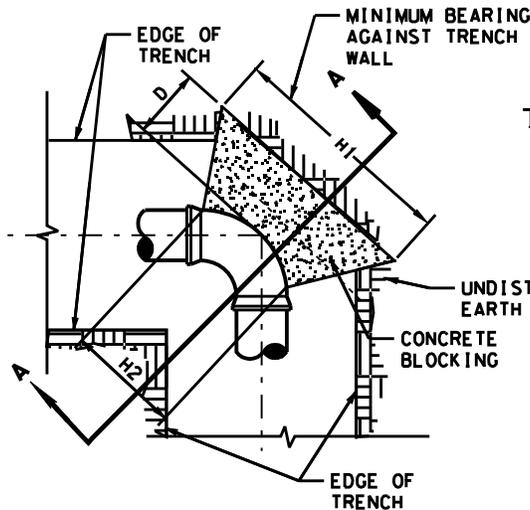
LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



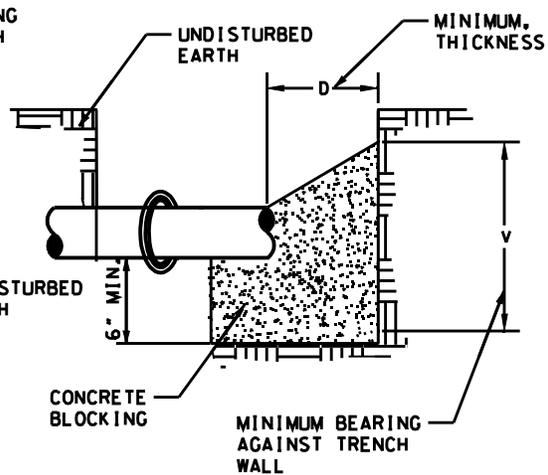
VERTICAL BENDS

TEES, CROSSES AND PLUGS

NOTE: DIMENSIONS ARE CONTROLLED BY DIAMETER OF BRANCH MAIN.



HORIZONTAL BENDS



SECTION A-A

NOTES:
 MEG-A-LUG RESTRAINING DEVICES MAY BE INSTALLED IF DIRECTED BY THE OWNER.
 IF RESTRAINING DEVICES ARE INSTALLED, CONCRETE THRUST BLOCKS ARE NOT REQUIRED.
 CONCRETE USED FOR BLOCKING SHALL BE 3,500 PSI. EARTH PRESSURES ARE CALCULATED FOR 4,000 PSF SOIL. BEARING AREAS OF THRUST BLOCKS SHALL BE INCREASED WHEN POURED IN SAND, LOOSE FILL OR WET EARTH. TABLE IS BASED ON 225 PSI OR 150 PSI WORKING PRESSURE PLUS 50% WATER HAMMER

TEES, CROSSES & PLUGS					90° BENDS					45° BENDS					22½° BENDS					1¼° BENDS					PIPE SIZE					
H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.						
24"	12"	12"	18"	2.25	24"	12"	12"	18"	2.25	18"	8"	12"	18"	1.60	18"	8"	12"	18"	1.60	18"	8"	12"	18"	1.60	18"	8"	12"	18"	1.60	3" & 4"
24"	16"	18"	18"	3.50	30"	16"	18"	18"	4.00	24"	10"	16"	18"	3.20	24"	10"	16"	18"	3.20	24"	10"	16"	18"	3.20	24"	10"	16"	18"	3.20	6"
36"	18"	18"	18"	5.00	39"	18"	24"	18"	7.30	30"	11"	18"	18"	3.90	30"	11"	18"	18"	3.90	24"	11"	16"	18"	3.40	24"	11"	16"	18"	3.40	8"
48"	24"	18"	24"	7.10	54"	32"	24"	18"	10.20	24"	18"	21"	18"	4.60	24"	18"	21"	18"	4.60	24"	18"	21"	18"	4.60	24"	18"	21"	18"	4.60	10"
54"	30"	24"	24"	13.4	54"	32"	36"	24"	18.10	42"	18"	24"	24"	9.60	24"	18"	24"	24"	6.60	24"	18"	21"	24"	6.10	24"	18"	21"	24"	6.10	12"

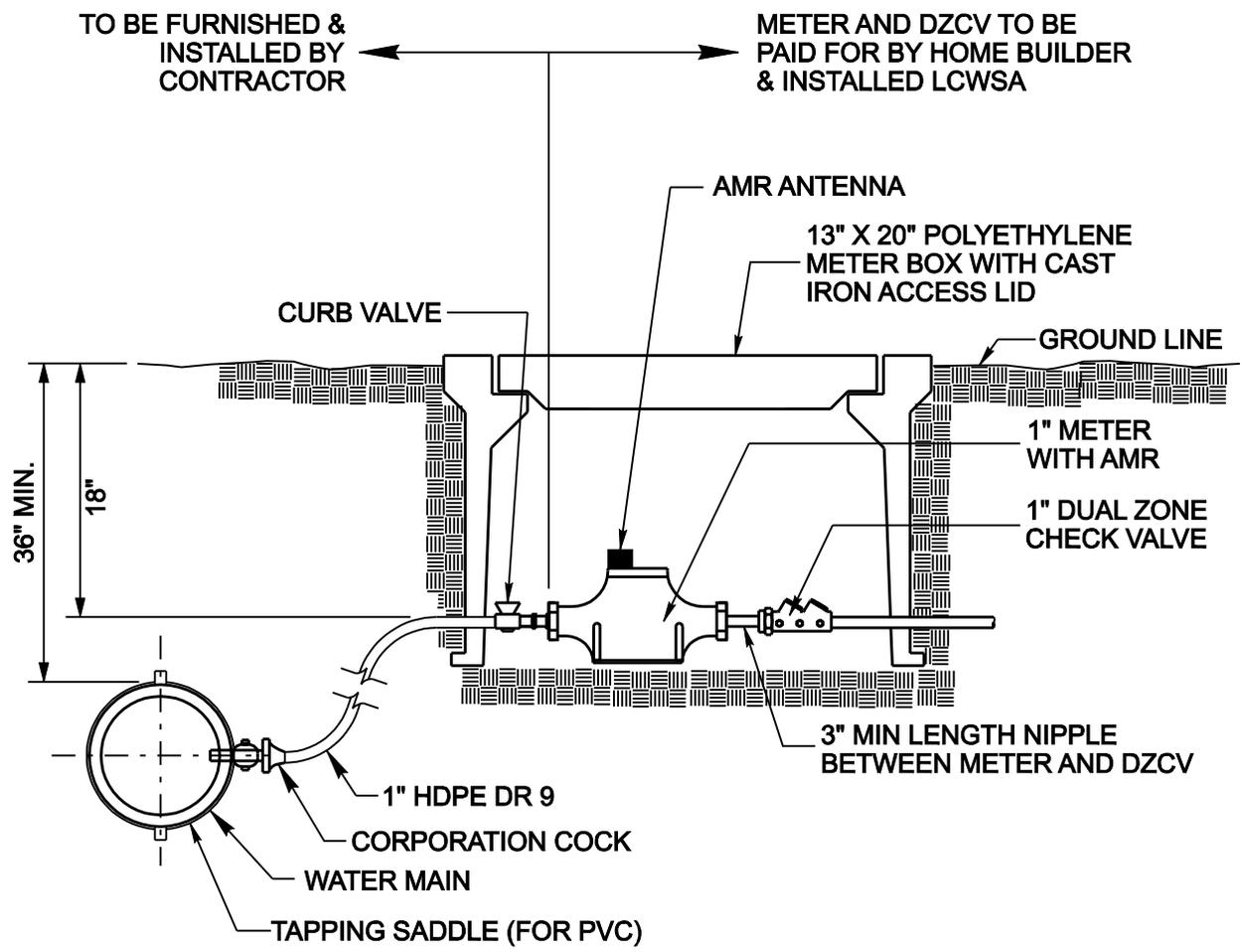
DATE: 08/2010

NOT TO SCALE

TYPICAL CONCRETE THRUST BLOCKING

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
 LIMESTONE COUNTY, ALABAMA



NOTES:

1. FOR TAPS IN PVC PIPE USE TAPPING SADDLE. NO SADDLE REQUIRED FOR DUCTILE IRON PIPE.
2. SERVICES UNDER ROADWAYS (NEW OR EXISTING) ARE TO BE INSTALLED INSIDE 2" SCH 40 PVC CARRIER PIPE TO A POINT 2' BEHIND SIDEWALK ON EACH SIDE OF ROADWAY. SERVICES UNDER EXISTING ROADWAYS TO BE BORED AND JACKED.
3. REFER TO STANDARD SPECIFICATIONS FOR TECHNICAL REQUIREMENTS OF EACH ITEM.
4. WATER TAPS ON NEW WATER MAINS TO BE MADE BY CONTRACTOR. WATER TAPS ON EXISTING WATER MAINS WILL BE MADE BY LCWSA.

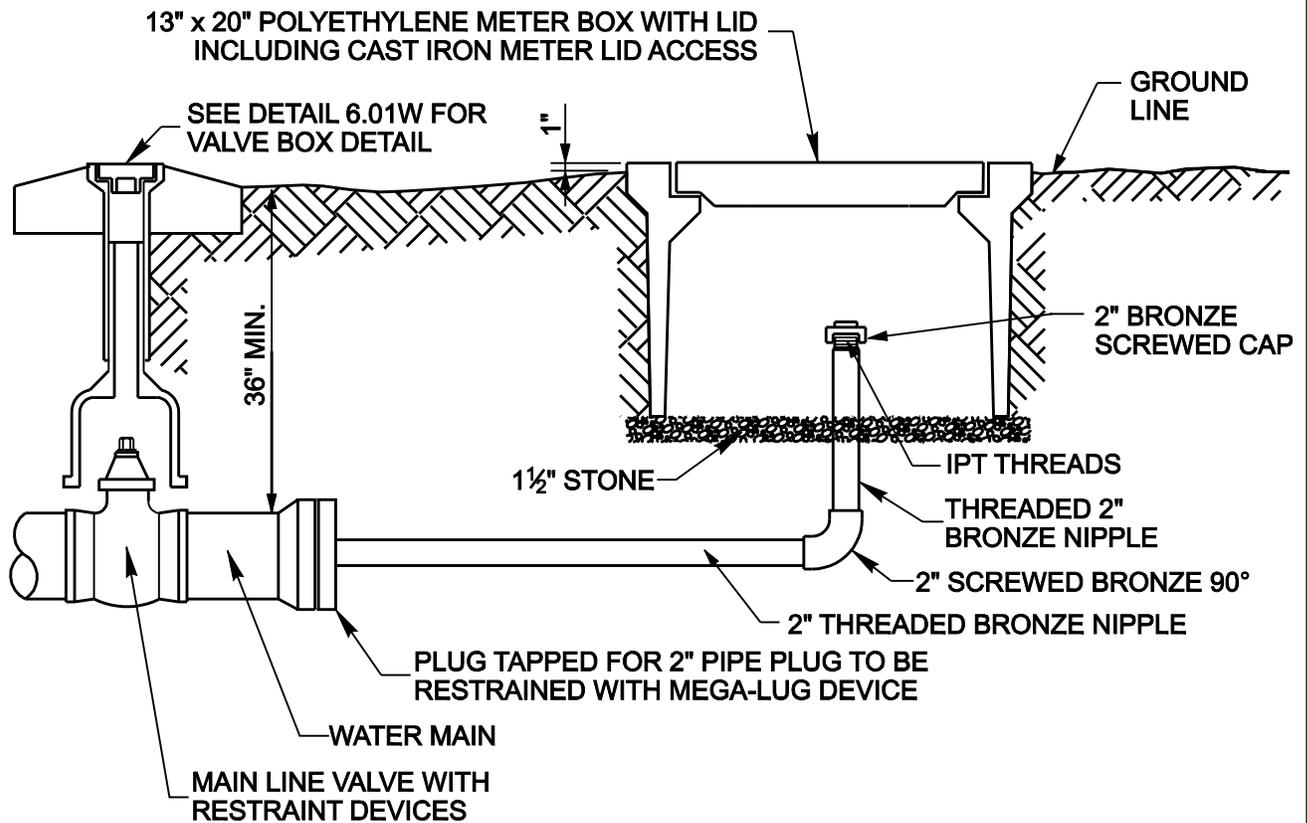
REVISED: 01/2015
DATE: 08/2010

NOT TO SCALE

1" SERVICE ASSEMBLY

STANDARD DETAILS

**LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA**



REVISED: 01/2015

REVISED: 09/2010

DATE: 09/2010

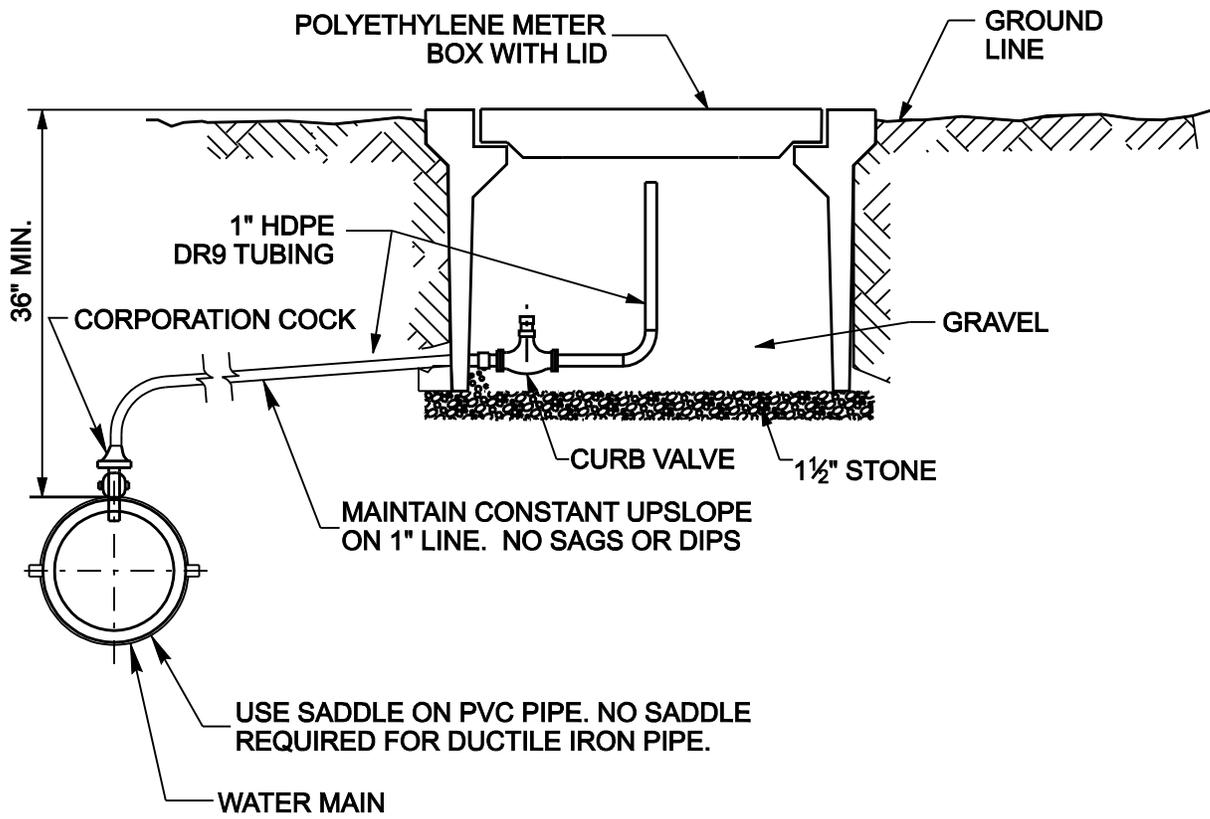
NOT TO SCALE

2" BLOWOFF DETAIL

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

6.06 W



NOTES:

