May 5, 2022

ADDENDUM 1 of 1

Invitation to Bid: Akins Blvd. Extension

May 30, 2022, 3:00 PM EST

City of Statesboro Central Services Purchasing Office

22 West Grady Street, Statesboro, Ga 30458

Addendum 1 of 1

1.) The due date has been extended to June1, 2021 at 3:00 PM EST

2.) The location of the Bid Opening shall be at the Central Services Office located at 22 W. Grady Street, Statesboro, GA 30458.

3.) MFBE Affidavit Form and MFBE Grid Form:

*A minimum of 20% of the total bid amount shall be comprised of funds to be paid to a validated MFBE contractor/sub-contractor (Labor and or supplies may account for this 20%). During the construction process contractors shall provide the City of Statesboro proof of payment to MFBE contractors/sub-contractors. This proof shall be provided with each pay request and or as requested by the City of Statesboro.

4.) Addendum 1 of 1 Letter:

5.) South Campus Roadway Ext. Technical Specifications:

6.) Revised Bid Schedule:

7.) It shall be the sole responsibility of any/all vendors to check the City of Statesboro website for future issued addenda.

This documentation must be included in your submitted sealed bid for the bid to be considered.

Receipt of Addendum 1 of 1 Acknowledged: Signature: _____

Minority and Female Business Enterprise Affidavit

City of Statesboro
50 E. Main Street
Statesboro, GA 3058
912-764-5468

Section 1: Business ID

I am a MFBE _____YES _____NO

TAX ID NUMBER _____

DBE /MFBE CERTIFICATION NUMBER _____

Section 2: Business Information

BUSINESS NAME:

DBA /MFBE NAME:

COMPANY TYPE:

COMPANY ETHNICITY:

COMPANY GENDER:

Section 3: Business Contact Information

MAIN COMPANY EMAIL:

MAIN PHONE: MAIN FAX: COMPANY WEBSITE:

COMPANY ADDRESS:

CITY: STATE/PROVINCE: COUNTRY:

Section 4: Company Contact Person

NAME:

TITLE:

EMAIL:

PHONE NUMBER: FAX NUMBER:

*Please sign, date, and return the completed form

Disclaimer and Signature

I certify that my answers are true and complete to the best of my knowledge.

Signature: _____ Date: _____

City of Statesboro Minority/ Female Business Enterprise Program
MFBE Participation Report

Name of Bidder: _____

Name of Project: _____

MFBE Firm	Type of Work	Contact Person	City, State	%	MBE or FBE

MBE Total _____% FBE Total_____% MFBE Combined_____%

The undersigned should enter into a formal agreement with MFBE Contractor identified herein for work listed in this schedule conditioned upon execution of contract with the City of Statesboro

_____ _____

Signature Print

MAXWELL-REDDICK
AND ASSOCIATES

May 03, 2022

RE: **Addendum No. 1**
Akins Boulevard Extension
Georgia Southern University, Statesboro, GA

To All Plan Holders:

The following items clarify, add to, delete from and/ or otherwise change and supersede the information previously issued as Bid Documents for the above referenced project, and shall be acknowledged as **Addendum No. 1** in your bid submittal.

Bid Related Items:

1. Replace the Bid Schedule listed in the Bid Contract Documents with the attached Bid Schedule.
2. GDOT specifications (latest edition) are incorporated by reference as stated in the bid documents. The attached special provision technical specifications supplement/compliment said GDOT specifications and are a part of the Contract Construction Documents.

Bidders shall make sure to acknowledge this addendum and any other addenda on the Bid Proposal Forms. Any errors, ambiguities or omissions of merit should be reported in writing to the attention of the undersigned.

Respectfully Submitted,

Jared Mock, P.E.
Maxwell-Reddick and Associates

TECHNICAL SPECIFICATIONS
100% CONSTRUCTION DOCUMENTS

FOR

BR-66-2101 SOUTH CAMPUS ROADWAY EXTENSION
GDOT PROJECT: 0017189
GEORGIA SOUTHERN UNIVERSITY
BULLOCH COUNTY, STATESBORO, GA

JANUARY 20, 2022

USING AGENCY APPROVAL:

SIGN: _____ **DATE:** 2/15/2022

DR. KYLE MARRERO
PRESIDENT
GEORGIA SOUTHERN UNIVERSITY

GEORGIA REGISTERED No. 36139 PROFESSIONAL ENGINEER JARED V. MOCK

MAXWELL-REDDICK
AND ASSOCIATES

40 JOE KENNEDY BLVD.
STATESBORO, GA 30458

TABLE OF CONTENTS

Division - Section Title	Pages
GDOT STANDARD SPECIFICATIONS INCORPORATED BY REFERENCE *(LATEST EDITION)*	
SPECIAL PROVISIONS AS FOLLOWS:	
DIVISION 01 – GENERAL REQUIREMENTS	
01 41 00 – Regulatory Requirements	002
DIVISION 27 – COMMUNICATIONS	
27 05 43.01 – Communications Raceway/Innerduct	004
DIVISION 32 – EXTERIOR IMPROVEMENTS	
32 14 00 – Unit Paving	004
DIVISION 33 - UTILITIES	
33 10 00 – Water Utilities	014
33 33 00 – Low Pressure Utility Sewerage	014

SECTION 01 41 00 – REGULATORY REQUIREMENTS *(NPDES STORMWATER PERMIT COMPLIANCE)*

PART 1 - GENERAL

1.1 SUMMARY

a) The OWNER shall execute the Notice of Intent of the NPDES Stormwater General Permit No. GAR 100001 as the Owner. The CONTRACTOR shall execute the Notice of Intent of the NPDES Stormwater General Permit No. GAR 100001 as the Operator. The CONTRACTOR shall provide inspection, compliance monitoring, and sampling in accordance with the NPDES Permit. The CONTRACTOR shall install BMP measures as called for on the construction drawings and maintain these measures throughout the length of the project.

PART 2 - PRODUCTS

n/a

PART 3 - EXECUTION

3.1 NPDES STORMWATER PERMIT (Permit)

a) The Owner shall execute Notice of Intent as the Owner and pay applicable NPDES application fee.

b) The Owner is responsible for submitting Erosion, Sedimentation and Pollution Control Plans to the GA EPD and for obtaining approval of said plans.

c) The Contractor shall provide the services of a Qualified Person to perform daily inspections and documenting in accordance with the Permit. The Owner shall provide the services of a Qualified Person to provide weekly inspections and documenting in accordance with the Land Disturbing Activity Permit and shall provide NPDES related water quality sampling.

d) The Contractor shall be responsible for permit compliance in his performance of the contract and in the work of any of his subcontractors until a Notice of Termination is issued when the project has achieved final stabilization.

e) The Contractor shall keep a copy of the ESPCP and Permit on site.

f) The Contractor shall not allow a stormwater discharge or release of any oil or hazardous material.

g) The Contractor shall notify the Design Professional immediately of the failure of any Best Management Practices (BMPs).

h) The Contractor shall implement the ESPCP prior to beginning construction.

3.2 MEASUREMENT AND PAYMENT

Measurement and payment for work under this section shall be the percentage completed for each pay period of the lump sum listed in the bid schedule.

END OF SECTION 01 41 00.

SECTION 27 05 43.01 - COMMUNICATIONS RACEWAY/INNERDUCT

PART 1 - GENERAL

To allow for future communication upgrades a specific number of conduits shall be dedicated for that purpose. To further that effort and achieve maximum conduit utilization, those conduits shall contain innerduct. Each conduit designated for fiber optic and communications cables shall include the number of useable pathways as per the project requirements, drawings and notes.

1.1 SECTION INCLUDES

A. Flexible Fabric Raceway, Innerduct or Conduit

1.2 REFERENCES

A. Innerduct definition per the American National Standards Institute (ANSI)

1.3 SUBMITTALS

A. Product Data - Provide standard details and installation instructions.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials & Equipment: Labeled and/or listed as acceptable to the authority having jurisdiction as suitable for the intended use.

B. Flexible optical fiber/communication or power raceway.

C. Provide wire management in a building for fiber optic and data and communications cabling.

2.2 MATERIALS

A. Orange Polyester resin monofilament
B. Orange Nylon resin monofilament
C. White and/or Orange textured polyester yarn
D. Pre applied >2% by weight Polydimethyl Siloxane lubricant
E. Preinstaled pull tape with color coded identification or Polyethylene monofilament jacketed woven rope

2.3 FABRIC INNERDUCT

A. Standard Outdoor Woven Fabric Innerduct: Product ranging in size from 1" – 4" width for communications cable. Single or Multi-cell polyester/nylon fabric in a non-simple weave partial float zone configuration for minimum pulling tension. All cells along said innerduct will be joined along a continuous seam. Each cell containing minimum 1250lb polyester flat woven pull tape or 1250lb woven polyester/ polyethylene rope. Multiple packs may be pulled into a single empty conduit.

2.4 PERFORMANCE

A. OSP rated products will have a minimum longitudinal elongation of <3% at 50lbs

B. OSP rated products will have a minum breaking strength of >250lbs/inch of fabric. Total product breaking tensile will meet minimum breaking tensile as following

Product	LBS	Product	LBS	Product	LBS
4" 3-Cell	5200	2" 4-Cell	4400	1.50" 3-Cell	2300
4" 2-Cell	3500	2" 3-Cell	3200	1.50" 2-Cell	1600
4" 1-Cell	1900	2" 2-Cell	2200	1.50" 1-Cell	900
3" 4-Cell	5400	2" 1-Cell	1200	1.25" 3-Cell	2000
3" 3-Cell	3900	1.75" 4-Cell	1900	1.25" 2-Cell	1400
3" 2-Cell	2700	1.75" 3-Cell	2800	1.25" 1-Cell	800
3" 1-Cell	1400	1.75" 2-Cell	1900	1.00" 3-Cell	1800
		1.75" 1-Cell	1100	1.00" 2-Cell	1300
				1.00" 1-Cell	700

C. Flexible fabric innerduct will meet the pulling tension requirements under the listed parameters as set forth in the table below.

Parameters:

3 or 4"" PVC Schedule 80 stick pipe
800ft straight pull section
1250lb rated flat pull tape
Straight section with at least 10ft but less than 50ft of gradient change
0.50-0.70" HDPE Fiber Optic Cable

	1.75"-2.50" Product	2.50" – 3.25" Product
Cable #1	<75lbs	<50lbs
Cable #2	<100lbs	<75lbs
Cable #3	<75lbs	<50lbs

D. Physical Testing Requirements All flexible fabric innerduct shall meet the following requirements.

i.	Melting Temperature	ASTM D3418	> 400° F
ii.	Working Temperature		-40°F to 200°F
iii.	Bending test	Bellcore 356 4.2.5	Pass
iv.	Print Durability	Bellcore 356 5.3.5	Pass
v.	Fungi Resistance	ASTM G21	Pass
vi.	Halogen Content	MIL PRF 85045 F	Zero
vii.	Coefficient of Thermal Exp	ASTM 4723	<10 mm/100 M/5 ° C degrees C

2.5 FABRIC INNERDUCT FITTINGS

A. Conduit Plugs: Compression-type conduit plugs with locking nuts for sealing and securing one or more fabric innerducts within a 4-inch inside diameter conduit.