1. IF PIPE IS IN ROADWAY, AIR RELEASE ASSEMBLY SHALL BE LOCATED OUTSIDE ROADWAY.
2. ASSEMBLY SHALL BE LOCATED AT HIGH POINT OF WATER MAIN AS DIRECTED BY LCWSA.
3. AIR RELEASE ASSEMBLIES SHALL ONLY BE USED WHERE FIRE HYDRANT SPACING DOES NOT PROVIDE FOR AIR RELEASE AT HIGH POINT.

REV. 01/2015
DATE: 08/2010

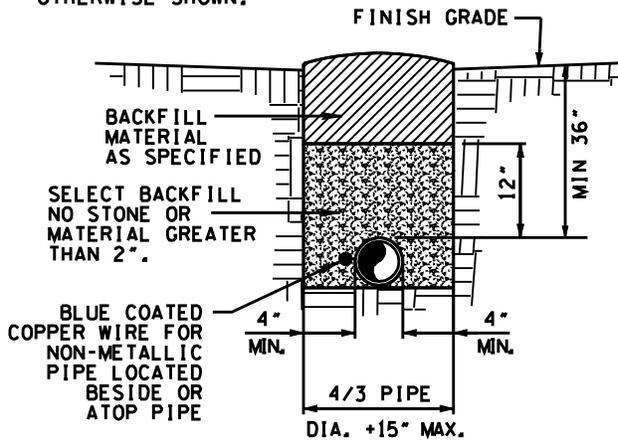
NOT TO SCALE

1" MANUAL AIR RELEASE ASSEMBLY

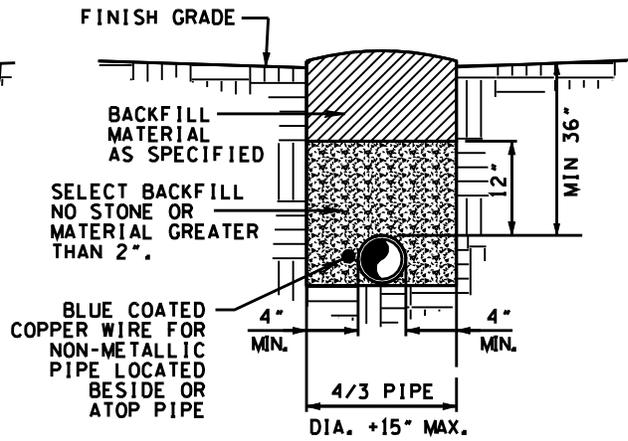
STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

NOTE:
36" MIN. COVER FOR ALL
WATER LINES UNLESS
OTHERWISE SHOWN.



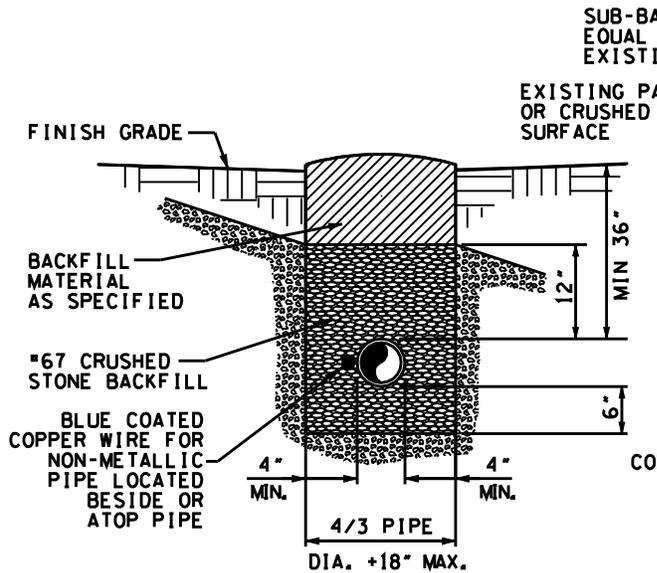
**DUCTILE IRON PIPE
IN EARTH**



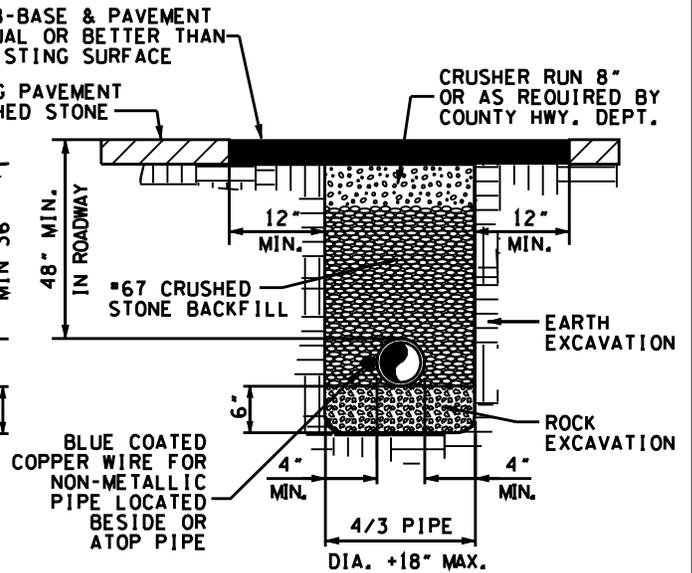
**PVC PIPE
IN EARTH**

NOTE:
UNTIL REPAVING IS COMPLETED USE
A DENSE GRADED STONE FOR THE
TOP 6" FOR TEMPORARY SURFACE

CRUSHED STONE SURFACE
EQUAL TO EXISTING SURFACE
OR 6" MIN.



**ALL PIPE
(DUCTILE IRON OR PVC)
IN ROCK**



**ALL PIPE
IN TRAFFIC AREAS**

DATE: 08/2010

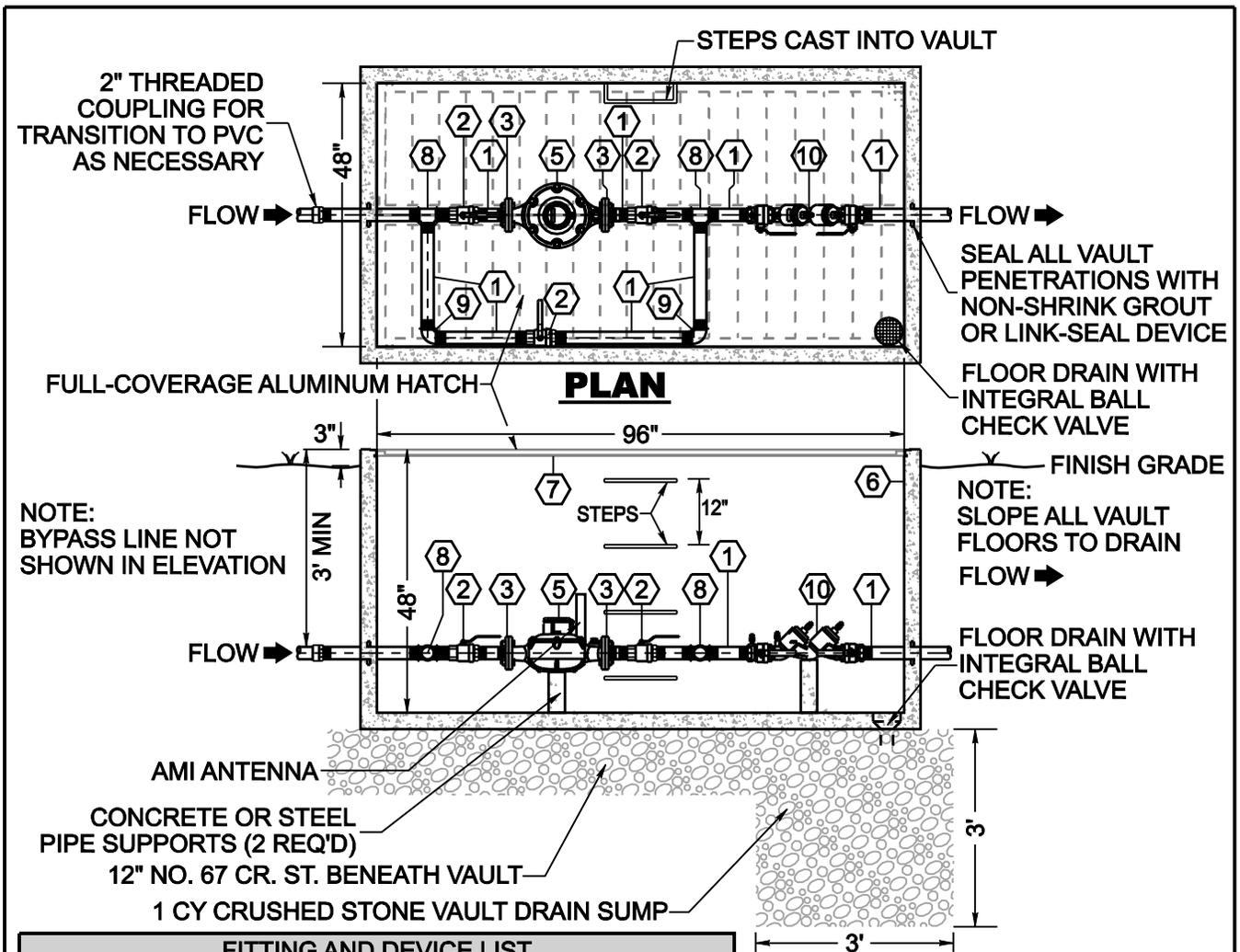
REV. 01/2015

NOT TO SCALE

STANDARD WATER MAIN & FORCE MAIN BEDDING AND BACKFILLING

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



FITTING AND DEVICE LIST	
①	2" THREADED HARD DRAWN COPPER PIPE
②	2" BRASS BALL VALVE
③	2" BLIND FLANGE THREADED 2" NPT
④	NO LONGER USED
⑤	2" MUELLER POSITIVE DISPLACEMENT METER (FLANGED)
⑥	96" x 48" x 48" DEEP PRECAST CONCRETE VAULT
⑦	96" x 48" FULL COVERAGE ALUMINUM HATCH**
⑧	2" x 2" THREADED STEEL TEE
⑨	2" THREADED 90° ELBOW
⑩	WATTS MODEL 719 DOUBLE CHECK VALVE ASSEMBLY

NOTES:

BALL VALVES ON EACH SIDE OF METER MUST REMAIN IN FULLY OPEN POSITION DURING NORMAL OPERATION TO INSURE ACCURACY OF METER.

BACKFLOW PREVENTION DEVICE TO BE UTILIZED IS BASED ON TYPE OF FACILITY OR STRUCTURE. REFER TO LCWSA POLICIES AND PROCEDURES FOR DETAILS.