B. Termination Bags: Inflation-type bags for sealing and securing around one or more fabric innerducts and cables within 2-inch outside diameter or larger conduit.

2.6 PULLING MEDIUM

A. Pull Tape: measuring and pulling tape constructed of synthetic fiber, printed with accurate sequential footage marks. Color-coded.

B. Pull Rope – woven rope contstructed of a strength core with a polyethylene jacket designed for minimal pulling tension.

2.7 PENETRATION SEALING MATERIALS

A. Duct Water Seal: products suitable for closing underground and entrance conduit openings where innerduct or cable is installed, to prevent entry of gases, liquids, or rodents into the structure.

PART 3 - EXECUTION

3.1 Protection During Construction

A. Protect products from the effects of moisture, UV exposure, corrosion and physical damage during construction.

3.2 Fabric Innerduct Type to Be Used

A. Aboveground, Exterior and Interior Conduit Installations: Outdoor fabric innerduct (Standard or Detectable as desired)

B. Interior Exposed Locations

a. Non-plenum Areas: Riser listed indoor fabric innerduct rated OFCR FT-4
b. Plenum Areas: Plenum-listed indoor innerduct rated OFCR FT-6

C. Cable Tray: Use Riser or Plenum listed indoor fabric innerduct as per local requirements.

3.3 Fabric Innerduct Installation

A. Provide fabric innerduct in conduit and wire ways, and place fabric innerduct within and under cable trays using continuous unspliced lengths of fabric innerduct between maintenance holes, pull boxes, and/or termination points as indicated on the drawings.

B. Make a 2" incision, approximately 18" from the end of fabric innerduct. If using standard Pull tape, pull out out and cut off approximately 2 feet of pull-tape. Thus allowing the pull tape ends to retract back into the cells. If using a pull rope, simply make the 2" incision but do not pull out the ropes.

C. Using roughly 3-4 feet of pull tape, tie a non-slip knot to the incision. Then tie 3 to 6 half-hitch knots down to the end of fabric innerduct. Apply black vinyl tape over all knots and the end of fabric innerduct. Using a Bow Line knot tie a swivel to the end of 3 feet pull tape. For multi-pack installations one swivel is sufficient, but stagger each fabric innerduct.

D. Using a Bowline knot, attach the pull rope located in the rigid conduit to the other end of the swivel. Install fabric innerduct – ensuring that no twist is introduced to the innerduct.

E. Provide suitable fabric innerduct slack in the maintenance holes, hand holes, pull boxes, and at turns to ensure there is no kinking or binding of the product.

F. Fabric Innerduct Mountings, Hangers and Attachments: When exposed indoors or in maintenance holes, hold firmly in place using independent support.

a. Design & install hangers and other similar fittings adequate to support loads and so as to not damage innerduct.

b. Do not fasten fabric innerduct to steam, water, or other piping, ductwork, mechanical equipment, electrical equipment, electrical raceways, or wires

c. When appropriate, use the following cable ties to secure fabric innerduct through previously created incisions:

i. Underground locations : Conventional plastic cable ties

G. Maintenance Hole and Hand Hole Installation:

a. At locations where fabric innerduct will be continuous through a manhole or hand hole, allow sufficient slack so that the innerduct may be secured to the side of the vault maintaining the minimum bend radius.

b. At maintenance holes serving as the junction location, pull the exposed end of the innerduct to the far end of the vault, install termination bag, and secure to the vault.

A. Seal all conduit and fabric innerduct entering structures at the first box or outlet to prevent entrance into the structure of gases, liquids or rodents.

B. Document entire installation process for future referral.

3.4 Measurement and Payment

Measurement and payment shall be included in the cost of the duct (conduit) as listed in the bid schedule.

END OF SECTION 27 05 43.01.

SECTION 32 14 00 – UNIT (PRECAST CONCRETE) PAVER SIDEWALKS

PART 1 – GENERAL

1.1 SCOPE:

Under this heading shall be included the following:

a) Ungrouted mortarless concrete pavers.
b) Edge restraints for unit pavers.

Compacted subgrade under unit pavers is specified in GDOT standard specifications for unit pavers or sidewalks whichever requires higher compaction.

1.2 GENERAL:

Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

Product data for the following products:

a) Precast Concrete pavers.

Samples for initial selection purposes in form of actual units or sections of units showing full range of colors, textures, and patterns available for each type of unit paver indicated.

Samples for verification purposes in full-size units of each type of unit paver indicated, in sets for each color, texture, and pattern specified, showing full range of variations expected in these characteristics.

1.3 DELIVERY, STORAGE, AND HANDLING:

Protect unit pavers and aggregate during storage and construction against wetting by rain, snow, or ground water and against soilage or contamination from earth and other materials.

PART 2 – PRODUCTS

2.1 PRODUCTS:

a) Manufacturers.

Subject to compliance with requirements, provide products by one of the following:

1. Light-Traffic Paving Brick:

    a. Kennedy Concrete.
    b. Tremron.
    c. or approved equal.

2. Concrete Pavers:

   a. Licensee of Uni-Group U.S.A. that markets unit pavers in Project location that comply with requirements.
   b. Tremron
   c. or approved equal.

b) Colors and Textures.

Provide materials and products that result in colors and textures of exposed unit paver surfaces and joints complying with the following requirements:

1. Match Owner's sample.
2. ADA Tactile Warning Pavers at all handicap ramps shall contrast from surrounding pavers per Owner specifications.

c) Unit Pavers.

Concrete Pavers: Solid concrete interlocking paving units, ASTM C 936, made from normal weight aggregates in sizes and shapes indicated.

d) Edge Restraints.

1. Concrete for Job-Built Edge Restraints: Per Concrete Edger Strip detail on the plans.

2. Leveling Course: Fine aggregate complying with ASTM C 33. Sand is acceptable for pedestrian traffic areas; sand will not be allowed in vehicular traffic areas – granite graded aggregate base fines only.

3. Sand for Joints: ASTM C 144 except use aggregate graded with 100 percent passing the No. 8 sieve and 95 percent, the No. 16 sieve.

e) Ungrouted Mortarless Setting Materials for Concrete Pavers.

1. GAB fines for leveling course: M90 fines.

3. Sand for Joints: ASTM C 144 except use aggregate graded with 100 percent passing the No. 8 sieve and 95 percent, the No. 16 sieve.

PART 3 - EXECUTION

3.1 EXECUTION:

a) Examination.

Examine surfaces indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit pavers. Do not proceed with installation until unsatisfactory conditions have been corrected.

b) Preparation.

Proof roll prepared subgrade surface to check for unstable areas and areas requiring additional compaction. Do not proceed with installation of unit pavers until deficient subgrades have been corrected and are ready to receive subbase for unit pavers. Verify subgrade surface is prepared/brought to specified grades.

c) General Installation.

Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.

Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

3. For concrete pavers, a mortar-driven masonry saw or block splitter may be used.

4. Joint Pattern: As indicated below:

   a. Per Precast Concrete Paver detail(s) on the plans.

5. Handtight Joints: Where unit pavers are indicated without spaced joints, set unit pavers with hand-tight joints.

6. Blend pavers for uniform appearance (i.e. no visually discernable discontinuities present).

3.2 UNGROUTED MORTARLESS CONCRETE PAVER APPLICATIONS:

a) Compact soil subgrade uniformly to at least 95 percent of ASTM D 1557 laboratory density.

b) Place graded aggregate for subbase and base over compacted subgrade. Provide compacted thickness of base and subbase indicated. Compact subbase and base to at least 100 percent of ASTM D 1557 maximum laboratory density.

c) Place graded aggregate for base over compacted subgrade. Provide compacted thickness of base indicated. Compact base to at least 100 percent of ASTM D 1557 maximum laboratory density.

d) Place leveling course and screed to a thickness of 1 inch to 1-1/4 inch, taking care that moisture content remains constant and the density is loose and constant until concrete pavers are set and compacted.

e) Set concrete pavers with a minimum joint width of 1/16 inch and a maximum of 3/16 inch, being careful not to disturb leveling base. If pavers have spacer bars, then place pavers hand tight against spacer bars. Use string lines to keep straight lines. Select units from 4 or more cubes to blend color and texture variations. Fill gaps between units that exceed 3/16 inch with pieces cut to fit from full-size unit pavers.

1. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.

f) Vibrate concrete pavers into leveling course with a low amplitude plate vibrator capable of a 3,500- to 5,000-pound compaction force. Perform at least 3 passes across paving with vibrator. Vibrate under the following conditions:

1. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.

2. Before ending each day's work, fully compact installed concrete pavers within 3 feet of the laying face. Cover the open layers with nonstaining plastic sheets overlapped 4 feet on each side of laying face to protect it from rain.

g) Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Brush and vibrate sand until joints are completely filled, then remove surplus sand.

h) Do not allow traffic on installed concrete pavers until sand has been vibrated into joints.

i) Repeat joint filling process 30 days later.

3.3 REPAIR, POINTING, CLEANING, AND PROTECTION:

a) Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.

b) Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit paver work being without damage or deterioration at time of Substantial Completion.

PART 4 - MEASUREMENT AND PAYMENT:

Measurement and payment for work under this section shall include the actual quantity of unit pavers installed (which includes edge restraining curb) per the unit listed in the bid schedule, which includes all labor, materials, certifications, testing, etc. as required by the plans and these specifications.

END OF SECTION 32 14 00.

SECTION 33 10 00 – WATER UTILITIES

PART 1 - GENERAL

1.1 SCOPE:

Under this heading shall be included installation of the water distribution system as shown and as specified herein.

The Contractor shall comply with all local codes and regulations of local utilities. He shall coordinate work necessary for the completion of utilities with local utility companies and cooperate with the companies as required.

1.2 EXCAVATION AND BACKFILL:

Excavation and backfill shall be as specified in Section 31 23 00, Excavation and Fill, except that the pipe zone shall be terminated at 2 inches above the pipe until after testing. A minimum cover over the top of the pipe of 2-1/2 feet from the proposed paving subgrade, shoulder or finished grade shall be provided.

All water piping shall be backfilled with select backfill (granular sandy material with no more than 30% passing No. 200 sieve) material for the entire excavation and shall be compacted in accordance with Specification Section 31 23 00. The select backfill shall be free of all roots, debris, and deleterious materials.

PART 2 - PRODUCTS

2.1 MATERIALS:

Except where specifically noted on the Plans, the following types of NSF approved pipe shall be used (all materials shall meet Owners Specifications):

a) Metal Pipe.

1) Ductile Iron Pipe.

Ductile iron pipe shall be manufactured in accordance with ANSI A21.51. Ductile iron pipe shall be of the thickness according to ANSI A21.50 for Laying Condition 2, and shall be Class 50 minimum.

2) Fittings.

Fittings shall conform to ANSI A21.10 and shall be push-on-type unless otherwise shown.

3) Joints.

Joints shall conform to ANSI A21.11, push-on-type unless otherwise shown.

4) Lining.

Lining for ductile iron pipe and fittings shall be a cement mortar lining meeting the ANSI A21.4 for standard thickness lining. After cement lining, the interior of the pipe shall be given a coat of approved bituminous material in accordance with ANSI A21.4.

5) Exterior Coating.

Exterior coating shall be an approved bituminous coating one mil thick unless otherwise shown and/or specified.

b) PVC Pipe.

PVC pipe shall be Underwriters' Laboratories approved and listed. PVC pipe used for water mains maintained by Owner shall be blue in color only. It shall meet or exceed AWWA C900 with the following supplemental specifications:

1) Pressure Pipe.

Pipe 4 inches and greater shall be Class 150 with Dimension Ratio 18 or lower (thicker). Pipe less than 4 inches shall be Class 200 with Dimension Ratio 21 or lower conforming to ASTM D2241.

2) Routine Hydrostatic Proof Test Requirements.

Each piece of pipe shall be tested at 4 times rated pressure class.

3) Outside Diameter.

Pipe shall have cast iron pipe outside diameter.

4) Joints.

Pipe shall have elastomeric-gasket integral bell end. Bell section shall have a thickened wall. Gasket groove wall thickness shall meet or exceed the thickness of the pipe barrel.

5) Fittings.

Ductile iron or cast iron, if used, push-on-type conforming to ANSI A21.10 unless otherwise shown.

6) Affidavit of Compliance.

The manufacturer shall furnish an affidavit that all materials delivered comply with the requirements of this standard and supplemental specifications.

7) Couplings and Fittings.

Couplings and fittings shall be furnished by the pipe manufacturer and shall accommodate the pipe for which they are to be used.

They shall have the same minimum pressure rating as the pipe. Coupling method shall allow for expansion or contraction of each pipe section to be taken up at each end of the pipe. Couplings shall permit 5-degree deflection (2-1/2 degrees on each

side) of the pipe without any evidence of infiltration, exfiltration, or breaking.

c) Galvanized Pipe.

Pipe shall be screw joint, conforming to F.S. WW-P-406, Schedule 40.

d) Gate Valves.

Gate valves shall be as shown on the Plans and shall conform to the following specifications:

1) Gate Valves (3 Inches and Larger).

Gate valves 3 inches and larger shall conform to AWWA C500 and shall be double disc, parallel seat type with non-rising stem.

Unless otherwise indicated or specified, gate valves shall be designed for a working pressure of not less than 150 psi.

Valves shall take full test pressure on either face. Valves shall be from not more than two manufacturers and similar sizes shall be identical and parts interchangeable. They shall be constructed with bolted bonnets provided with stuffing boxes having bolted followers. The stuffing boxes shall be easily accessible and shall be packed ready for use.

Iron body valves 3 inches and larger shall have fittings of Grade I Bronze, except peened or rolled-in gate rings, which shall be Grade 11 Bronze.

Rubbing surfaces and surfaces in contact during the seating operations, including wedge, wedge seats, thrust ring seats, top and bottom stem guide bearing surfaces, packing gland surfaces and contact seats provided for packing under pressure, shall be all bronze bushed or bronze faced.

Stems for valves 3 inches and larger shall be cast, forged or rolled bronze conforming to AWWA C500. Cast stems shall be of Grade IV Bronze. Bronze for forged and rolled stems shall be Grade III.

Gate valves for liquid service shall be designed for 150 psi working pressure and shall be similar in design, construction and materials to American-Darling No. 52 or 55, Mueller Company No. A-2480-20 or A-2380-6, Dresser Style 67, or equal.

Unless shown or specified otherwise, manually operated valves shall be equipped with a mechanism which will allow the valve to be opened or closed with a force of not more than 40 pounds applied to the nut, crank or handwheel.

All valves shall open by turning handwheels, tee wrenches or other operators in a counterclockwise direction.

2) Resilient-Seated Gate Valves (3 Inches & Larger).

Resilient-seated gate valves 3 inches and larger shall conform to AWWA C509 with non-rising stem.

Unless otherwise indicated or specified, gate valves shall be designed for a working pressure of not less than 150 psig.

Valves shall take full pressure on either face. Valves shall be from one manufacturer and similar sizes shall be identical and parts interchangeable. They shall be constructed with bolted bonnets provided with two O-ring stem seals which can be replaced with the valve under pressure in the full-open position.

Valves shall be constructed of materials conforming to AWWA C509. All internal and external surfaces shall be coated with epoxy to a minimum thickness of 8 mils.

Valve seats shall be coated with a rubber material conforming to AWWA C509 so that there shall be no rubber to metal contact when the valve is in the fully closed position.

Valves shall be hydrostatically tested in accordance with AWWA C509.

Valves shall be American, Waterous or equal and shall be furnished with standard handwheels, chain wheels or nuts as shown on the Plans and/or as specified.

3) Gate Valves (2-1/2 Inches & Smaller.)

Gate valves 2-1/2 inches and smaller shall be designed for a working pressure of not less than 125 psi. They shall be bronze, rising stem, double disc, parallel seat, screwed bonnet type. Valves shall be similar in design, construction, and materials to Crane No. 440, or Nibco No. T-111-2 or equal, with appropriate end connections.

e) Hydrants.

Hydrants shall conform to AWWA C502. Main Valve opening size shall be 4-1/2 inches minimum and inside barrel diameter shall be 7 inches minimum with 3 feet minimum bury. Hose connections shall be two 2-1/2 inches and one 4-1/2 inches. Nipple caps shall be chained to the barrel. Hydrant shall be DRY TOP type protecting operating threads from coming in contact with water. Operating threads will be grease lubricated through easily accessible Alemite fitting in top of operating nut. Direction of opening shall be counter-clockwise and be cast on the head of the hydrant. Hose nipples shall be bronze or non-corrosive metal and threads shall be National Standard.

Hydrants shall be traffic type utilizing stem breaking coupling and breakaway traffic flange. (Breakable bolts or nuts are not acceptable.)

Hydrants shall be painted with 1 coat of red lead paint and 2 finish coats of approved paint of fire hydrant yellow color or as otherwise directed.

Hydrants shall be the type and model (or approved equivalent) as required by Owner specifications.

f) Tapping Sleeves and Valves.

Tapping sleeves and valves shall be used for making branch connections to an existing watermain. Tapping sleeves shall be provided at the locations indicated on the Plans and shall be mechanical joint type, Mueller No. H-615, Clow F-5205 or equal. Tapping valves shall be mechanical joint type gate valves, Mueller No. 667, Clow F-5093 or approved equal, and shall conform to the requirements of this Section.

g) Water Service (Domestic & Irrigation) Pipe Material.

Pipe conforming to the following specifications will be required with no exception unless approved in writing:

	To Be Marked
Polyethylene	
Nominal Size	X
ASTM D2737	X
SDR 9	X
HDPE 4710	X
Working Pressure - 250 psi	X
Water Service Tubing	X
National Sanitation Foundation (NSF)	X
Preferable Pipe Color - Blue Stripe	

Unmarked pipe, without information noted above, will not be accepted. Brass or bronze compression type fittings shall be used. Flared connections will not be permitted. Continuous metallic tape over the pipe will be required. No gooseneck will be allotted nor will solvent weld joints be allowed. Corporation and curb stops will be required on all laterals.

h) Corporation Stops.

At each tapped point a connection to the pipe shall be made by installing a corporation stop. Corporation stops shall be Mueller H15008 Ground Key Corporation Stop, or approved equal, as required for the type of pipe being tapped.

i) Curb Stops.

Curb stop shall be 1 inch size or as shown on the Plans and shall be Mueller Company H-15317, H-10203, or approved equal.

j) Post Indicator Valve (PIV).

Each post indicator valve shall consist of a resilient seated gate valve which meets these specifications and an indicator post which meets National Fire Protection Association Code, NFPA 13. The gate valve and post indicator shall be compatible. Post indicator shall be painted with one coat of red lead paint and two coats of fire approved red paint suitable for exterior finish.

k) Post Indicator Valve Control Supervisory Switch (PIVCSS).

PIVCSS shall be installed on each valve as designated on the drawings and/or as specified herein. Switches shall be mounted so as not to interfere with the normal operation of the valve and shall be adjusted to operate within two revolutions of the valve control or when the valve flag has moved no more than one-fifth of the distance from its normal position. The mechanism shall be contained in a weatherproof die cast metal housing, which shall provide a side entrance for ½" conduit and incorporate a ½" NPT nipple for attachment to the valve body. A grounding provision is provided. The switch assembly shall include two switches each with a rated capacity of 10 Amp @ 125/250V AC and 2.5 Amp @ 24V DC. The cover shall contain tamper-resistant screws for which a security wrench will be provided with each switch. PIVCSS shall be Underwriters Laboratories listed for indoor or outdoor use. PIVCSS shall meet applicable NFPA requirements.

PART 3 - EXECUTION

3.1 INSTALLATION.

a) General.

Pipe, fittings, valves, hydrants, and other accessories shall, unless otherwise directed, be unloaded at the point of delivery, hauled to and distributed at the site of the project by the Contractor. They shall at all times be handled with care to avoid damage. In loading and unloading, they shall be lifted by hoists or slid or rolled on skidways in such a manner as to avoid shock. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground. In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench. Coated pipe shall be handled in such a manner that a minimum of damage to the coating will result. Damaged coating shall be repaired. Pipe shall be placed on the site of work parallel with the trench alignment and with bell ends facing the direction in which the work will proceed unless otherwise directed. The interior of all pipe, fittings, and other accessories shall be kept free from dirt and foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing before installation.

Cutting pipe for inserting fittings, or closure pieces, shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise directed, pipe shall be laid with the bell ends facing the direction of laying. For lines on an appreciable slope, bells shall face upgrade. Wherever necessary to deflect the pipe from straight line, whether in the vertical or horizontal plane to avoid obstructions, the degree of deflection shall not exceed 2-1/2 degrees. No pipe shall be laid in water or when the trench condition or the weather is unsuitable for such work. Installation shall be in accordance with manufacturer's instructions.