MINIMUM INSIDE HATCH AND VAULT DIMENSIONS	
DESCRIPTION	NUMBER
PRECAST CONCRETE VAULT (A&L VAULT PRODUCTS)	A&L9648CV
ALUMINUM HATCH (A&L VAULT PRODUCTS)	A&L9648ALM**

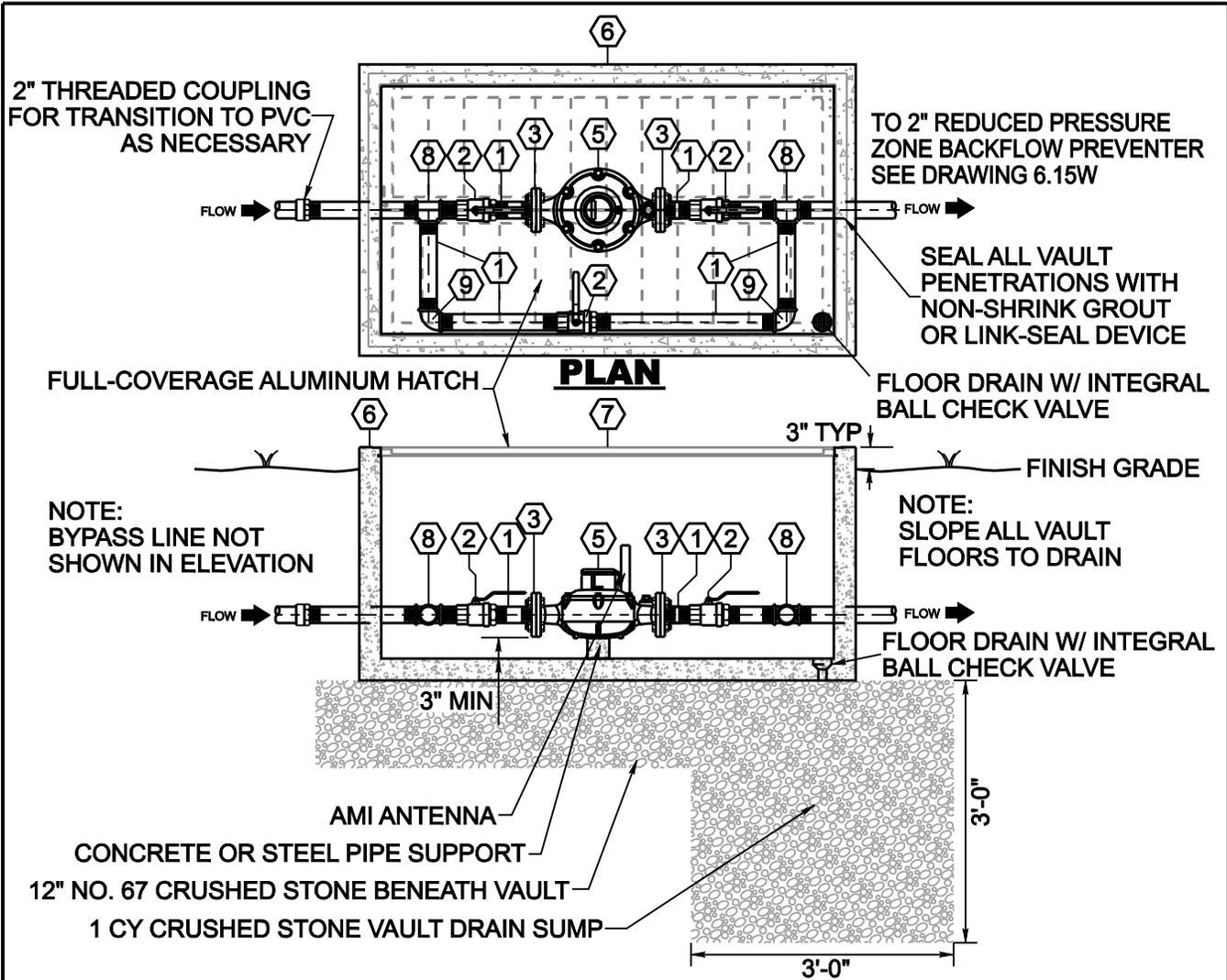
DATE: 12/2010 | REV. 02/2012 | REV. 02/2015

** - HATCHES ARE FOOT TRAFFIC RATED ONLY
NOT TO SCALE

2" WATER METER VAULT ASSEMBLY WITH DOUBLE CHECK VALVE BACKFLOW PREVENTER

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



FITTING AND DEVICE LIST	
①	2" THREADED HARD DRAWN COPPER PIPE
②	2" BRASS BALL VALVE
③	2" BLIND FLANGE THREADED 2" NPT
④	NO LONGER USED
⑤	2" MUELLER POSITIVE DISPLACEMENT METER (FLANGED)
⑥	MIN. 55" x 34" x 29" DEEP PRECAST CONCRETE VAULT
⑦	55" x 34" FULL COVERAGE ALUMINUM HATCH**
⑧	2" x 2" THREADED STEEL TEE
⑨	2" THREADED 90° ELBOW

NOTES:
BALL VALVES ON EACH SIDE OF METER MUST REMAIN IN FULLY OPEN POSITION DURING NORMAL OPERATION TO INSURE ACCURACY OF METER.

** - HATCHES ARE FOOT TRAFFIC RATED ONLY

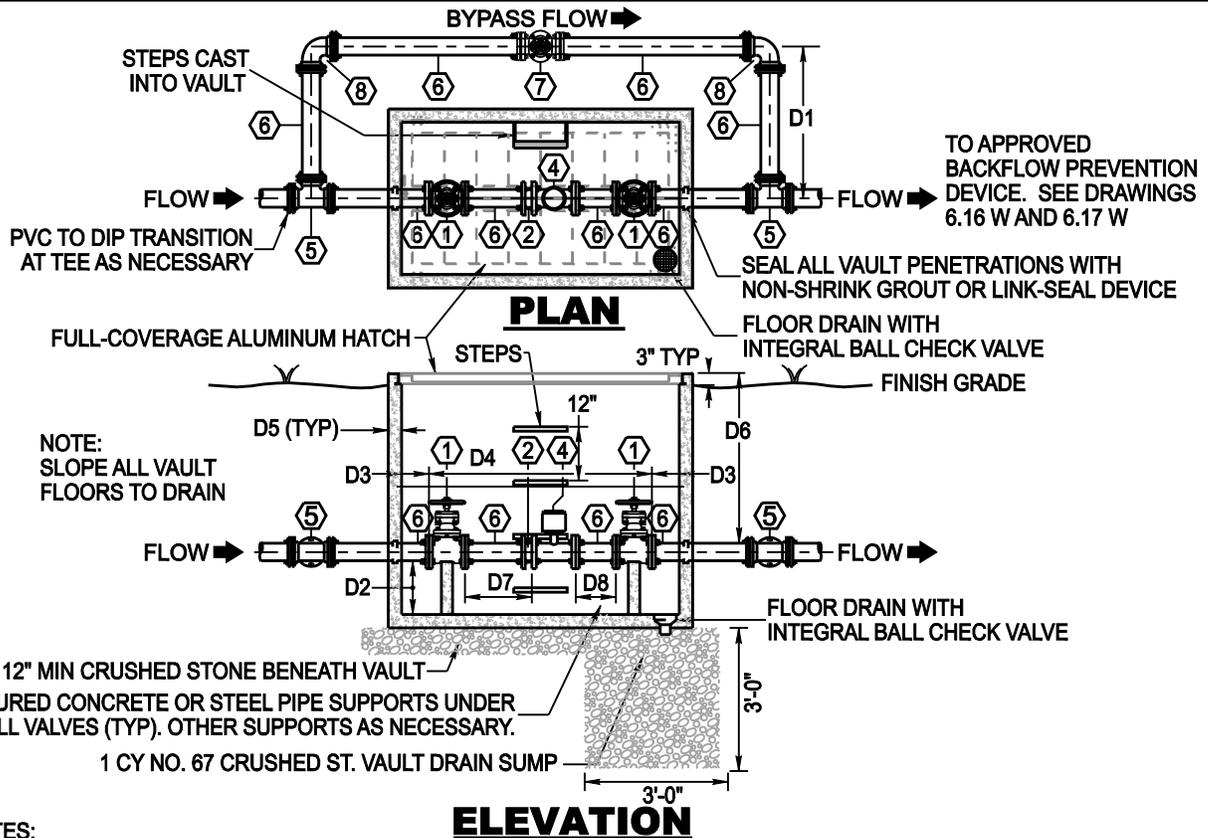
MINIMUM INSIDE HATCH AND VAULT DIMENSIONS	
DESCRIPTION	NUMBER
PRECAST CONCRETE VAULT (A&L VAULT PRODUCTS)	A&L6234CV
ALUMINUM HATCH (A&L VAULT PRODUCTS)	A&L6234ALM**

DATE: 12/2010 | REV. 02/2012 | REV. 02/2015 | NOT TO SCALE

2" WATER METER VAULT ASSEMBLY FOR USE WITH RPZ BACKFLOW PREVENTER

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. BYPASS LINE MAY BE PLACED ON OPPOSITE SIDE AS NECESSARY TO ACCOMODATE SITE CONDITIONS.
2. ALL EXTERNAL MJ FITTINGS TO BE RESTRAINED WITH MECHANICAL RESTRAINT DEVICES.
3. GATE VALVES ON EACH SIDE OF METER MUST REMAIN IN FULLY OPEN POSITION DURING NORMAL OPERATION TO INSURE ACCURACY OF METER.
4. UNIFLANGE DEVICES AND PLAIN-END PIPE MAY BE USED AS NECESSARY IN LIEU OF FLANGED PIPE.
5. ROMAC #501 COUPLING ADAPTER MAY BE USED IN LIEU OF SMITH-BLAIR #912
6. RAMNECK BUTYL SEALANT (2 ROLLS) REQUIRED BETWEEN VAULT AND RISER
7. MOUNT AMI MTU PER MANUFACTURER RECOMMENDATIONS.

DIMENSIONS	
DIM.	3" LINE
D1	3'-0"
D2	1'-0"
D3	6" +/-
D4	4'-2" *
D5	3"
D6	3'-0"
D7	15" MIN
D8	9" MIN

FITTING AND DEVICE LIST	
(1)	3" GATE VALVE WITH HANDWHEEL (NRS SHOWN) FL x FL
(2)	3" SMITH-BLAIR MODEL 912 FLANGED COUPLING ADAPTER
(3)	NO LONGER USED
(4)	3" MUELLER ELECTROMAG FLOW METER (FLANGED)
(5)	3" DI MJ TEE
(6)	3" DIP MIN CL 52
(7)	3" MJ GATE VALVE WITH VALVE BOX
(8)	3" DI MJ 90° BEND

* = VARIES DEPENDING ON SPOOL

** - HATCHES ARE FOOT TRAFFIC RATED ONLY

MINIMUM INSIDE HATCH AND VAULT DIMENSIONS	
DESCRIPTION	3" LINE
PRECAST CONCRETE VAULT (A&L VAULT PRODUCTS)	62"L x 34"W x 29"H W/ 25" RISER
ALUMINUM HATCH (A&L VAULT PRODUCTS)	A&L6234ALM**

DATE: 12/2010

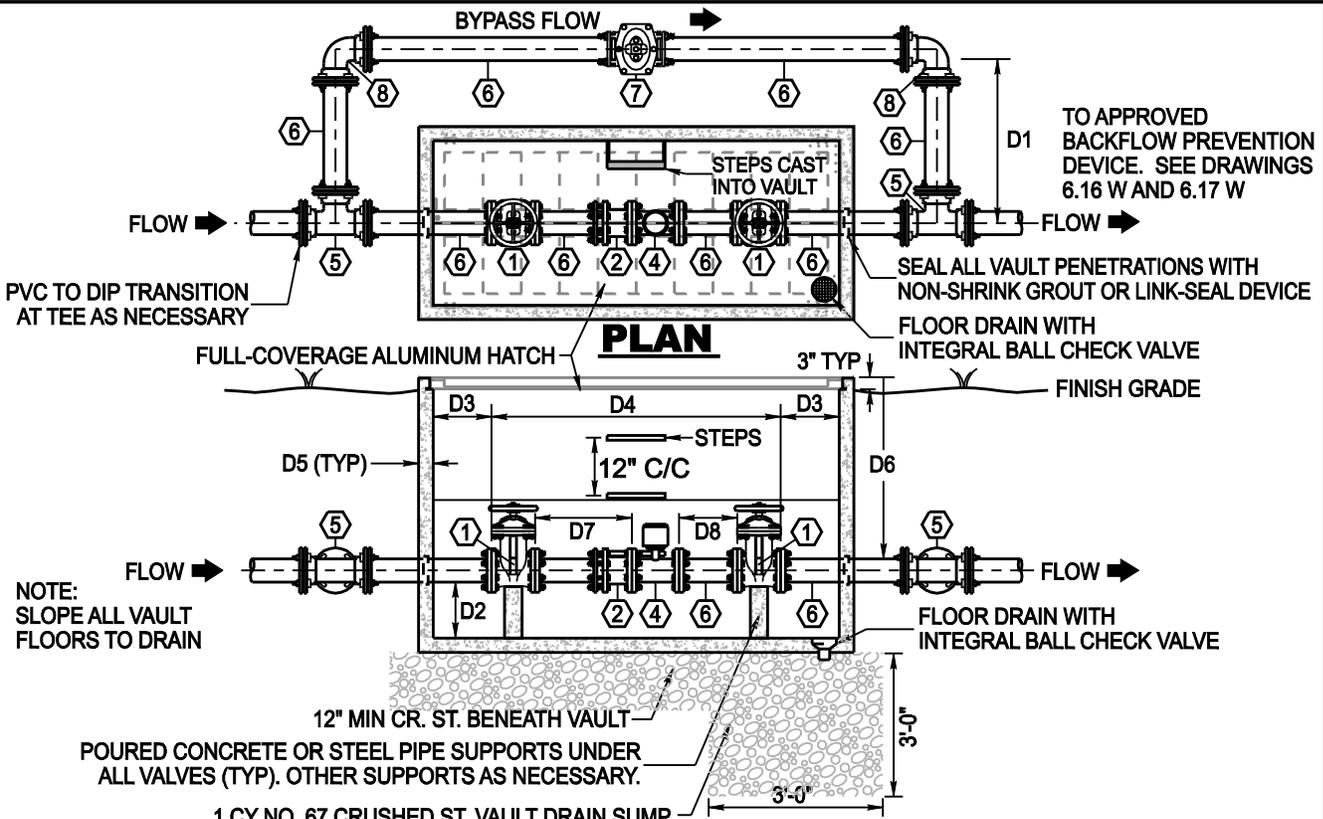
REV. 01/2015

NOT TO SCALE

3" WATER METER VAULT ASSEMBLY

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. BYPASS LINE MAY BE PLACED ON OPPOSITE SIDE AS NECESSARY TO ACCOMODATE SITE CONDITIONS.
2. ALL EXTERNAL MJ FITTINGS TO BE RESTRAINED WITH MECHANICAL RESTRAINT DEVICES.
3. GATE VALVES ON EACH SIDE OF METER MUST REMAIN IN FULLY OPEN POSITION DURING NORMAL OPERATION TO INSURE ACCURACY OF METER.
4. UNIFLANGE DEVICES AND PLAIN-END PIPE MAY BE USED AS NECESSARY IN LIEU OF FLANGED PIPE.
5. ROMAC #501 COUPLING ADAPTER MAY BE USED IN LIEU OF SMITH-BLAIR #912
6. RAMNECK BUTYL SEALANT (2 ROLLS) REQUIRED BETWEEN VAULT AND RISERS IF RISERS ARE USED.
7. MOUNT AMI MTU PER MANUFACTURER RECOMMENDATIONS.