All pipe and fittings shall be carefully lowered into the trench piece by piece by means of derrick, ropes or other suitable tools or equipment in such a manner as to prevent damage to the pipe. Under no circumstances shall pipe or accessories be dropped into the trench. Before lowering and while suspended, ductile iron pipe shall be inspected for defects and rung with a light hammer to detect cracks. Any defective, damaged, or unsound pipe shall be rejected. All foreign matter or dirt shall be removed from the inside of the pipe before it is lowered into its position in the trench and it shall be kept clean by approved means during and after laying. Care shall be taken to prevent dirt from entering the joint space. At all times when pipe laying is not in progress, the open ends of the pipe shall be closed by approved

means and no trench water shall be permitted to enter the pipe.

b) Ductile Iron Pipe.

Proper implements, tools and facilities shall be provided and used by the Contractor for the safe and convenient prosecution of the work.

c) PVC.

Pipe shall be installed in accordance with ASTM D2321. Excavation, bedding and backfill shall be as specified in Section 31 23 00. Bedding shall be Class I, II or III.

d) Hydrants.

Hydrants shall be set at such elevations that the connecting pipe will have the same depth of cover as the distribution mains. The connecting pipe shall be ductile iron pipe. The hydrants shall be set on a base of concrete not less than 6 inches thick and 18 inches square. The back of the hydrant opposite the pipe connection, shall be firmly wedged by a poured-in-place concrete thrust block against the vertical face of the trench to prevent the hydrant from blowing off the line. The base of the hydrant shall be wrapped or oiled to prevent bond between thrust blocks and hydrants. Hydrants and valves shall have the interior cleaned of all foreign matter before installation. Not less than 1 cubic foot of broken stone shall be placed around the base of the hydrant.

Contractor shall place a bag over the hydrant to indicate its not being in service until after the water main is put into service.

e) Water Service Connections.

Service lines shall be connected to 4 inch and larger mains with corporation stops. Connections to mains smaller than 4 inches shall be made with a rigid connection. Plugged tees or crosses for future connections shall be installed where shown on the Plans. Minimum cover of 24 inches shall be provided until a short transition to 12 inches depth at the water meter.

Water service laterals shall be installed to the property line of all lots along streets and rights-of-way in which watermain is constructed or to a distance of 5 feet from the building line for apartments, condominiums, or other uses besides subdivision lots unless shown otherwise.

f) Galvanized Steel and Pipe Fittings.

Threads shall be cleanly cut with sharp tools and the jointing procedure shall conform with the best practice. Before jointing, all scale shall be removed from pipe by some suitable means. After cutting, all pipe shall be screwed together with an application of graphite and engine oil, teflon tape, or other sealing compound applied to all threads and once a joint has been screwed on it shall not be backed off unless the threads are recleaned and new compound or teflon tape applied. Unions shall be installed at every connection to the supply line.

g) Thrust Blocking and Mechanical Joint Restraints.

All plugs, caps, bends 11-1/4 degrees or greater and tees shall be provided with thrust

blocking in accordance with the Thrust Blocking or Mechanical Joint Restraint Schedule attached to this Section or as shown on the Plans. Thrust blocking shall bear directly against the undisturbed trench wall, and shall be made with concrete having a compressive strength of at least 2,500 psi. Thrust blocking should be so arranged that it will not interfere with reworking joints should such work become necessary. If the area for thrust blocking is over excavated beyond the dimensions required by the Schedule, additional concrete shall be provided to extend the thrust blocking to undisturbed earth at no additional cost to the Owner.

h) Hydrostatic Tests.

All piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi or 50 psi in excess of system working pressure, whichever is greater.

The Contractor shall provide all necessary equipment and shall perform all work required in connection with the tests. Each section shall be tested. The Design Professional shall witness and certify that the pressure test meets testing requirements. Each section shall be slowly filled with water, care being taken to expel all air from the pipes. If necessary, the pipe shall be tapped at high points to vent the air. The required pressure as measured at the point of lowest elevation shall be applied for not less than 2 hours and all pipe, fittings, valves, hydrants, and joints shall be carefully examined for defects. All defective joints shall be repaired or replaced.

After completion and testing of the water distribution system provide the Owner with the Contractor's material and Test Certificates required by the National Fire Protection Association Standard 24, a copy of which is included in this specification.

i) Connection to Existing Water System.

The Contractor shall furnish necessary materials and perform all excavation, dewatering, shoring, backfilling, etc., necessary to make the connection of a new main to the existing watermain. The Contractor shall notify the Design Professional and Owner, a minimum of 48 hours in advance of construction. The Contractor shall be responsible for coordinating his construction with the Owner Project Manager.

j) Damage to Water System.

Damage to any part of the water system by the Contractor, or subcontractors, that is repaired by Water Department forces shall be charged to the Contractor on the basis of time and material, plus 30 percent for overhead and administration.

k) Protection of Water Supply Systems.

See Section 312300, Paragraph 13 for protection of Water Supply Systems.

3.2 LEAKAGE TEST:

A leakage test shall be conducted after the pressure test has been satisfactorily completed. The duration of the leakage test shall be 2 hours and during the test the main or section of main under test shall be subjected to a pressure of 150 psi based on the lowest point in the line or section under test, and connected to the elevation of the test gauge. Leakage is defined as the quantity of water to be

supplied into the newly laid pipe or any valved section thereof, necessary to maintain the specified leakage test pressure after the air has been expelled and the pipe has been filled with water at the test pressure. No pipe installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula below:

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

L = allowable leakage in gallons per hour
S = the length of pipe tested in linear feet.
D = the nominal diameter of the pipe in inches
P = the average test pressure during the leakage test
in pounds per square inch gauge.

- Should any test of pipe laid disclose leakage greater than the above specified, the Contractor shall at his own expense locate and repair the defective joints until leakage is within the specified allowance.

The description and results of all tests shall be recorded on the following National Fire Protection Association (NFPA) form "Contractor's Material and Test Certificate for Underground Piping". Said certification shall be completed in its entirety and the original submitted to the Design Professional.

Contractor's Material and Test Certificate for Underground Piping

PROCEDURE
Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

Property name		Date	
Property address			
Plans	*Accepted by approving authorities (names)*		
	Address		
	Installation conforms to accepted plans	❑ Yes	❑ No
	Equipment used is approved If no, state deviations	❑ Yes	❑ No
Instructions	Has person in charge of fire equipment been instructed as to location of control valves and care and maintenance of this new equipment? If no, explain	❑ Yes	❑ No
	Have copies of appropriate instructions and care and maintenance charts been left on premises? If no, explain	❑ Yes	❑ No
Location	Supplies buildings		
Underground pipes and joints	Pipe types and class	Type joint	
	Pipe conforms to _____ standard *Fittings conform to* _____ standard If no, explain	❑ Yes ❑ Yes	❑ No ❑ No
	Joints needing anchorage clamped, strapped, or blocked in accordance with _____ standard If no, explain	❑ Yes	❑ No
Test description	Flushing: Flow the required rate until water is clear as indicated by no collection of foreign material in burlap bags at outlets such as hydrants and blow-offs. Flush at one of the flow rates as specified in 10.10.2.1.3. Hydrostatic: All piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi (13.8 bar) or 50 psi (3.5 bar) in excess of the system working pressure, whichever is greater, and shall maintain that pressure ±5 psi (0.35 bar) for 2 hours. Hydrostatic Testing Allowance: Where additional water is added to the system to maintain the test pressures required by 10.10.2.2.1, the amount of water shall be measured and shall not exceed the limits of the following equation (for metric equation, see 10.10.2.2.6): $L = \frac{SDP}{148{,}000}$ L = testing allowance (makeup water), in gallons per hour S = length of pipe tested, in feet D = nominal diameter of the pipe, in inches P = average test pressure during the hydrostatic test, in pounds per square inch (gauge)		
Flushing tests	New underground piping flushed according to _____ standard by (company) If no, explain	❑ Yes	❑ No
	How flushing flow was obtained ❑ Public water ❑ Tank or reservoir ❑ Fire pump	Through what type opening ❑ Hydrant butt ❑ Open pipe	
	Lead-ins flushed according to _____ standard by (company) If no, explain	❑ Yes	❑ No
	How flushing flow was obtained ❑ Public water ❑ Tank or reservoir ❑ Fire pump	Through what type opening ❑ Y connection to flange and spigot ❑ Open pipe	

© 2012 National Fire Protection Association

Hydrostatic test	All new underground piping hydrostatically tested at _____ psi for _____ hours		Joints covered ❑ Yes ❑ No
Leakage test	Total amount of leakage measured gallons _____ hours		
	Allowable leakage _____ gallons _____ hours		
Forward flow test of backflow preventer	Foward flow test performed in accordance with 10.10.2.5.2:		❑ Yes ❑ No
Hydrants	Number installed	Type and make	All operate satisfactorily ❑ Yes ❑ No
Control valves	Water control valves left wide open If no, state reason		❑ Yes ❑ No
	Hose threads of fire department connections and hydrants interchangeable with those of fire department answering alarm		❑ Yes ❑ No
Remarks	Date left in service		
Signatures	Name of installing contractor		
	Tests witnessed by		
	For property owner (signed)	Title	Date
	For installing contractor (signed)	Title	Date

Additional explanation and notes

© 2012 National Fire Protection Association

NFPA 24 (p. 2 of 2)

3.3 CLEANING AND DISINFECTION OF NEW MAINS:

All water mains must be cleaned, disinfected and the water passing through them must show by laboratory tests safe results before the system can be placed in service. Disinfection of all water lines shall be in accordance with AWWA C651. Approved methods for the accomplishment of these are as follows:

Clean the interior of all pipe by brushing, swabbing, or washing out all debris before laying. Stop up all branches and other openings with wooden plugs or heads until either capped or connected.

Install sufficient number of hydrants to give representative sampling on the newly installed lines. The hydrants should be at least 18 inches higher than main and must discharge toward the ground.

Flush the new pipelines until the water runs clear at the end of all mains and laterals. This should be done after the pressure test and before disinfection. Each valved section of the newly laid pipe should be flushed separately with potable water.

Disinfect the pipelines with chlorine. The preferable point of application of the chlorinating agent is at the beginning of the pipeline extension, or any valved section of it, and through a corporation cock inserted in the horizontal axis of the newly laid pipe. Water from the existing distribution system should be controlled to flow very slowly into the newly laid pipe during the application of the chlorine. Partially open all hydrants or valves on the newly laid line under treatment to prevent the building up of water pressure. Continue treatment until the water flowing from the hydrants at the far end of the main contains sufficient residual chlorine to develop a deep red color (50 parts per million) when orthotolidine reagent is added to a sample of water. Stop the flow of water and chlorine by closing all openings. The chlorine residual after 24 hours shall be not less than 25 parts per million.

Allow the treated water to remain in the pipeline for at least 24 hours following which period the main must be thoroughly flushed until all the heavily chlorinated water has been removed.

Test water samples with orthotolidine reagent to make sure all chlorine has been flushed out or until the concentration of chlorine in the newly laid lines is no higher than that of a sample taken on the supply line.

Chlorine products for disinfecting water pipes are available in several forms as follows:

a) Liquid chlorine is available in 100 and 150 pound steel cylinders.

b) High test calcium hypochlorite is a powder and is available in 4 pound tins and 100 pound drums. The chlorine content is approximately 65 percent (comparable to commercial products known as "Perchloron", "H.T.H.", "Maxochlor", etc.).

c) Chlorinated lime is a powder and is available in 12 ounce cans and 110 pound drums. The chlorine content varies from 24 percent to 33 percent. Chlorinated lime is also known as chloride of lime and as bleaching powder.
Liquid chlorine may be applied to watermains by means of a solution feed chlorinating device or the gas may be fed directly from the cylinder provided it is equipped with proper devices for regulating the rate of flow and the effective diffusion of gas within the pipe. The former method is preferable to the direct feed method.

High test calcium hypochlorite or chlorinated lime must be prepared as a water mixture for introduction into the watermains. Either powder should first be made into a paste and then thinned to about one percent chlorine solution. This requires the following proportions of powder to water:

Product	Pounds of Powderof Water	Gallons
High Test Calcium Hypochlorite 65%	1	7.50
Calcium Hypochlorite 15 %	1	1.50
Chlorinated Lime 24 %	1	2.50
Chlorinated Lime	1	3.50

Prepare a 1 percent chlorine solution in a wooden or plastic barrel and permit solids to settle. Apply the clear supernatant solution to the main through a rubber hose either by gravity, siphonage, injection, or by pumping.

The application of small amounts of dry hypochlorite or chlorinated lime to each length of pipe as it is laid will not be permitted.

After the new lines have been properly cleaned, sterilized, and flushed the Contractor shall send samples of the water to a state approved independent laboratory. Two samples shall be taken 24 hours apart from locations selected by the Design Professional.

The Design Professional will arrange for the regulatory agency inspection. Lines will not be placed in operation until agency approval and Design Professional directs Contractor to do so.

A hydrant flow test will be performed after the lines are placed in service as directed by the Design Professional. Results of the test will be reported in writing to the Design Professional.

3.4 IDENTIFICATION:

Mylar detectable tape shall be installed 6 inches below the top of the trench of the watemains where non-metallic pipe is used. The tape shall be 2 inches wide, of blue color and have imprinted on the tape "Caution - Water Line Below." The tape shall be a printed foil warning tape encased in mylar and shall be easily detected by electronic pipe locators. The tape shall be laid the entire length of the trench.

3.5 SHOP DRAWINGS:

Shop drawings shall be submitted on each manufactured item supplied under this Section along with other information as specified herein.

3.6 MEASUREMENT AND PAYMENT:

Measurement and payment for work under this section shall be as listed in the bid schedule and as follows:

670-0805 WATER METER, 2 IN: includes all materials, labor, certifications, testing, appurtenances, etc. as required by the plans and these specifications, and the City of Statesboro's specifications; items shown on detail plan sheets titled "Water Meter w/ Double Check Backflow Preventer Detail"; temporary irrigation stub with above grade t-post marker; and City of Statesboro irrigation tap/meter fee.

670-1120 WATER MAIN, 12 IN: includes all materials, labor, certifications, testing, appurtenances, etc. as required by the plans and these specifications, and the City of Statesboro's specifications for a complete system; items shown on detail plan sheets pertaining to water main installation *(i.e. tees, bends, restraints, fittings, caps, stubs, etc.)*; connecting to existing water main; adjusting horizontal and/or vertical location of proposed water main to avoid conflicts with utilities or other obstructions while ensuring minimum cover is maintained.

670-2120 GATE VALVE, 12 IN: includes all materials, labor, certifications, testing, appurtenances, etc. as required by the plans and these specifications, and the City of Statesboro's specifications; items shown on plan details sheets pertaining to gate valves.

670-4000 FIRE HYDRANT: includes all materials, labor, certifications, testing, appurtenances, etc. as required by the plans and these specifications, and the City of Statesboro's specifications; items shown on detail titled "Standard Fire Hydrant"; leader pipe and risers as required by plans and grades.

670-5020 WATER SERVICE LINE, 2 IN: includes all materials, labor, certifications, testing, appurtenances, etc. as required by the plans and these specifications, and the City of Statesboro's specifications; items shown on detail titled "Water Service Lateral"; leader pipe and risers as required by plans and grades.

670-8050 DOUBLE STRAP SADDLE – 12 IN X 2 IN: includes all materials, labor, certifications, testing, appurtenances, etc. as required by the plans and these specifications, and the City of Statesboro's specifications; items shown on detail titled "Double Strap Tapping Service Saddle".

END OF SECTION 33 10 00

SECTION 33 33 00 - LOW PRESSURE UTILITY SEWERAGE

PART 1 - GENERAL

1.1 SCOPE:

Under this heading shall be included the complete construction of sewers.

1.2 LOCATION AND GRADE:

The line and grade of the sewer and the position of all manholes and other appurtenances will be according to the Plans. The grade line as given on the profile or mentioned in these Specifications means the invert or bottom of the inside of the pipe, and the price for trenching shall include the trench for the depth below this line necessary to lay the sewer to this grade, but measurements for payment will be made only to the grade line.

All necessary lines and grades will be laid out by the Contractor from the control lines and benchmarks furnished by the Design Professional. The Contractor shall provide such field men as the Design Professional may request and such planks, stakes, spikes, nails and other fastenings as may be required for giving same.

The Contractor shall furnish the Design Professional with the original and one copy of the construction cut sheets.

1.3 ROADWAY AND OTHER CROSSINGS:

At such crossings, and other points as may be required, the trenches shall be bridged in an open and secure manner, so as to prevent any serious interruption of travel upon the roadway and sidewalks, and also to afford necessary access to the premises.

The material used, and the mode of constructing said bridges, and the approaches thereto, shall be submitted to the Design Professional for review. The cost of all such work must be included in the lump sum bid price amount.

1.4 PROTECTION OF OTHER UTILITIES AND STRUCTURES:

a) Damage to Existing Utility Lines.

Any damage done to existing utility lines, services, poles and structures of every nature shall be repaired or replaced by the Contractor at his own expense. The approximate position of certain known underground lines are shown on the Plans for information. Existing small lines may not be shown. The Contractor shall locate these and other possible unknown utility lines and shall excavate and expose all existing underground lines in advance of trenching operations.

Removing and relaying of such lines and appurtenances which constitute an obstruction to the completed lines and grade of the new work will be made at the expense of the Owner, unless otherwise shown on Plans to be altered by the Contractor.

At locations where the sewer is to be constructed in roadways, the Contractor shall take all

precautions, and comply with all requirements, as may be necessary to protect the improvements, including installation and maintenance of lights and barricades for protection of traffic.

b) Protection of Water Supply Systems.

See Section 33 10 00 for protection of water supply pipes.

PART 2 - PRODUCTS

2.1 PIPE MATERIALS:

Unless otherwise specified or shown on the Plans, the following types of pipe shall be used:

a) Clay Sewer Pipe

Clay Sewer Pipe shall be non-perforated, extra strength, vitrified type, furnished in lengths of not less than 4 feet and shall satisfy the requirements of ASTM C700. Pipe shall be of first quality, have smooth exterior and interior surfaces, be free from cracks, flaws, blisters, and other imperfections, and be true to theoretical form throughout each length. Pipe shall be subject to inspection by the Design Professional. Pipe which does not satisfy the requirements of this Section shall be so marked by the Design Professional, and the Contractor shall remove it from the job site upon notice being given of its rejection.

The manufacturer of the pipe shall submit evidence of having consistently produced pipe of the specified quality, and having satisfactory performance results in service over a period of not fewer than 5 years, unless otherwise specified.

Pipe shall be tested in accordance with the requirements of the Special Conditions and shall be stamped with the testing laboratory's special stamp. Crushing and absorption tests will be required for all sizes of pipe used in the work.

Joints shall meet the requirements of ASTM C425.

Fittings shall conform to the same specifications applicable to sewer pipe except all wyes or tees up and including 8 inches shall be monolithically formed and have joints conforming to ASTM C425. At the time of shipment, the manufacturer shall submit 3 copies of written certification and test results to the Design Professional that the pipe was manufactured and tested in accordance with the above specifications.

b) PVC Sewer Pipe (Solid Wall).

1. General.

Pipe shall be made of PVC Plastic having a Cell Classification of 12454-B or 12454-C or 13364-B (with a minimum tensile modulus of 500,000 psi) as defined in ASTM D1784. Pipe shall be available in standard laying lengths of 12-1/2 feet.

Fittings shall be made of PVC Plastic having a Cell Classification of 12454-B, 12454-C, or 13343-C as defined in ASTM D1784.

Pipe and fittings shall meet the requirements of ASTM D3034 for pipe 15" and smaller, latest revision (SDR 26). Pipe 18" and larger shall conform to ASTM F679. Pipe and fittings shall be homogeneous throughout and free from cracks, holes, foreign inclusions, or other injurious defects. The pipe shall be as uniform as commercially practicable in color, opacity, density and other physical properties. Pipe shall be subject to inspection by the Design Professional. Pipe which does not meet the requirements of this Section shall be so marked by the Design Professional and the Contractor shall remove it from the job site upon notice being received of its rejection.

Pipe and fittings shall utilize rubber gasketed joints. The assembly of joints shall be in accordance with the pipe manufacturer's recommendations.

2. Certification.

Each length of pipe shall be marked with the following information: Manufacturer, Size, PVC Cell Classification, Type PSM, SDR, PVC Gravity Sewer Pipe, ASTM D3034 (pipe 15" and smaller), ASTM F679 (pipe 18" and larger), and Code Number.

The manufacturer of the pipe shall submit evidence of having consistently produced pipe of the specified quality, and having satisfactory performance results in service over a period of not fewer than 5 years, unless otherwise specified.

At the time of shipment, the manufacturer shall submit 3 copies of written certification and test results to the Design Professional that the pipe was manufactured
and tested in accordance with the above specifications.

c) PVC Sewer Pipe (Profile Wall)

PVC seamless ribbed pipe shall meet the requirements of ASTM F794 or F949. The pipe shall be homogeneous, and have a smooth interior with a solid cross-sectional rib exterior. Exterior ribs shall be open profile and perpendicular to the axis of the pipe. The pipe stiffness at 5% deflection shall be a minimum of 46 psi when tested in accordance with ASTM D2412.

d) Ductile Iron Pipe.