DIMENSIONS	
DIM.	4" LINE
D1	3'-0"
D2	1'-0"
D3	12" +/-
D4	5'-0" *
D5	3"
D6	3'-0"
D7	20" MIN
D8	12" MIN

FITTING AND DEVICE LIST	
(1)	4" GATE VALVE WITH HANDWHEEL (NRS SHOWN) FL x FL
(2)	4" SMITH-BLAIR MODEL 912 FLANGED COUPLING ADAPTER
(3)	NO LONGER USED
(4)	4" MUELLER ELECTROMAG FLOW METER (FLANGED)
(5)	4" DI MJ TEE
(6)	4" DIP MIN CL 52
(7)	4" MJ GATE VALVE WITH VALVE BOX
(8)	4" DI MJ 90° BEND

* = VARIES DEPENDING ON SPOOLS

** - HATCHES ARE FOOT TRAFFIC RATED ONLY

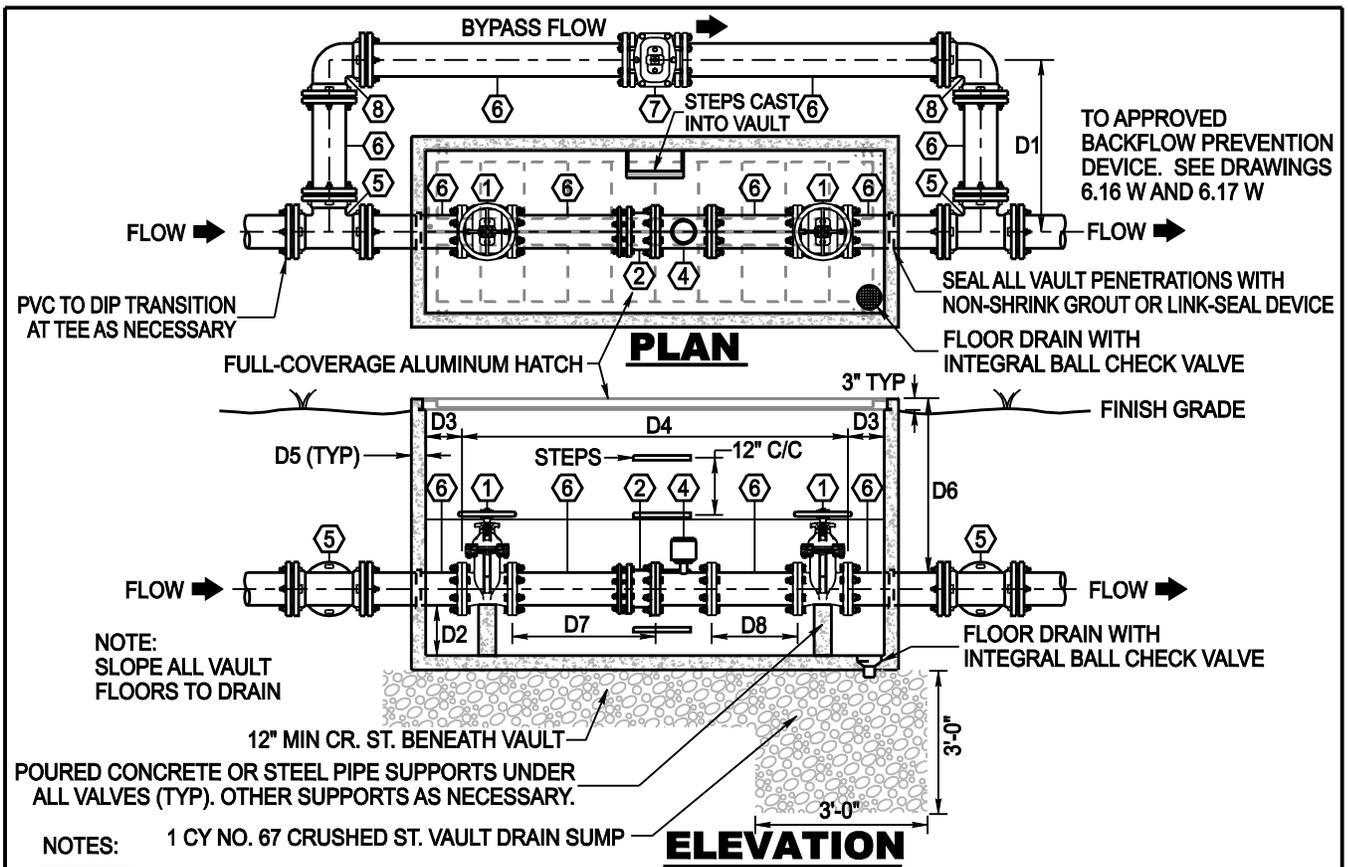
MINIMUM INSIDE HATCH AND VAULT DIMENSIONS	
DESCRIPTION	4" LINE
PRECAST CONCRETE VAULT (A&L VAULT PRODUCTS)	84"L x 34"W x 29"H W/ 25" RISER
ALUMINUM HATCH (A&L VAULT PRODUCTS)	A&L8434ALM**

DATE: 12/2010 REV. 01/2015 NOT TO SCALE

4" DOMESTIC WATER METER VAULT ASSEMBLY

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



1. BYPASS LINE MAY BE PLACED ON OPPOSITE SIDE AS NECESSARY TO ACCOMODATE SITE CONDITIONS.
2. ALL EXTERNAL MJ FITTINGS TO BE RESTRAINED WITH MECHANICAL RESTRAINT DEVICES.
3. GATE VALVES ON EACH SIDE OF METER MUST REMAIN IN FULLY OPEN POSITION DURING NORMAL OPERATION TO INSURE ACCURACY OF METER.
4. UNIFLANGE DEVICES AND PLAIN-END PIPE MAY BE USED AS NECESSARY IN LIEU OF FLANGED PIPE.
5. ROMAC #501 COUPLING ADAPTER MAY BE USED IN LIEU OF SMITH-BLAIR #912
6. RAMNECK BUTYL SEALANT (2 ROLLS) REQUIRED BETWEEN VAULT AND RISERS IF RISERS ARE USED.
7. MOUNT AMI MTU PER MANUFACTURER RECOMMENDATIONS.

DIMENSIONS	
DIM.	6" LINE
D1	3'-6"
D2	1'-0" +/-
D3	7" +/-
D4	5'-0" *
D5	3"
D6	3'-0"
D7	30" MIN
D8	18" MIN

FITTING AND DEVICE LIST	
(1)	6" GATE VALVE WITH HANDWHEEL (NRS SHOWN) FL x FL
(2)	6" SMITH-BLAIR MODEL 912 FLANGED COUPLING ADAPTER
(3)	NO LONGER USED
(4)	6" MUELLER ELECTROMAG FLOW METER (FLANGED)
(5)	6" DI MJ TEE
(6)	6" DIP MIN CL 52
(7)	6" MJ GATE VALVE WITH VALVE BOX
(8)	6" DI MJ 90° BEND

* = VARIES DEPENDING ON SPOOL

** - HATCHES ARE FOOT TRAFFIC RATED ONLY

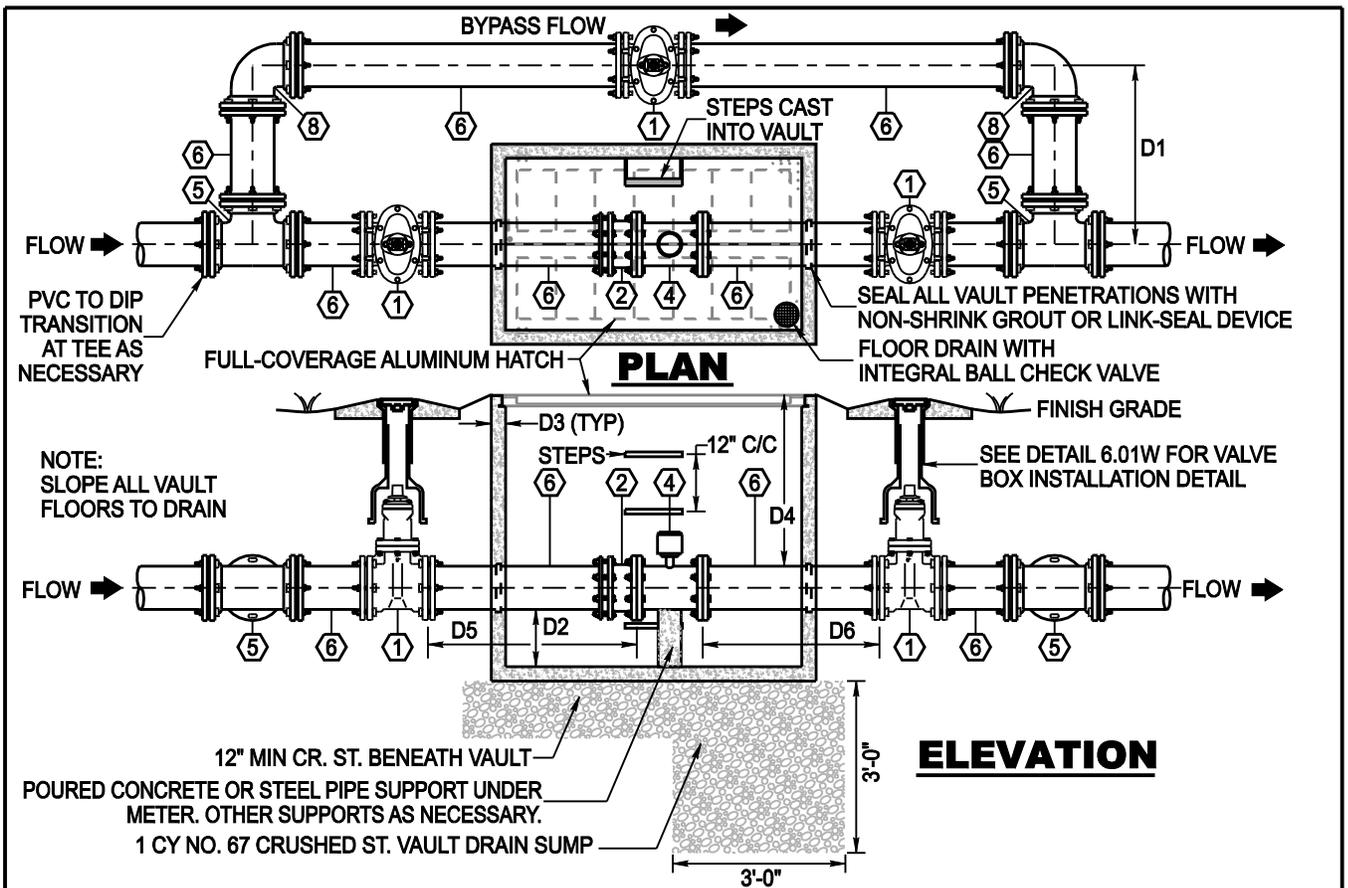
MINIMUM INSIDE HATCH AND VAULT DIMENSIONS	
DESCRIPTION	6" LINE
PRECAST CONCRETE VAULT (A&L VAULT PRODUCTS)	96"L x 48"W x 48"H W/ 6" RISER
ALUMINUM HATCH (A&L VAULT PRODUCTS)	A&L9660ALM**

DATE: 12/2010 REV. 01/2015 NOT TO SCALE

6" DOMESTIC WATER METER VAULT ASSEMBLY

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. BYPASS LINE MAY BE PLACED ON OPPOSITE SIDE AS NECESSARY TO ACCOMODATE SITE CONDITIONS.
2. ALL EXTERNAL MJ FITTINGS TO BE RESTRAINED WITH MECHANICAL RESTRAINT DEVICES.
3. GATE VALVES ON EACH SIDE OF METER MUST REMAIN IN FULLY OPEN POSITION DURING NORMAL OPERATION TO INSURE ACCURACY OF METER.
4. UNIFLANGE DEVICES AND PLAIN-END PIPE MAY BE USED AS NECESSARY IN LIEU OF FLANGED PIPE.
5. ROMAC #501 COUPLING ADAPTER MAY BE USED IN LIEU OF SMITH-BLAIR #912
6. RAMNECK BUTYL SEALANT (2 ROLLS) REQUIRED BETWEEN VAULT AND RISERS IF RISERS ARE USED.
7. MOUNT AMI MTU PER MANUFACTURER RECOMMENDATIONS.