1) Ductile Iron Pipe.

Ductile iron pipe shall be manufactured in accordance with ANSI/AWWA C151/A21.51, latest revision. Ductile iron pipe shall be of the thickness according to ANSI/AWWA C150/A21.50, latest revision, for Laying Condition 2, and shall be Class 50 minimum.

2) Joints.

Joints shall conform to ANSI/AWWA C111/A21.11, push-on-type as described in latest revision, unless otherwise shown.

3) Fittings.

Fittings shall conform to ANSI/AWWA C11-/A21.10, latest revision, and shall be mechanical-joint type unless otherwise shown.

4) Lining.

Lining for the interior of ductile iron pipe and fittings shall be 40 mils nominal dry film thickness of ceramic epoxy, conforming to ASTM E-96-66, ASTM B-117, ASTM 6-95, ASTM D-714-87, latest revision. Ceramic epoxy shall be Protecto 401, or equal. Lining application, inspection, certification, handling and surface preparation of the area to receive the protective coating shall be in accordance with the manufacturer's specifications and requirements.

5) Exterior Coating.

Exterior coating shall be a petroleum asphaltic coating one mil thick in accordance with ANSI/AWWA C110/A21.10, latest revision, unless otherwise shown and/or specified.

PART 3 - EXECUTION

3.1 EXCAVATION, TRENCHING AND BACKFILL FOR UTILITY SYSTEMS:

Shall be as specified in Section 312300, "Excavation and Fill."

All sanitary sewer piping and structures shall be bedded with a minimum of 6 inches of #57 stone for the full width of the trench for piping and a minimum of 12 inches beyond the structure base unless otherwise detailed on the plans.

All piping shall be backfilled with select backfill (granular sandy material with no more than 30% passing No. 200 sieve) material for the entire excavation and shall be compacted in accordance with Specification Section 312300. The select backfill shall be free of all roots, debris, and deleterious materials.

3.2 LAYING PRE-FABRICATED JOINT PIPE:

All sewer pipe shall be laid upgrade; spigots shall point downgrade. The pipe shall be laid in the trench so that after the sewer is completed, the interior surface shall conform on the bottom accurately to the grades and alignment fixed or given by the Design Professional.

No joints shall be made where surfaces of pipe and bell to be joined have been soiled by earth in handling, until such soiled surfaces are thoroughly cleaned by brushing and wiping so that all traces of the earth are removed. The interior of the pipe shall be carefully made free from all dirt and superfluous material of every description as the work proceeds.

All pipe shall be carefully examined for cracks and other defects; no pipe shall be laid which is found defective. If pipe is found to be defective after being laid, it shall be removed and replaced with sound pipe, at no additional expense to the Owner.

The surfaces of pipe to be joined, as well as the gaskets, shall be cleaned and lubricated with a vegetable soap or other lubricating agents recommended by the pipe manufacturer. Lubricating agent shall not be injurious and detrimental to the gaskets. Gaskets shall be checked for proper position prior to installation of the succeeding length of pipe.

No pipe shall be laid on blocking of any kind except at manholes and other structures where temporary blocking may facilitate installation of the pipe. After installation of the pipe, blocking shall be carefully removed and all voids left by the blocking shall be filled with selected material and tamped.

When the work of pipe laying is suspended, for the night and at other times, the end of the sewer shall be closed with a tight cover. The Contractor will be held responsible for keeping the sewer free from obstructions.

3.3 LAYING CLAY OR DUCTILE IRON PIPE:

No pipe shall be laid which is known to be defective. The pipe shall be thoroughly cleaned before being laid and shall be kept clean until accepted in the completed work.

Pipe shall be laid to conform accurately to the lines and grades shown on the drawings.

When pipe is laid in trenches, care shall be taken to give the pipe a solid bearing throughout its entire length, and in refilling the trenches the earth filled into the bottom of the trench under and up to a cover of 1 foot over the top of the pipe, shall be of selected material and shall be carefully tamped with proper tools for the purpose. Refer to Section 33 10 00.

3.4 LAYING PVC PIPE:

No pipe shall be laid which is known to be defective. All pipe shall be thoroughly cleaned before being laid and shall be kept clean until accepted in the completed work.

Pipe shall be laid to conform accurately to the lines and grades shown on the drawings.

PVC sewer pipe shall be installed in accordance with ASTM D2321 and Section 31 23 00. Bedding shall be Class I, II or III.

3.5 MANHOLES:

a) General.

Manholes shall be constructed as such points as designated on the plans. In all cases the channel shall be smooth and properly rounded. Special care shall be exercised in laying the channel and adjacent pipes to grade. The connection of the sewer with the wall and channel of the manholes shall be tight and smooth. Pipe connections shall be made to manholes using water stops, standard O-ring joints, special manhole couplings, or shall be made in accordance with the manufacturer's recommendations. The Contractor's proposed method of connection, showing materials selected and specials required, shall be submitted to the Design Professional prior to installation.

The top of manholes outside of roads, streets and highways shall be built to grades 3 inches above ground surface, unless otherwise shown. Manholes in roads, streets, and highways,

shall be built to grades shown on the plans.

When directed by the Design Professional, the manhole shall be placed on 3,000 psi concrete or 12 inches #57 stone footing to ensure adequate bearing.

b) Precast Concrete Manholes

Precast Concrete manholes shall be constructed of reinforced Class "A" Concrete. Walls shall be not thinner than 5 inches, or 1/12 of the inside diameter, whichever is greater. Precast manholes shall meet all requirement of ASTM C478, "Specification for Precast Reinforced Concrete Manhole Sections."

Rings shall be custom made with openings to meet the necessary pipe alignment conditions and invert elevations. Shop drawings shall be submitted consisting of manufacturer's standard details of various sections, before placing order for manholes. Joints and gaskets shall conform to the applicable provisions of ASTM C443, "Joints for Circular Concrete Sewer and Culvert Pipe using Rubber Gasket" or Ram-Nek Premoulded Plastic Joint Sealer. Bell and spigot surfaces shall be smooth, accurately formed, and provide a loose, sliding fit, with a clearance between the bell and spigot of not more than 1/6 inch. Precast manholes shall be bedded on not less than 6 inches of compacted crushed stone as the Contractor's expense. The crushed stone shall extend not less than 6 inches outside the walls of the manhole and under the entire length of pipe within the excavation for the manhole.

c) Drop Manholes.

Drop manholes shall be precast conforming to ASTM C478 and shall be built at the locations and in conformance with the details shown where the difference in invert elevations between incoming pipe and manhole invert is more than 2 feet. The drop pipe shall be the same size as the influent sewer. Payment for drop manholes will be made at the unit prices for the various depths states in the Proposal, and shall include all necessary pipe, pipe fittings, concrete encasement of drop pipe, extension of manhole base slab and compacted crushed stone under sewer spanning the manhole excavation.

d) Manhole Steps:

Manhole steps shall be cast into the manhole riser and cone sections by the manufacturer. Steps shall be 12 inches wide, 5 inch projection, arranged in a single row 16 inches on center. Steps shall be of a tough copolymer polypropylene that encapsulates a ½ inch, Grade 60, steel reinforcing rod.

e) Manhole Castings.

Manholes shall be provided with a cast iron frame and solid cover with concealed pickhole. The frame and cover shall weigh not less than 400 pounds and shall be of Class 30 cast iron, free from injurious flaws and defects, conforming to ASTM A48. The frame and cover shall be sandblasted prior to the application of a coal pitch tar finish. Bearing surfaces of the frame and cover shall be machined to fit and shall be non-rocking.

Provide covers with the inscription "SEWER" cast into the cover in lettering at least 2 inches high. The manufacturer's name, if it appears on the cover, shall be confined to the periphery.

Manhole covers and frames shall be Neenah R-1642, Clow F-3210, or equal, unless otherwise indicated on the Plans.

f) Stub-Outs.

Stub-outs from manholes shall be laid to the proper grade and alignment, plugged with a suitable pipe stopper and made watertight.

g) Pipe Connectors.

ASTM C923, KOR-N-SEAL or equal; connection to existing sanitary sewer manhole shall be with "Link Seal" meeting the Municipality's specifications.

3.6 ADAPTORS:

Prefabricated flexible couplings or adaptors shall be used for connecting pipe of dissimilar materials.

3.7 CONCRETE:

Refer to Division 03.

3.8 CONCRETE ENCASEMENT OF PIPE:

Where called for on the Plans sewer pipe shall be completely encased with concrete. The trench shall first be excavated not less than 6 inches below the bell of the pipe and the pipe laid to the line and grade on concrete blocking. Concrete shall then be placed to the full width of the trench, but in no case less than 6 inches above the top of the pipe bell. No backfill material shall be placed in the trench for a period of at least 24 hours after the concrete encasement has been placed.

3.9 SERVICE CONNECTIONS:

Service connections shall be provided at locations shown on the Plans. The connection shall be made as shown on the Drawings, or shall be a pipe stubbed out from a septic tank, and shall extend to a distance as shown on the plans at an elevation at least 2 feet below the finished floor elevation of the building being served or deeper if necessary to provide service to a building or to the property line as shown on the Plans.

Service pipe shall be extra strength cast iron soil pipe, ABS solid wall pipe conforming to ASTM D2751, SDR 26 or PVC Sewer Pipe conforming to ASTM D3034 SDR 26. Mylar detectable tape shall be installed where ABS or PVC pipe is used.

A 2" x 4" 30-inch long pressure treated flag stake painted red shall be located at the end of each sewer lateral.

3.10 PROTECTION OF EXISTING SANITARY SEWER SYSTEMS:

During the construction of new Sanitary Sewer Systems, the existing sanitary sewer shall be protected at the point of connection with use of a pneumatic or mechanical plug. This isolation shall remain in place until the new system is fully accepted. Provisions must be in place to prevent sediment and excess water from entering the Municipality's existing Sanitary Sewer System. The isolation of the new system must be performed at the Contractor's expense. Any breach of this isolation shall be resolved

by the Contractor to meet the Municipality's expectations and standards. The Contractor may also be liable and responsible for remediation costs due to this breach.

3.11 CLEANING:

Prior to mandrel tests, televising, and before acceptance of the gravity sewer systems, all sewer lines shall be cleaned to the satisfaction of the Engineer. Where any obstruction occurs, the Contractor will be required to clean the sewers by flushing and by means of rod and swabs or other instruments. Cleaning of new sewers is to be completed without impacting the existing sewer system; debris/foreign material from the new line (i.e. dirt, sand, and trash) shall not be discharged into the existing system.

3.12 TESTING AND INSPECTION

A. Leakage Testing: Mains and Laterals

All new gravity sewers and laterals shall be pressure tested within 30 days following final backfill in accordance with the Time-Pressure Drop Method specified in ASTM F1417 - Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air, latest revision. The procedure is summarized as follows:

1. Isolate the section of the sewer line to be tested using inflatable plugs or stoppers.

2. Cap all laterals and stubs using glued caps. All caps and plugs shall be securely braced to prevent blow-out.

3. One of the plugs or caps shall have an inlet tap or other provision for connecting a hose to a portable air control source.

4. Connect the air hose to the inlet tap and portable air control source. The air source equipment shall include necessary valves and pressure gages to pressurize an oil free air source at a controlled rate into the test section.

5. Add air slowly to the test section until the pressure inside the pipe reaches four (4) psi greater than the average backpressure of any groundwater submerging the pipe. *(NOTE: All test pressures are measured as gage pressure, which is any pressure greater than atmospheric pressure. Since water produces a pressure of 0.43 psi per foot of depth, air test pressures must be increased to offset the depth of groundwater over the sewer line. If the groundwater is two (2) feet or more above the top of the pipe at the upstream end, or if the required test pressure exceeds nine (9) psi, this test should not be used).*

6. Disconnect the air supply and allow a minimum of two (2) minutes for pressure stabilization.

7. Measure the pressure drop over the following time period, depending on the diameter of the sewer pipe being tested *(based on a maximum test section length of 400 feet between manholes)*:

8 inch: 6 minutes
10 inch: 8 minutes
12 inch: 12 minutes
15 inch: 18 minutes
18 inch: 26 minutes

8. Acceptable pressure drop over time period: Not more than 0.5 psi.

The testing shall be performed by the Contractor, and a representative of the Owner shall be present to observe the test. The Contractor shall be responsible for all costs associated with performing the leakage testing, locating leaks, repairing leaks, and conducting additional leakage testing as necessary until the system passes the pressure test. No gravity sewers or laterals will be accepted by the Owner without a passing pressure test.

B. Deflection of Mains

It is the responsibility of the Contractor to assure that backfill is sufficient to limit deflection for all PVC pipe, eight (8) inch diameter and larger, to no more than 5% of the internal diameter of the pipe which shall be tested by a mandrel permitting no greater than maximum 5% deflection. All pipe shall be tested no sooner than 30 days after installation. All pipes not passing the 5% deflection limitation test shall be repaired or removed and replaced.

The mandrel shall be pulled through the pipe (SDR-26) with the following diameter:

Nominal Pipe Size (Inches)	Average inside Diameter (Inches)	Mandrel Size (Inches) Diameter Diameter (Inches)
8	7.754	7.37
10	9.692	9.20
12	11.538	10.96

C. Deflection of Laterals

It is the responsibility of the Contractor to assure that installation and backfill is sufficient to limit obstructions and deflections in the laterals. Laterals shall be tested by dropping a tennis ball in the upstream end of the pipe. The tennis ball must show up at the next downstream manhole. If not, the lateral must be repaired or removed and replaced. The tennis ball may be followed by water to help with its travel to the next downstream manhole.

D. Televising

After the completion of successful mandrel tests and cleaning, all newly constructed sewer lines must be televised by the Contractor prior to acceptance as follows:

a) Equipment:

a.1) Television inspection equipment shall have an accurate footage counter that will display on the monitor and record the camera distance from the centerline of the starting manhole.

a.2) The camera shall be of the remotely operated pan and tilt type. The rotating camera and light head configuration shall have the capability of panning 360 degrees with pan and tilt capability of providing a full view of the pipe to ensure complete inspection of the mainline pipe and service laterals.

a.3) The camera, television monitor, and other components shall be color. To ensure peak picture quality throughout all conditions encountered, the color camera shall be equipped

with the necessary circuitry to allow for the remote adjustment of the optical focus iris from the power control unit at the viewing station. A variable intensity control of the camera lights shall also be located at the viewing station.

a.4) Lighting and camera quality shall be suitable to allow a clear, in-focus picture for the entire inside periphery of pipelines extending at least ten (10) feet in front of the camera. In High Density Polyethylene (HDPE) or ductile iron poly-lined pipe, lighting should be sufficient enough to provide a clear view at least two (2) feet in front of the camera. The replay of the recorded video information shall be free of electrical interference and shall provide a clear stable image.

a.5) Camera quality shall be suitable to provide a full 360 degree view of the pipe during the inspection.

a.6) The travel speed of the camera shall be variable but uniform and shall not exceed 30 feet per minute. Any means of propelling the camera through the sewer line which would produce non-uniform or jerky movement of the camera, will not be acceptable.

a.7) The television system shall be capable of performing line segment inspection in increments of 400 feet with one setup.

a.8) Service laterals shall be inspected utilizing a CCTV inspection push camera system, capable of inspecting up to a minimum of 100 feet of pipe.

b) Procedure:

b.1) Prior to performing CCTV inspection activities, the Contractor shall thoroughly clean the sewer line(s) and service laterals designated to be televised.

b.2) Just prior to performing the video inspection procedure, water must be introduced into the nearest upstream manhole until observed at the nearest downstream manhole. This will ensure that any pipe segments with bellies are easily identified during CCTV inspection.

b.3) All fog shall be evacuated from the pipeline and the pipeline kept clear of any fog during the CCTV inspection process.

b.4) Main Line Inspection:

i) Perform the inspection on all mainline sections from manhole to manhole.

ii) Should access to a particular sewer segment be difficult, and where adjacent segments require television inspection, the CCTV Contractor may be allowed to complete the inspection of multiple sewer line segments with one setup. When multiple sewer line segments are inspected utilizing one setup, the CCTV Contractor shall zero the footage counter at each subsequent sewer manhole to establish a uniform starting point for each line segment televised.

iii) The interior of the pipe shall be carefully inspected to determine the location and extent of all deficiencies. Pipe conditions that result in a question of proper installation procedures shall be noted so that these conditions can be reviewed and, if necessary, corrected before actual acceptance of the sewer system.

iv) At all service connections, the camera shall be stopped and the pan and tilt features shall be used to obtain a clear picture. At each service lateral, the camera shall be panned to view up each lateral or point of connection. Make note of any deficiencies through the use of Data Collection Software.

v) Prior to the beginning of each CCTV inspection, manhole identification numbers as indicated on the record drawings, will be displayed in the title and shall become a part of the video record.

vi) As directed by the Owner and/or Engineer of Record or his designee, the camera shall be stopped to view and analyze conditions that appear unusual or uncommon. The CCTV inspection technician shall, at all times, be able to move the camera through the lines in either direction without the loss of quality in the video presentation.

b.5) Service Lateral Inspection:

i) Perform the inspection of all service laterals from the building line cleanout to all mainline and manhole connections.

ii) Prior to beginning each CCTV inspection, the starting location shall be indicated on the record drawings, will be displayed in the title and shall become a part of the video record.

c) Deliverables:

c.1) Contractor shall record inspection in a format suitable to the Engineer of Record and the video shall be recorded in an extra-high quality CD/DVD format. The title block shall include the following information.

i) Date
ii) Television operator's identification (Name, ID number, etc.)
iii) Sewer segment number. Segment numbers shall be assigned by the Engineer.
iv) Upstream manhole number.
v) Downstream manhole number.
vi) Size of sewer pipe.
vii) Pipe material and lining method.
viii) Direction of movement of camera and direction of normal flow.
ix) Location of service connections indicated by clock position and with counter distance in feet from beginning manhole's centerline.
x) Location (start and end counter distances in feet from the beginning manhole's centerline) and description of obstructions, structural defects, longitudinal and/or circumferential cracking, joints including open and/or offset joints, ovality, leakage or evidence thereof, break in connections, protruding connections, mineral deposits, roots, previous repairs, deposits on pipe walls, sags, and other abnormalities with respect to the sewer's condition with counter distance in feet from the beginning manhole's centerline.
xi) CCTV Contractor's log shall contain the same information.

c.2) CD/DVD shall visually display, at a minimum, CCTV Contractor's name, project name, date of inspection, pipe segment number, manhole numbers or lateral numbers. The distance between manholes shall be verified by measuring tape. If the counter distance and the taping distance differ by more than 2 feet per 100 feet, the run shall be re-televised by CCTV Contractor.

c.3) CD/DVD shall be maintained and delivered in a hard case, which shall display the project name, project number, date of inspection, manhole segment number(s) inspected, and camera operator's identification. No segment shall be split between two disks. A disk may have multiple segments, so long as an entire section is on one disk. Original disks of all sections will be submitted to the Owner as a part of the closeout submittals along with the respective television inspection field logs to be reviewed for completeness and soundness of construction.

d) Acceptance:

d.1) CCTV Contractor shall present inspection video and inspection logs on CD/DVD disk. A continuous image in complete conformance with these specifications with a full view of the internal pipe surface is required. CCTV Contractor shall re-clean and televise any segment for which the video does not present a clear image of the internal pipe surface at all times, and/or is accompanied by an incomplete inspection log.

d.2) Any of, but not limited to, the following observations shall be considered defects:

i) Any bellies in a joint of pipe
ii) Pipe out of roundness
iii) Joint separations
iv) Offset joints
v) Chips in pipe ends
vi) Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rocks, roots, etc.)
vii) Infiltration
viii) Roots
ix) Debris or other foreign objects in of pipe
x) Other obvious deficiencies when compared to approved plans, permits, and/or minimum standards

d.3) The Owner and Engineer of Record will require corrections prior to acceptance of the project. The Contractor shall submit a plan for said corrections for review and approval by the Engineer of Record prior to correcting the deficiencies.

d.4) The Contractor shall be notified in writing of any deficiencies revealed by the television inspection that will require repair. The Contractor shall excavate and make the necessary repairs. Upon completion of repairs, the line segment(s) shall be re-inspected at the Contractor's expense. CCTV video shall be submitted to the Owner and Engineer of Record for review upon completion of repairs.

E. Compaction

Laboratory tests of the soil shall be made in accordance with ASTM D-698. In-place density tests shall be made in accordance with ASTM D-1556 or D-2922. Results of the tests shall be furnished to the Engineer by the testing laboratory. The minimum number of tests required shall be: 1. Backfill over sewer in traffic areas: 1 per 100 linear feet or less for each four (4) feet of depth or portion thereof. 2. Backfill over sewer in non-traffic areas: 1 per 200 linear feet or less for each six (6) feet of depth or portion thereof.