DIMENSIONS	
DIM.	8" LINE
D1	3'-6"
D2	1'-0" +/-
D3	3"
D4	3'-0"
D5	40" MIN
D6	24" MIN

FITTING AND DEVICE LIST	
(1)	8" MJ GATE VALVE WITH VALVE BOX
(2)	8" SMITH-BLAIR MODEL 912 FLANGED COUPLING ADAPTER
(3)	NO LONGER USED
(4)	8" MUELLER ELECTROMAG FLOW METER (FLANGED)
(5)	8" x 8" DI MJ TEE
(6)	8" DIP MIN. CL 52
(7)	8" GATE VALVE WITH VALVE BOX
(8)	8" DI 90° MJ BEND

* = VARIES DEPENDING ON SPOOL

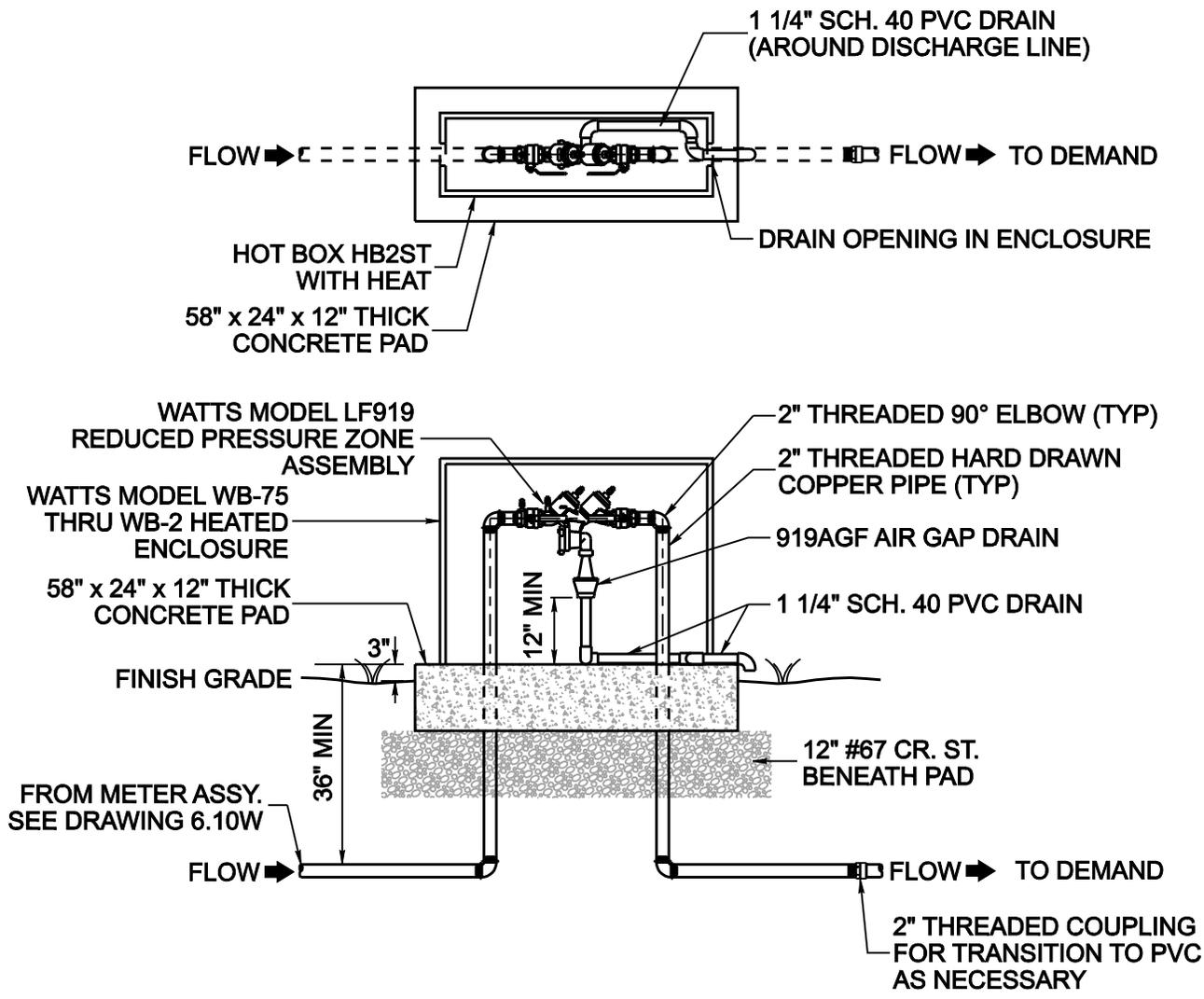
MINIMUM INSIDE HATCH AND VAULT DIMENSIONS	
PRECAST CONCRETE VAULT (A&L VAULT PRODUCTS)	62"L x 34"W x 29"H W/ 25" RISER
ALUMINUM HATCH (A&L VAULT PRODUCTS)	A&L6234ALM**

** - HATCHES ARE FOOT TRAFFIC RATED ONLY

DATE: 12/2010 REV. 01/2015 NOT TO SCALE

8" DOMESTIC WATER METER VAULT ASSEMBLY

STANDARD DETAILS
LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. BACKFLOW PREVENTION DEVICE TO BE UTILIZED IS BASED ON TYPE OF FACILITY OR STRUCTURE. REFER TO LCWSA POLICIES AND PROCEDURES FOR DETAILS.
2. RPZ ASSEMBLY MAY BE INSTALLED WITHIN BUILDING OR STRUCTURE HOWEVER NO CONNECTIONS TO THE WATER LINE MAY BE MADE BETWEEN THE METER AND THE BACKFLOW PREVENTER.
3. AC POWER WILL BE REQUIRED FOR ENCLOSURE HEAT.

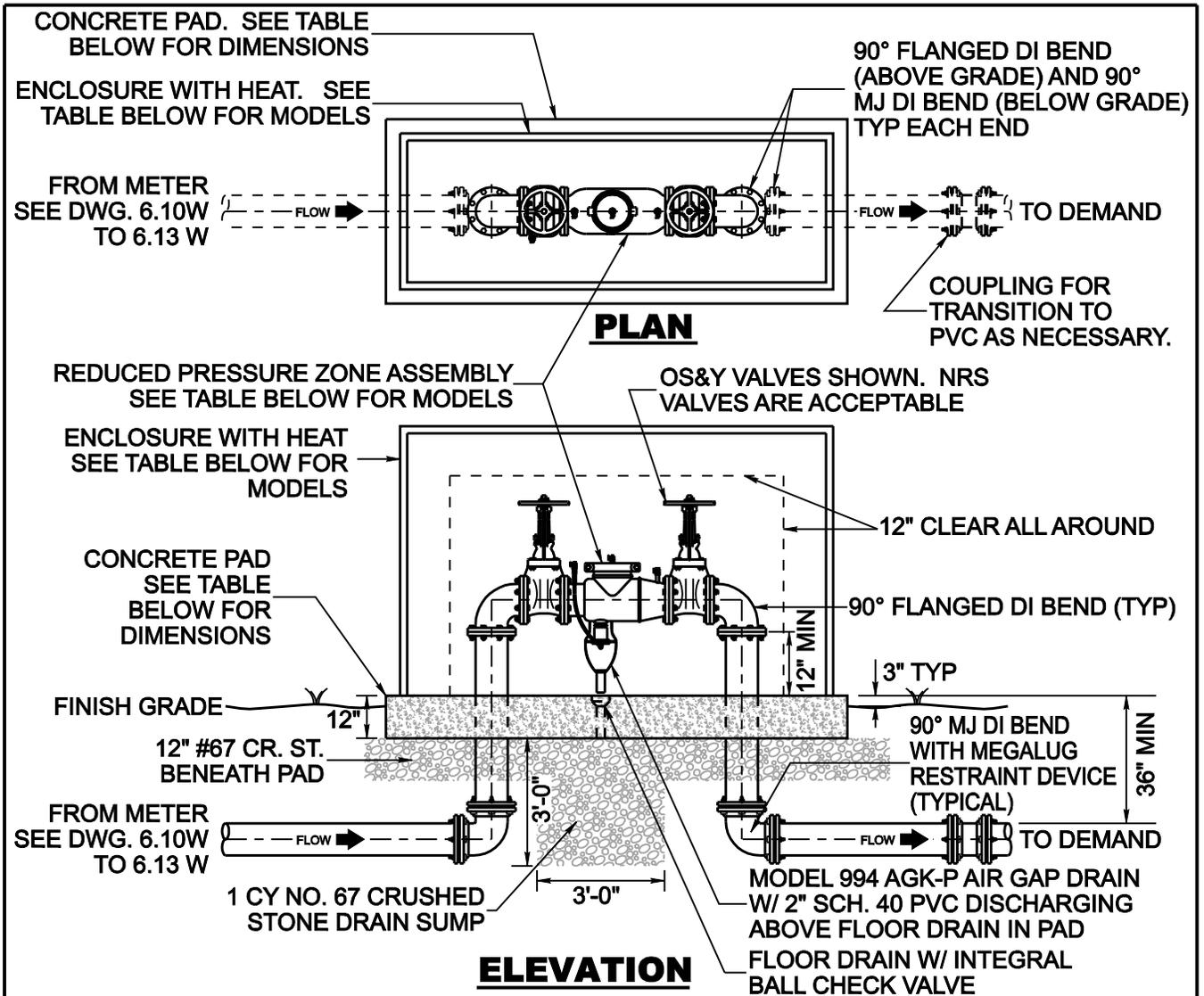
REV. 01/2015
DATE: 12/2010

NOT TO SCALE

2" REDUCED PRESSURE ZONE BACKFLOW PREVENTER ASSEMBLY

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



RPZ SIZE	RPZ	ENCLOSURE (NRS)	ENCLOSURE (OSY)	PAD (NRS)	PAD (OSY)
3"	WATTS 994	WATTS WBN3	WATTS WBE3	82" x 38"	82" x 38"
4"	WATTS 994	WATTS WBN3	WATTS WBE3	82" x 38"	82" x 38"
6"	WATTS 994	WATTS WBN4	WATTS WBE6	102" x 44"	117" x 48"
8"	WATTS 994	WATTS WBN6	WATTS WBE8	102" x 44"	130" x 52"

NOTES:

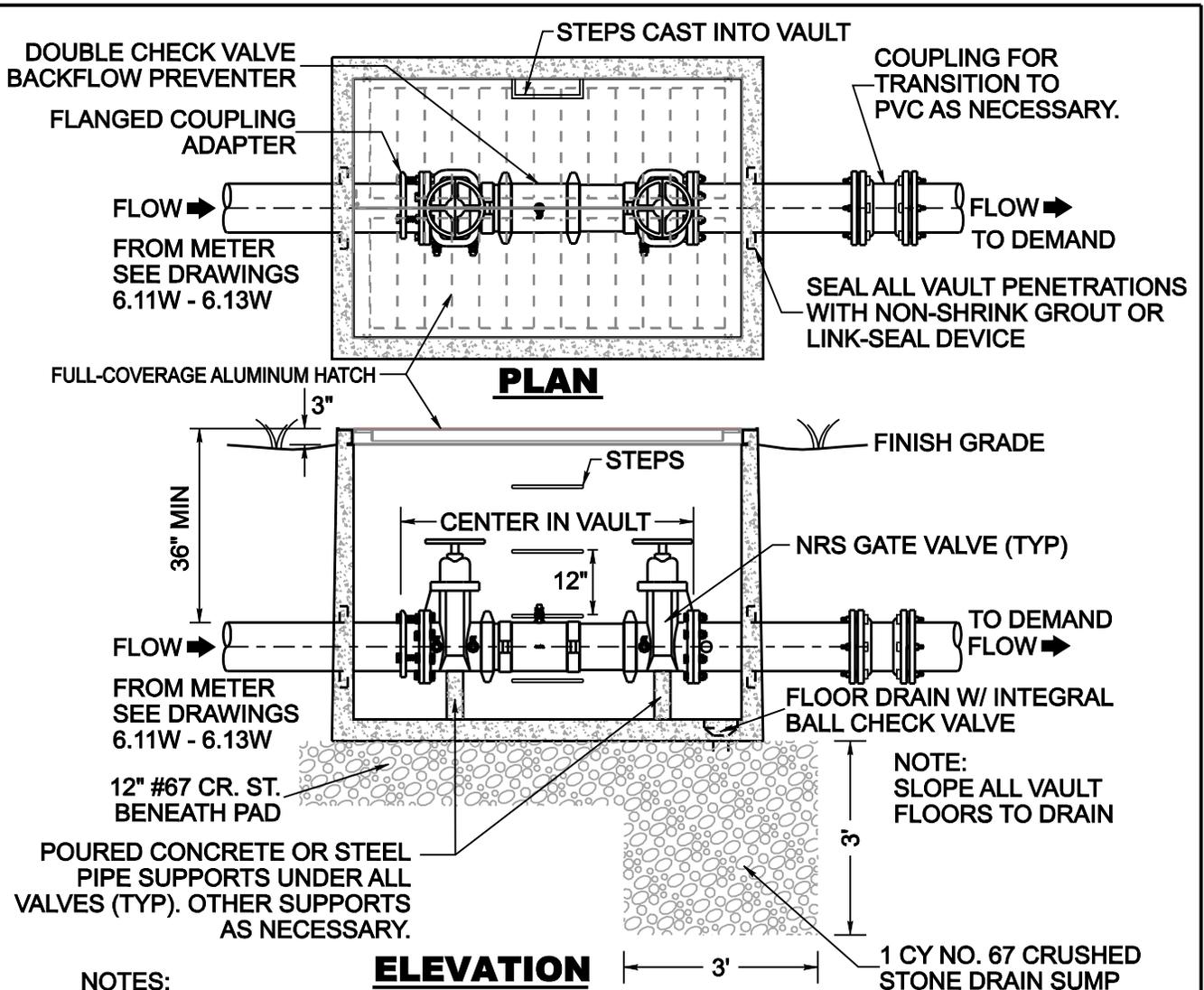
1. BACKFLOW PREVENTION DEVICE TO BE UTILIZED IS BASED ON TYPE OF FACILITY OR STRUCTURE. REFER TO LCWSA POLICIES AND PROCEDURES FOR DETAILS.
2. RPZ ASSEMBLY MAY BE INSTALLED WITHIN BUILDING OR STRUCTURE HOWEVER NO CONNECTIONS TO THE WATER LINE MAY BE MADE BETWEEN THE METER AND THE BACKFLOW PREVENTER.
3. AC POWER WILL BE REQUIRED FOR ENCLOSURE HEAT.

DATE: 12/2010 REV. 01/2015 NOT TO SCALE

3" TO 8" REDUCED PRESSURE ZONE BACKFLOW PREVENTER ASSEMBLY

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. BACKFLOW PREVENTION DEVICE TO BE UTILIZED IS BASED ON TYPE OF FACILITY OR STRUCTURE. REFER TO LCWSA POLICIES AND PROCEDURES FOR DETAILS.
2. BACKFLOW PREVENTER MAY BE INSTALLED WITHIN BUILDING OR STRUCTURE HOWEVER NO CONNECTIONS TO THE WATER LINE MAY BE MADE BETWEEN THE METER AND THE BACKFLOW PREVENTER.
3. AC POWER WILL BE REQUIRED FOR ENCLOSURE HEAT.

SIZE	BACKFLOW PREVENTER	VAULT AND HATCH	FLANGED COUPLING ADAPTER
3"	WATTS 757 NRS	A&L6234CV* + A&L6234ALM	SMITH-BLAIR #912 OR ROMAC #501
4"	WATTS 757 NRS	A&L6234CV* + A&L6234ALM	SMITH-BLAIR #912 OR ROMAC #501
6"	WATTS 757 NRS	A&L7248CV6 + A&L7248ALM	SMITH-BLAIR #912 OR ROMAC #501
8"	WATTS 757 NRS	A&L7248CV6 + A&L7248ALM	SMITH-BLAIR #912 OR ROMAC #501

* VAULT RISER REQUIRED

DATE: 12/2010

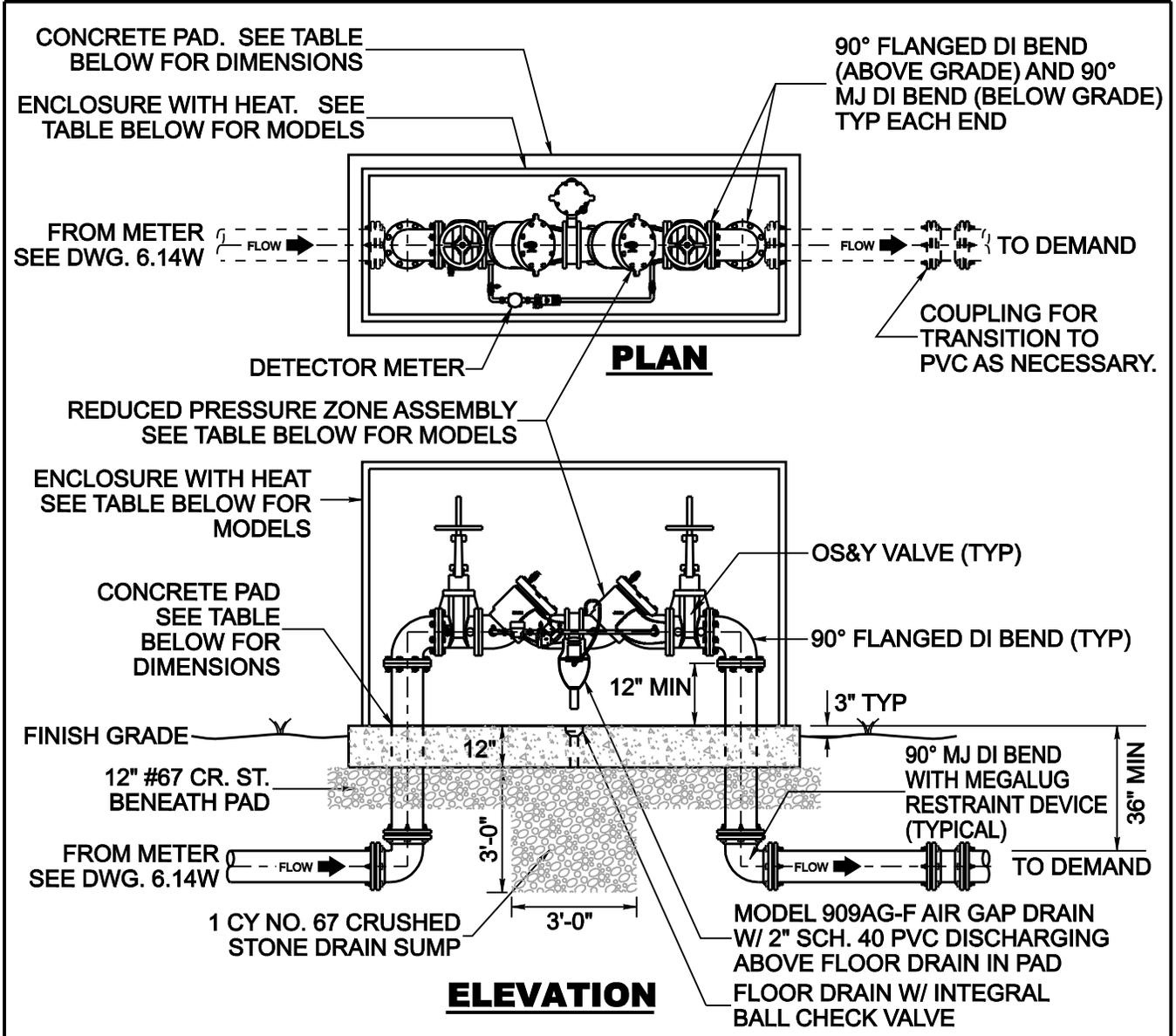
REV. 01/2015

NOT TO SCALE

3" TO 8" DOUBLE CHECK VALVE BACKFLOW PREVENTER ASSEMBLY

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



DRPZ SIZE	DRPZ	ENCLOSURE	PAD
6"	WATTS 909RPDA	WATTS WBN6	117" x 48"
8"	WATTS 909RPDA	WATTS WBE8	130" x 52"

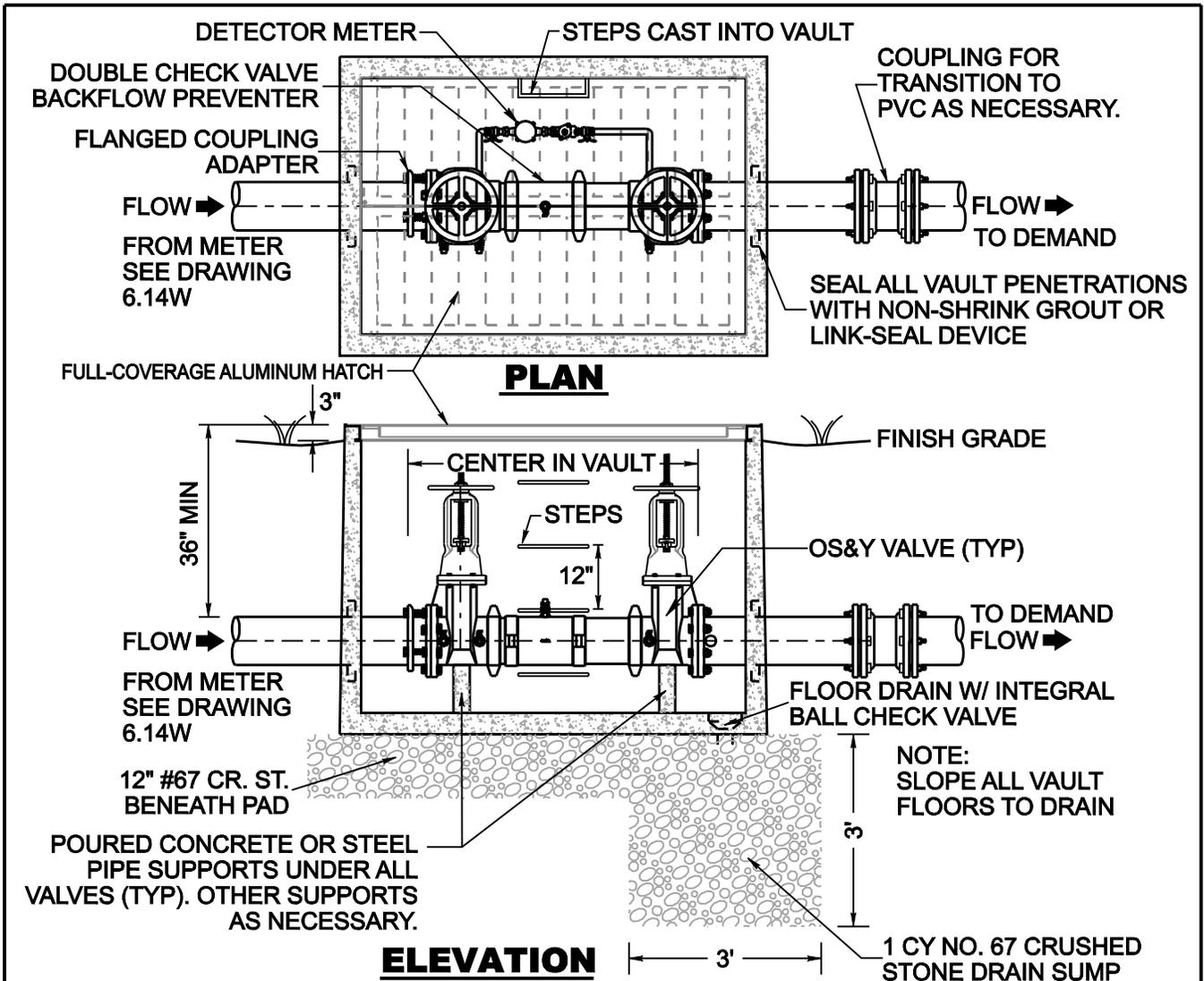
NOTES:

1. BACKFLOW PREVENTION DEVICE TO BE UTILIZED IS BASED ON TYPE OF FACILITY OR STRUCTURE. REFER TO LCWSA POLICIES AND PROCEDURES FOR DETAILS.
2. DRPZ ASSEMBLY MAY BE INSTALLED WITHIN BUILDING OR STRUCTURE HOWEVER NO CONNECTIONS TO THE WATER LINE MAY BE MADE BETWEEN THE METER AND THE BACKFLOW PREVENTER.
3. AC POWER WILL BE REQUIRED FOR ENCLOSURE HEAT.

DATE: 12/2010 REV. 01/2015 NOT TO SCALE

**6" AND 8" DETECTOR REDUCED PRESSURE ZONE
BACKFLOW PREVENTER ASSEMBLY
(FOR FIRE PROTECTION SERVICE ONLY)**

STANDARD DETAILS
LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

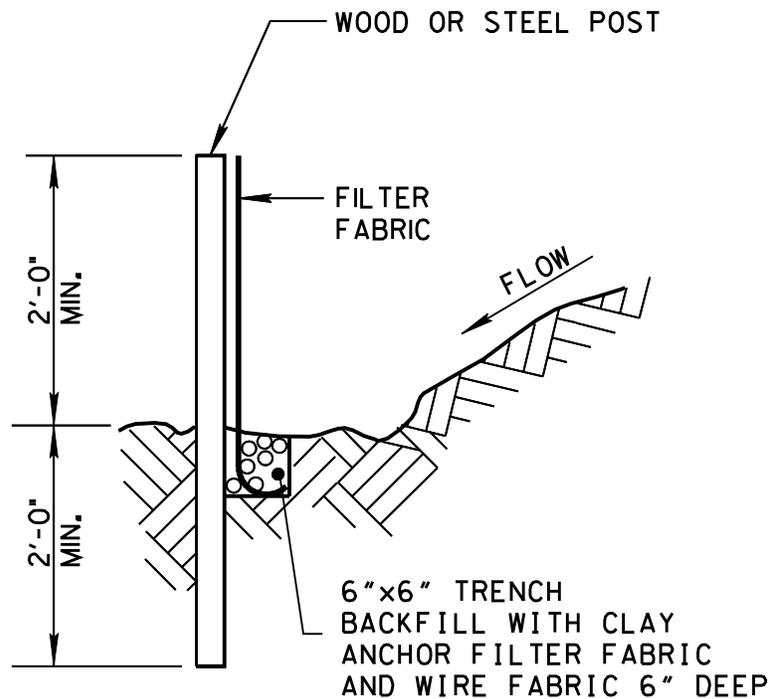
1. BACKFLOW PREVENTION DEVICE TO BE UTILIZED IS BASED ON TYPE OF FACILITY OR STRUCTURE. REFER TO LCWSA POLICIES AND PROCEDURES FOR DETAILS.
2. BACKFLOW PREVENTER MAY BE INSTALLED WITHIN BUILDING OR STRUCTURE HOWEVER NO CONNECTIONS TO THE WATER LINE MAY BE MADE BETWEEN THE METER AND THE BACKFLOW PREVENTER.
3. AC POWER WILL BE REQUIRED FOR ENCLOSURE HEAT.

SIZE	BACKFLOW PREVENTER	VAULT AND HATCH	FLANGED COUPLING ADAPTER
6"	WATTS 757DCDA-OSY	A&L7248CV6 + A&L7248ALM	SMITH-BLAIR #912 OR ROMAC #501
8"	WATTS 757DCDA-OSY	A&L7248CV6 + A&L7248ALM	SMITH-BLAIR #912 OR ROMAC #501

DATE: 05/2012	REV. 02/2012	REV. 01/2015	NOT TO SCALE
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**6" AND 8" DETECTOR DOUBLE CHECK VALVE
BACKFLOW PREVENTER ASSEMBLY
(FOR FIRE PROTECTION SERVICE ONLY)**

STANDARD DETAILS
LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. FILTER FABRIC FENCE TO BE PLACED PRIOR TO START OF ROUGH GRADING.
2. STEEL POSTS SHALL BE APPROVED BY OWNER PRIOR TO USE.
3. WOOD POSTS SHALL BE 2"x 2" MIN., OAK OR SIMILAR HARDWOOD.
4. POSTS SHALL BE SPACED AT 6' INTERVALS.
5. FILTER FABRIC SHALL BE SECURELY BOUND TO POSTS WITH EITHER STAPLES OR WIRE TIES.
6. FILTER FABRIC SHALL BE POLYPROPYLENE FABRIC WITH EQUIVALENT OPENING SIZE (EOS) OF NO.100 SIEVE MIN., NO.40 SIEVE MAX., AS DETERMINED BY CORPS OF ENGINEERS GUIDE SPEC. CW 02215.