3.13 CLOSING PIPE

When the work or pipe laying is suspended, either for the night or at other times, the end of the gravity sewer or force main pipe must be closed with a water tight cover. The Contractor will be held responsible for keeping the gravity sewer or force main free from obstruction. Plugs shall remain in pipe ends until all water is removed from the trench.

3.14 SHOP DRAWINGS:

Shop drawings shall be submitted on each manufactured item supplied under this Section along with other information as specified herein.

3.15 MEASUREMENT AND PAYMENT:

Measurement and payment for work under this section shall be as listed in the bid schedule and as follows:

660-0008 SAN SEWER PIPE, 8 IN PVC: includes all materials, labor, certifications, testing, appurtenances, etc. as required by the plans and these specifications, and the City of Statesboro's specifications; items shown on detail plan sheets pertaining to sanitary sewer piping.

660-0012 SAN SEWER PIPE, 12 IN PVC: includes all materials, labor, certifications, testing, appurtenances, etc. as required by the plans and these specifications, and the City of Statesboro's specifications; items shown on detail plan sheets pertaining to sanitary sewer piping.

668-3300 SAN SEWER MANHOLE, TP 1: includes all materials, labor, certifications, testing, appurtenances, etc. as required by the plans and these specifications, and the City of Statesboro's specifications; items shown on detail plan sheets pertaining to sanitary sewer manholes; standard and dog house style precast manholes.

END OF SECTION 33 33 00.

INTENTIONALLY LEFT BLANK

AKINS BOULEVARD (SOUTH CAMPUS ROADWAY) EXTENSION BID SCHEDULE						
LINE ITEM	GDOT PAY ITEM #	DESCRIPTION	QTY	UNIT	UNIT $	TOTAL $
BASE BID						
MISCELLANEOUS						
1	150-1000	TRAFFIC CONTROL	1	LS		
EROSION & SEDIMENTATION CONTROL						
2	163-0232	TEMPORARY GRASSING	3.6	AC		
3	163-0240	MULCH	581	TN		
4	163-0301	CONSTRUCT AND REMOVE CONSTRUCTION EXITS	3	EA		
5	163-0527	CONSTRUCT AND REMOVE RIP RAP CHECK DAMS, STONE PLAIN RIP RAP/SAND BAGS	20	EA		
6	163-0529	CONSTRUCT AND REMOVE TEMP SEDIMENT BARRIER OR BALED STRAW CHECK DAM	50	LF		
7	163-0550	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	9	EA		
8	165-0010	MAINTENANCE OF TEMPORARY SILT FENCE, TP A *(NS - NONSENSITIVE)*	2,750	LF		
9	165-0030	MAINTENANCE OF TEMPORARY SILT FENCE, TP C *(S - SENSITIVE)*	8,000	LF		
10	165-0041	MAINTENANCE OF CHECK DAMS - ALL TYPES	180	LF		
11	165-0101	MAINTENANCE OF CONSTRUCTION EXIT	3	EA		
12	165-0105	MAINTENANCE OF INLET SEDIMENT TRAP	9	EA		
13	167-1500	WATER QUALITY INSPECTIONS	12	MO		
14	171-0010	TEMPORARY SILT FENCE, TYPE A *(NS - NONSENSITIVE)*	2,750	LF		
15	171-0030	TEMPORARY SILT FENCE, TYPE C *(S - SENSITIVE)*	8,000	LF		
16	550-1480	STORM DRAIN PIPE, 48 IN, H 1-10 *(TEMP CMP)*	40	LF		
17	603-2182	STN DUMPED RIP RAP, TP 3, 24 IN	300	SY		
18	603-7000	PLASTIC FILTER FABRIC	600	SY		
19	700-6910	PERMANENT GRASSING	3.6	AC		
20	716-2000	EROSION CONTROL MATS, SLOPES	16,400	SY		
GRADING						
21	210-0100	GRADING COMPLETE	1	LS		
BASE, PAVING & CONCRETE						
22	310-5040	GR AGGR BASE CRS, 4 INCH, INC MATL	920	SY		
23	310-5080	GR AGGR BASE CRS, 8 INCH, INC MATL	17,520	SY		
24	402-3130	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	1,927	TN		
25	402-3190	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1,927	TN		
26	413-0750	TACK COAT	1,752	GL		
27	439-0018	PLAIN PC CONC PVMT, CL 3 CONC, 8 INCH THK	550	SY		
28	439-0082	CONT REINF CONC PVMT, CL 3 CONC, 10 INCH THK	390	SY		
29	441-0748	CONCRETE MEDIAN, 6 IN	180	SY		
30	441-5008	CONCRETE HEADER CURB, 6 IN, TP7	190	LF		
31	441-5025	CONCRETE HEADER CURB, 4 IN, TP9	290	LF		
32	441-6012	*CONC CURB & GUTTER, 6IN X 24 IN, TP2*	7,000	LF		
DOUBLE 10'x5' REINFORCED CONCRETE BOX CULVERT, PARAPETS, TOEWALLS, & WINGWALLS						
33	207-0203	FOUND BKFILL MATL,TP II	300	CY		
34	500-3002	CLASS AA CONCRETE	388	CY		
35	511-1000	BAR REINF STEEL	39,770	LB		
STORM DRAINAGE						
36	207-0203	FOUND BKFILL MATL,TP II	204	CY		
37	500-3101	CLASS A CONCRETE	29	CY		
38	550-1180	STORM DRAIN PIPE, 18 IN, H 1-10	240	LF		
39	550-1240	STORM DRAIN PIPE, 24 IN, H 1-10	530	LF		
40	550-1300	STORM DRAIN PIPE, 30 IN, H 1-10	54	LF		
41	550-1420	STORM DRAIN PIPE, 42 IN, H 1-10	1,706	LF		
42	550-1540	STORM DRAIN PIPE, 54 IN, H 1-10	336	LF		

43	550-4218	FLARED END SECTION 18 IN, STORM DRAIN	1	EA		
44	573-2006	UNDER DRAIN PIPE INCL DRAINAGE AGGR, 6 IN	1,270	LF		
45	600-0001	FLOWABLE FILL	15	CY		
46	603-2036	STN DUMPED RIP RAP, TP 1, 36 IN	450	SY		
47	668-2100	DROP INLET, GP 1	3	EA		
48	668-2110	DROP INLET, GP 1, ADDL DEPTH	12	LF		
49	668-2200	DROP INLET, GP 2	6	EA		
50	*668-2210*	*DROP INLET, GP 2, ADDL DEPTH*	2	LF		
51	668-4300	STORM SEWER MANHOLE, TP 1	10	EA		
52	668-4300	STORM SEWER MANHOLE, TP 1 *(GPC Std Ring/Cover)*	1	EA		
53	668-4311	STORM SEWER MANHOLE, TP 1, ADDL DEPTH, CL 1	12	LF		
54	668-4312	STORM SEWER MANHOLE, TP 1, ADDL DEPTH, CL 2	2	LF		
		ROAD SIGNAGE/STRIPING/MARKERS				
55	635-1000	BARRICADES	170	LF		
56	636-1033	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 9	310	SF		
57	636-2070	GALV STEEL POSTS, TP 7	640	LF		
58	653-0120	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	9	EA		
59	653-1501	THERMOPLASTIC SOLID TRAFFIC STRIPE, 5 IN, WHITE	13,250	LF		
60	653-1502	THERMOPLASTIC SOLID TRAFFIC STRIPE, 5 IN, YELLOW	6,400	LF		
61	653-1704	THERMOPLASTIC SOLID TRAFFIC STRIPE, 24 IN, WHITE	75	LF		
62	653-1804	THERMOPLASTIC SOLID TRAFFIC STRIPE, 8 IN, WHITE	1,520	LF		
63	653-3501	THERMOPLASTIC SKIP TRAFFIC STRIPE, 5 IN, WHITE	1,470	GLF		
64	653-6004	*THERMOPLASTIC TRAFFIC STRIPING, WHITE*	*180*	SY		
65	659-5013	HOT APPLIED PREFORMED PLASTIC PVMT MKG, WORDS AND/OR SYMBOLS, WHITE, TP P	8	EA		
66	659-7015	HOT APPLIED PREFORMED PLASTIC PVMT MKG, BIKE LANE MARKING, TP P	8	EA		
		CONCRETE PAVER SIDEWALKS & WHEELCHAIR RAMPS				
67	500-3002	CLASS AA CONCRETE	6	CY		
68	511-1000	BAR REINF STEEL	380	LB		
69	900-0035	CONCRETE AND BRICK PAVERS SIDEWALK	42,000	SF		
		LANDSCAPING AND IRRIGATION				
70	009-2000	LANDSCAPING WITH IRRIGATION	1	LS		
		UTILITIES				
71	207-0203	FOUND BKFILL MATL,TP II	30	CY		
72	611-8050	ADJUST MANHOLE TO GRADE	4	EA		
73	660-0008	SAN SEWER PIPE, 8 IN, PVC	120	LF		
74	660-0012	SAN SEWER PIPE, 12 IN, PVC	585	LF		
75	670-0805	WATER METER, 2 IN	2	EA		
76	670-1120	WATER MAIN, 12 IN	4,050	LF		
77	670-2120	GATE VALVE, 12 IN	12	EA		
78	670-4000	FIRE HYDRANT	7	EA		
79	670-5020	WATER SERVICE LINE, 2 IN	60	LF		
80	670-8050	DBL STRAP SADDLE - 12 IN x 2 IN	2	EA		
81	668-3300	SAN SEWER MANHOLE, TP 1	6	EA		
82	668-3311	SAN SEWER MANHOLE, TP 1, ADDL DEPTH, CL 1	4	LF		
83	668-3312	SAN SEWER MANHOLE, TP 1, ADDL DEPTH, CL 2	26	LF		
84	682-8525	ELECTRICAL POWER SERVICE ASSEMBLY (UNDERGROUND SERVICE POINT)	2	EA		
85	950-3510	INSTALLATION TELECOMMUNICATIONS FACILITY, CONDUIT, DIRECTIONAL BORE - 4 IN, 6 WAY	2,880	LF		
86	950-3540	INSTALLATION TELECOMMUNICATIONS FACILITY, PRECAST - TP 1, CL 1	8	EA		
					BASE BID TOTAL:	

DEDUCTIVE ALTERNATES						
DEDUCT BELOW FROM LANDSCAPING WITH IRRIGATION GDOT PAY ITEM #009-2000						
D1	N/A	ALL TREES & SHRUBS	1	LS		
D2	N/A	SUBSTITUTE HYDROSEEDING FOR SOD	1	LS		
D3	N/A	IRRIGATION SYSTEM	1	LS		
					DEDUCTIVE ALTERNATES TOTAL:	
					BASE BID TOTAL + DEDUCTIVE ALTERNATES TOTAL:	