DATE: 08/2010

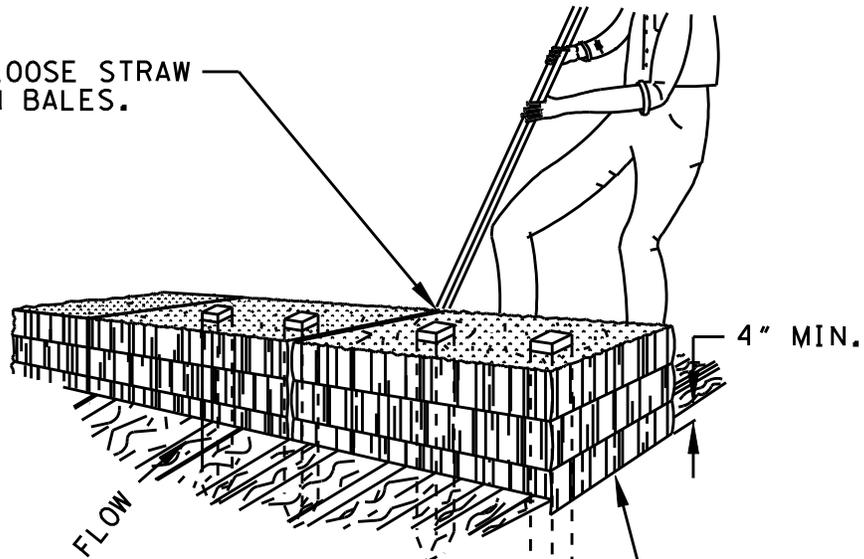
NOT TO SCALE

TEMPORARY SILT FENCE

STANDARD DETAILS

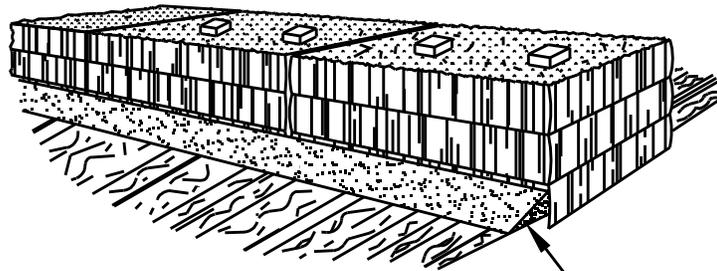
LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

WEDGE LOOSE STRAW
BETWEEN BALES.



PLACE AND STAKE
STRAW BALES

EXCAVATE TRENCH
WIDTH FOR BALE



BACKFILL AND COMPACT
THE EXCAVATED SOIL

STRAW BALE BARRIER

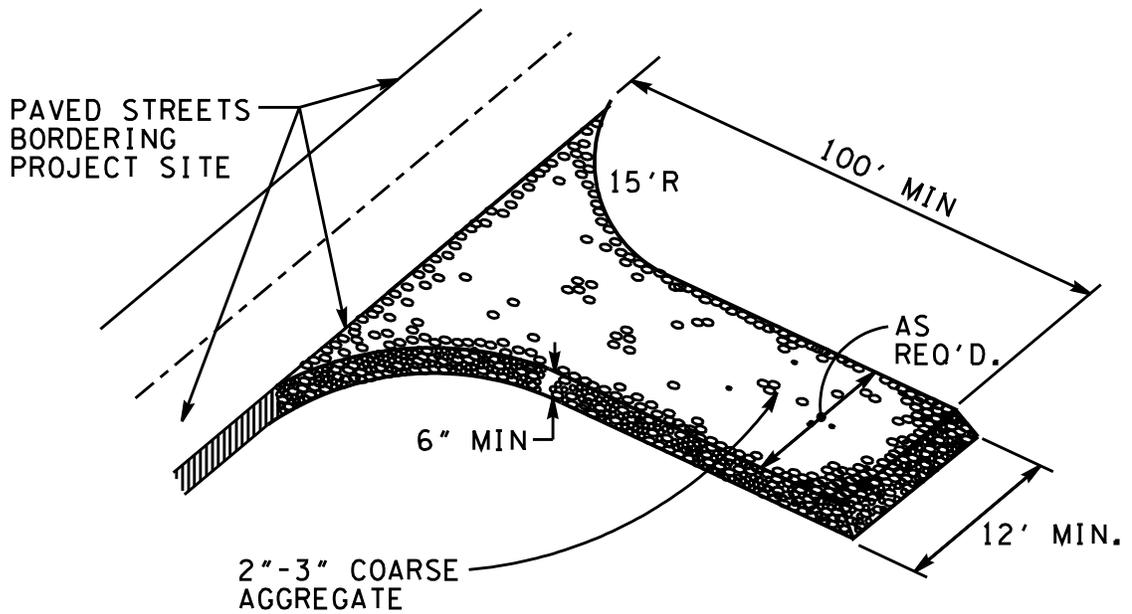
DATE: 08/2010

NOT TO SCALE

STRAW BALE BARRIER

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTE:
 GRAVEL PAD IS REQUIRED TO PROVIDE BUFFER AREA WHERE VEHICLES CAN DROP THEIR MUD AND SEDIMENT TO AVOID TRANSPORTING IT ONTO PAVED STREETS, TO CONTROL EROSION FROM SURFACE RUNOFF, AND TO HELP CONTROL DUST.

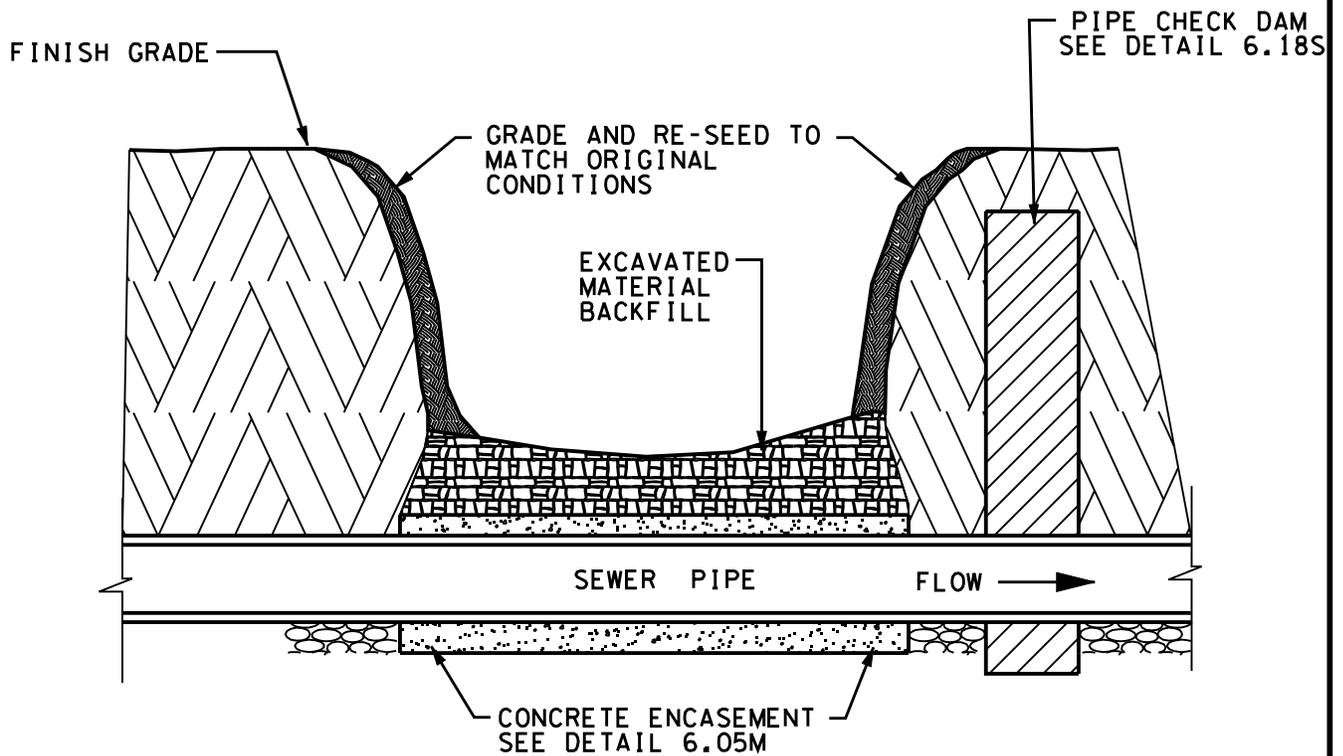
DATE: 08/2010

NOT TO SCALE

TEMPORARY CONSTRUCTION ENTRANCE

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
 LIMESTONE COUNTY, ALABAMA



NOTE: FOR A NO-BLAST CREEK CROSSING, CROSSING IS TO BE PERFORMED AS FOLLOWS.

1. LINE DRILL ON 8" CENTER-TO-CENTER ACROSS THE CREEK ALONG EACH EDGE OF PROPOSED DITCH (36" DITCH WIDTH).
2. PERFORM ADDITIONAL LINE DRILLING BETWEEN PROPOSED DITCH EDGES AS NEEDED.
3. BREAK ROCK BETWEEN LINE DRILL HOLES WITH HOE-RAM AND REMOVE FRACTURED ROCK AS NEEDED TO ALLOW FOR PIPE INSTALLATION.
4. INSTALL PIPE AT GRADE AND ENCASE IN CONCRETE PER DETAIL 6.04M. TOP OF CONCRETE TO EXTEND 8" ABOVE TOP OF PIPE. (CONCRETE TO BE CLASS "B" AS SPECIFIED IN CONTRACT DOCUMENTS. ENCASEMENT WIDTH TO BE POURED THE WIDTH OF THE TRENCH WITH A MINIMUM OF 4" ON EACH SIDE.)
5. BACKFILL OVER CONCRETE WITH ORIGINAL EXCAVATED MATERIAL.
6. GRADE CREEK BANK AND CREEK BOTTOM TO MATCH ORIGINAL GRADE.
7. RE-SEED BANKS TO MATCH ORIGINAL CONDITIONS.

DATE: 08/2010

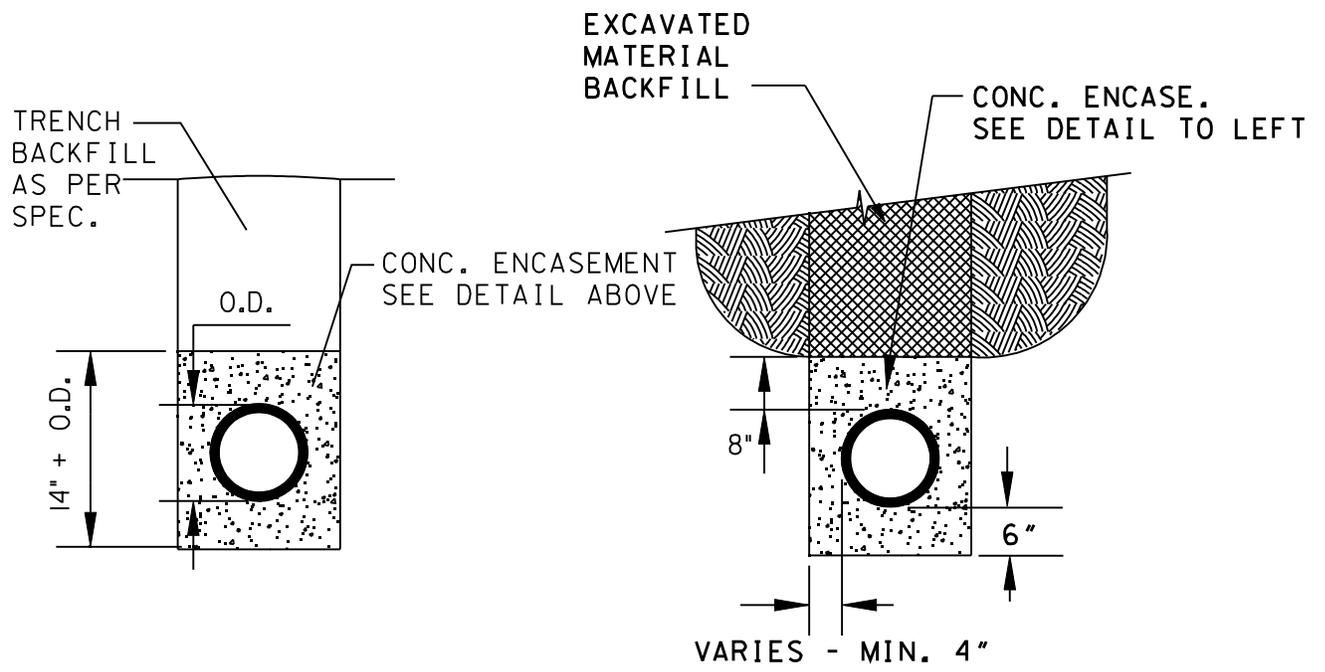
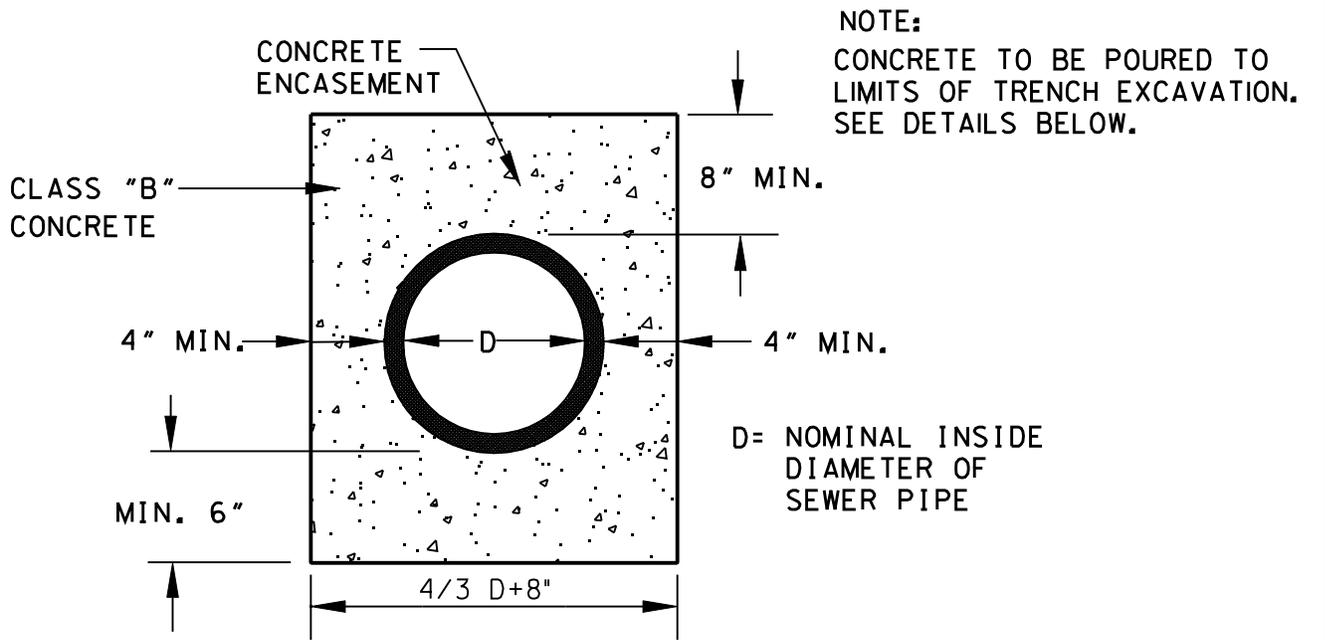
NOT TO SCALE

CREEK CROSSING

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

6.04 M



STANDARD CONCRETE ENCASEMENT

CREEK BOTTOM CONCRETE ENCASEMENT

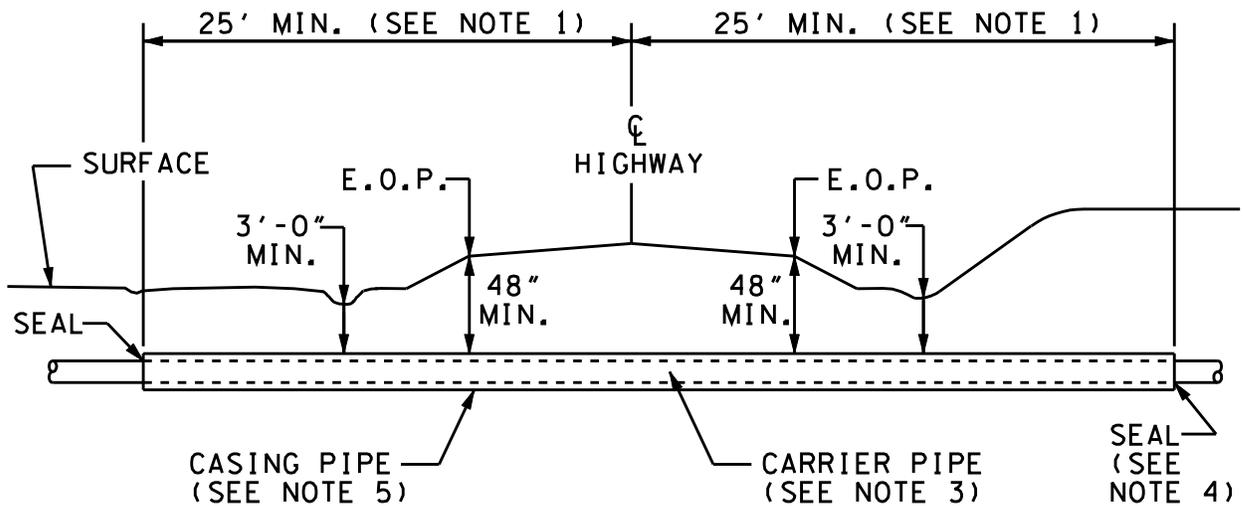
DATE: 08/2010

NOT TO SCALE

CONCRETE PROTECTION FOR UTILITY LINES

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTES:

1. CASING SHALL EXTEND TO THE GREATER OF THE FOLLOWING DISTANCES:
 - A. 2' BEYOND TOE OF SLOPE
 - B. 5' BEYOND CENTERLINE OF DITCH
 - C. MIN. OF 25' WHEN CASING IS SEALED AT BOTH ENDS
2. BORED CROSSINGS SHALL BE PERMITTED AND INSTALLED TO MEET THE REQUIREMENTS OF ALABAMA DEPARTMENT OF TRANSPORTATION AND/OR LIMESTONE COUNTY HIGHWAY DEPARTMENT.
3. CARRIER PIPE SHALL BE DUCTILE IRON PIPE AS REQUIRED BY OWNER. CARRIER PIPE SHALL BE CENTERED IN THE CASING PIPE. CARRIER PIPE SHALL BE INSTALLED USING CASING SPACERS. SPACERS SHALL BE PLACED AT PIPE JOINT MIDPOINT AND 1' FROM EACH END OF PIPE JOINT. SEE DETAIL 6.07M FOR CASING SPACER AND END SEAL DETAILS.
4. ENDS OF CASING PIPE SHALL BE SEALED UTILIZING SYNTHETIC RUBBER SEALS WITH STAINLESS STEEL BINDING STRAPS.
5. REFER TO SPECIFICATION FOR CASING PIPE THICKNESS AND DIAMETER.

DATE: 08/2010

NOT TO SCALE

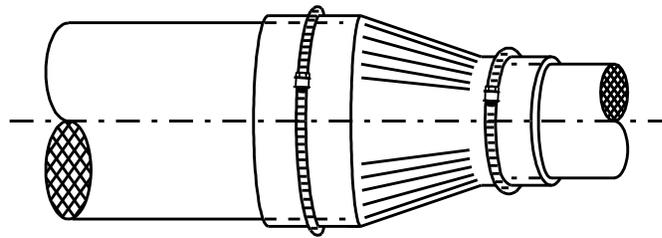
BORE AND JACK FOR HIGHWAYS

STANDARD DETAILS

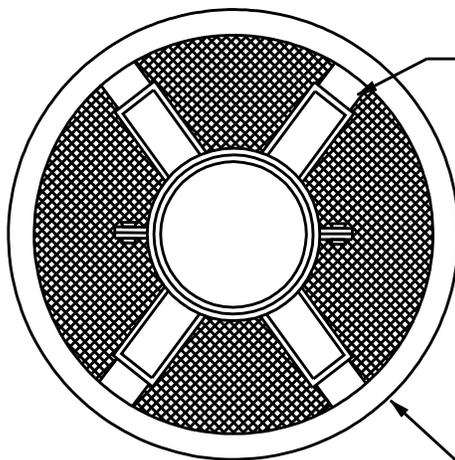
LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA

6.06 M

NEOPRENE RUBBER WRAP AROUND END SEALS WITH STAINLESS STEEL BANDS WITH WORM SCREWS. ADVANCE PRODUCTS & SYSTEMS, INC. TYPE AW, PIPELINE SEAL AND INSULATOR, INC, TYPE W OR APPROVED EQUAL.



END SEAL

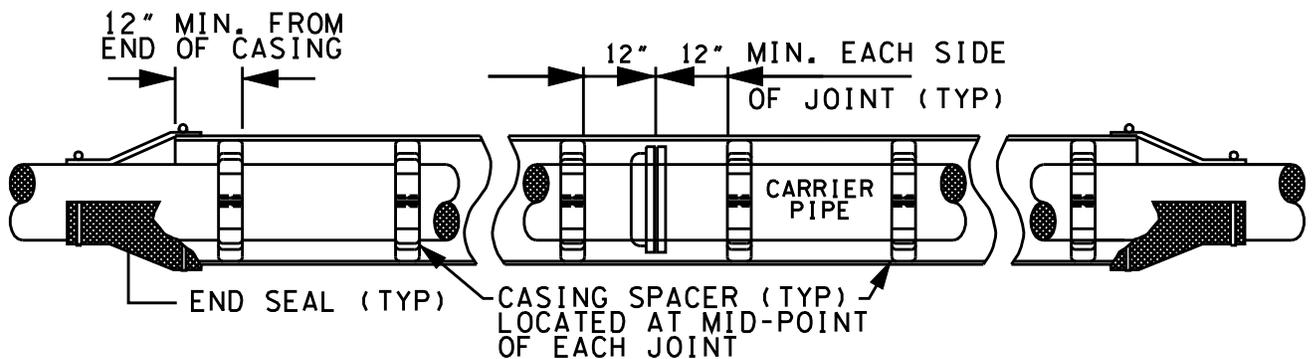


ABRASION RUNNER (MIN OF 4)

COATED CASING SPACER, 14 GA. STEEL, FUSION BONDED PVC COATING OR FLEXIBLE EPDM LINER, 2 PIECE, 2" WIDE GLASS REINFORCED POLYMER RUNNERS, PVC LINER. PIPELINE SEAL AND INSULATOR, INC. TYP. C, ADVANCE PRODUCTS AND SYSTEMS, INC. TYPE S18 OR EQUAL.

CASING

SECTION



12" MIN. FROM
END OF CASING

12" 12" MIN. EACH SIDE
OF JOINT (TYP)

CARRIER
PIPE

END SEAL (TYP)

CASING SPACER (TYP)
LOCATED AT MID-POINT
OF EACH JOINT

ELEVATION

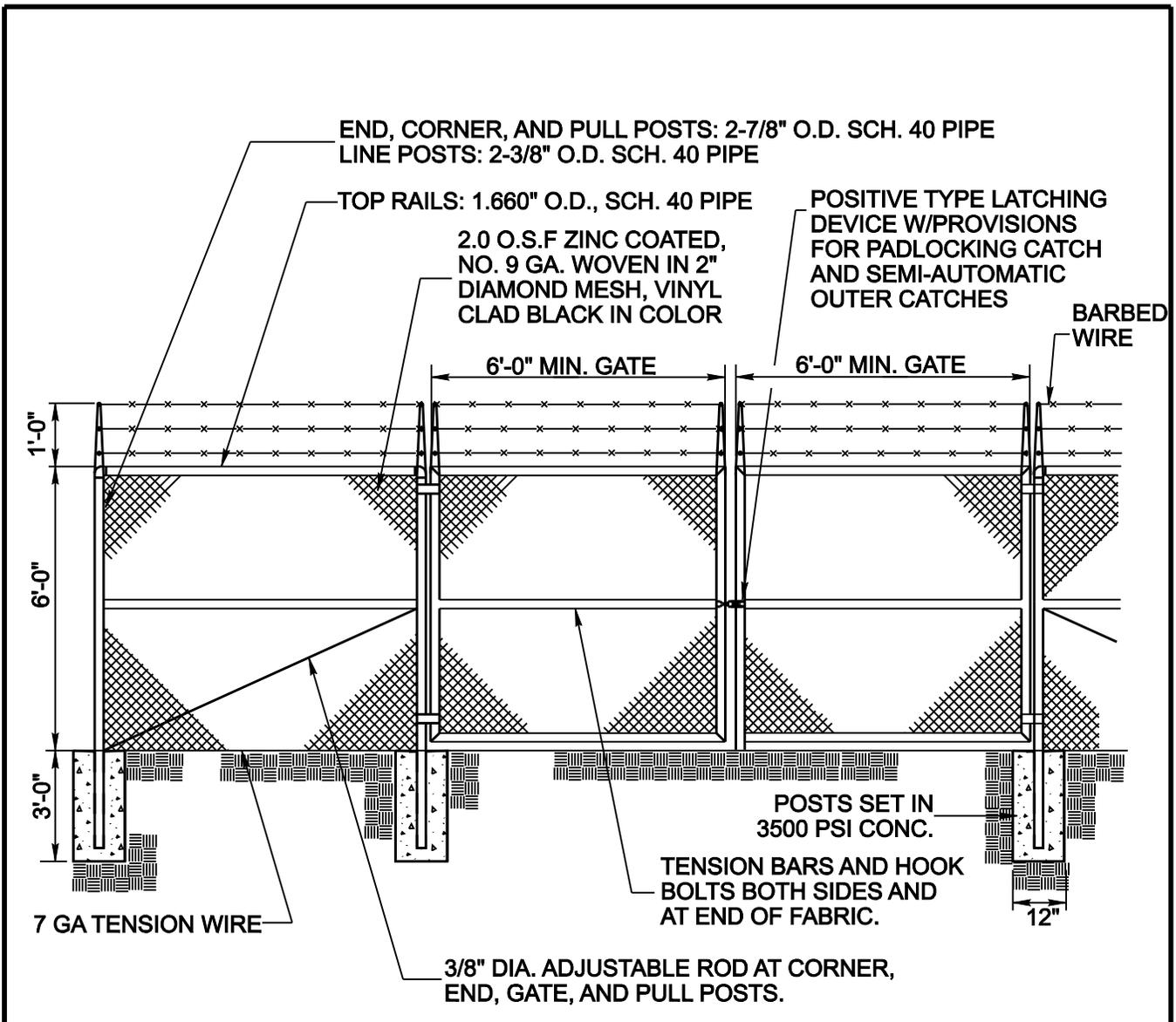
DATE: 08/2010

NOT TO SCALE

CASING SPACER AND END SEAL DETAILS

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
LIMESTONE COUNTY, ALABAMA



NOTE:

ALL POSTS AND OTHER APPURTENANCES SHALL BE HOT DIP GALVANIZED W/ MIN. 2.0 O.S.F. ZINC. ALL FITTINGS SHALL BE MALLEABLE OR DUCTILE IRON OR STEEL. FENCE FABRIC AND ALL APPURTENANCES TO BE VINYL COATED, COLOR TO BE BLACK.

REV. 01/2015
 DATE: 02/2012

NOT TO SCALE

STANDARD CHAIN-LINK FENCE DETAIL

STANDARD DETAILS

LIMESTONE COUNTY WATER AND SEWER AUTHORITY
 LIMESTONE COUNTY, ALABAMA