CONTRACT DOCUMENTS AND DETAILED SPECIFICATIONS FOR

WALKER MOUNTAIN MSWLF

PUMP STATION

BID No. 016-16

ENGINEERING DEPARTMENT

P.O. Box 1433, 200 Vaughn Rd., Rome, GA 30162-1433

GEORGIA REGISTERED No. [illegible] PROFESSIONAL ENGINEER MARCIA A. LIVERMAN 5/27/16

ATLANTIC COAST CONSULTING, INC.

7 East Congress Street
Suite 801
Savannah, GA 31401
912.236.3471
www.atlcc.net

FUNDING FOR THIS PROJECT PROVIDED BY

THE CTIY OF ROME, GA.

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ADVERTISEMENT FOR BIDS
CITY OF ROME, GEORGIA
Bid #016-016

Sealed Bids for construction of WALKER MOUNTAIN MSWLF PUMP STATION, Bid No. 016-016, will be received in the Purchasing Department Conference Room in City Hall, located at 601 Broad Street, Rome, Georgia, 30161 until 3:00 pm, July 12, 2016 at which time and place they will be publicly opened and read aloud. No bid may be withdrawn after the closing time for the receipt of bids for a period of 60 days.

Work to Be Done: The work to be done consists of furnishing all labor, tools, equipment and materials necessary to construct a new landfill leachate pump station along with all associated appurtenances including but not limited to selective demolition of existing pump station components, 108+/- linear feet of 8-inch HDPE leachate sewer lines, 1 HDPE leachate manhole, 2 +/- air release valves in manholes, and a 2,597+/- linear feet of 6-inch HDPE SDR 17 force main to be installed per the drawings and specifications. The work will be awarded in one contract. Work shall be completed by a contractor in possession of a valid Utility Contractors License issued by the State of Georgia. All electrical work shall be completed under the supervision of an Electrician in possession of a Valid Electricians License issued by the State of Georgia. The bid submittal package shall bear the name of the Utility Contractor and the licensed Electrician along with his/her valid license number thereon. Any bid package received not bearing this information may be considered incomplete and may not be opened.

NOTE: RECOGNIZING THAT CONTRACTORS HAVE EXISTING PROJECTS THEY ARE WORKING ON AS WELL AS PROJECTS ALREADY COMMITTED TO, WE ARE REQUESTING THAT A "ANTICIPATED START DATE" BE PROVIDED FOR THIS PROJECT. THIS DATE IS THE DATE AT WHICH THE CONTRACTOR ANTICIPATES THAT HE CAN BE FULLY MOBILIZED AND READY TO BEGIN WORK ON THIS PROJECT.

Plans, Specifications and Contract Documents: Plans, Specifications, and Contract Documents are on file in the office of the Rome Engineering Services Department, P.O. Box 1433, 200 Vaughn Rd, Rome Georgia 30161. Copies may be obtained online at the City of Rome, Georgia website www.romefloyd.com Interested parties may download all drawings, specifications and contract documents necessary from the website. The drawings are compiled at 24" X 36" sheet size and may be downloaded and printed provided the interested firm has large sheet print capability. In an effort to help the City of Rome provide ample seating at the bid opening for this project, it is requested that anyone downloading drawings and specifications for this project provide contact information along with the number of persons planning to attend the bid opening in an Email to Aaron W. Carroll, R.L.S., P.E., at acarroll@romega.us. While this is not a requirement, it would be greatly appreciated to aid us

with our planning for this project. Copies can otherwise be obtained in person at the City of Rome Engineering Department located at 200 Vaughn Road, Rome, Georgia 30161. Documents and plans are $100.00 per set (non-refundable). Checks should be made payable to the City of Rome. Interested parties must provide the company name, contact person, address, phone number and e-mail address when purchasing plans. It shall be the full and complete responsibility of interested parties choosing to download the documents from the City of Rome website to check said website on a frequent basis to insure discovery of any addenda that may be issued. Any bid that does not include all addenda issued may be considered incomplete and may be rejected.

Bonds: All Bids must be accompanied by the Bidder's Declaration, Non-Collusion Affidavit, Certificate of Non-Discrimination, Bid Bond, Georgia Security and Immigration Compliance Act, etc. and all other contract documents. The bid bond accompanying the bid must be in an amount not less than 5% of the total amount bid. The successful bidder, if awarded the contract, will be required to furnish a Performance Bond and Materials Payment Bond, each in the amount of 100% of the contract amount, and shall be required to provide a Certificate of Insurance in the amount of (two) $2,000,000.00 million dollars with the City of Rome listed as the additionally insured before a “Notice to Proceed” will be issued.

The City of Rome Georgia reserves the right to reject any or all bids, to waive informalities, and to readvertise if necessary.

By: City of Rome, Georgia
Johnna M. Allen
Director of Purchasing

INSTRUCTIONS TO BIDDERS

1. Intent: It is intended that the Instructions to Bidders, General Conditions, Detailed Specifications and the Contract Drawings shall define and describe the complete work to which they relate.

2. Definitions: Where the following words or the pronouns used in their stead occur herein, they shall have the following meaning:

"Owner" shall mean the City of Rome, Georgia, or its authorized and legal representative.

"Director" shall mean the Public Services Manager for the City of Rome, Georgia, or his authorized and legal representatives.

"Engineer" shall mean the Director of Engineering Services Department of Rome, Georgia, or his authorized and legal representative.

"Contractor" shall mean the party of the second part to the Contract Agreement or the authorized and legal representative of such party.

"Contract Time" shall mean **120** consecutive calendar days for completion of the work, to be computed from the date of the Notice to Proceed.

"Liquidated Damages" shall mean the sum of Five Hundred Dollars ($500.00) which the Bidder agrees to pay for each consecutive calendar day beyond the Contract Time required to complete the work.

"Products" shall mean materials or equipment permanently incorporated into the work.

"Provide" shall mean to furnish and install.

"Anticipated Start Date" shall mean the date on which the contractor will be able to be mobilized and begin construction on this project.

3. Work to Be Done: The work to be done consists of furnishing all products and performing all labor necessary to construct WALKER MOUNTAIN MSWLF PUMP STATION, Bid No. 016-16, including, but not limited to, trenching, pipe installation, wet well and other structure installation, excavation, backfilling, electrical installation, fencing installation, finishing concrete, generator installation and site restoration.

NOTE: THIS WORK WILL OCCUR AT AN ACTIVE MUNICIPAL SOLID WASTE LANDFILL SITE. ACCESS TO THE PUMP STATION SITE AND WORKING HOURS SHALL BE COORDINATED WITH LANDFILL PERSONNEL TO ENSURE CONTINUED OPERATION OF LANDFILL ACTIVITES DURING CONSTRUCTION.

NOTE: RECOGNIZING THAT CONTRACTORS HAVE EXISTING PROJECTS THEY ARE WORKING ON AS WELL AS PROJECTS ALREADY COMMITTED TO, WE ARE REQUESTING THAT A "ANTICIPATED START DATE" BE PROVIDED FOR THIS PROJECT. THIS DATE IS THE DATE AT WHICH THE CONTRACTOR ANTICIPATES THAT HE CAN BE FULLY MOBILIZED AND READY TO BEGIN WORK ON THIS PROJECT.

4. Addenda and Interpretations: No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally. All questions should be submitted simultaneously to jallen@romega.us and acarroll@romega.us via Email. All questions and answers will be posted on the website – www.RomeFloyd.com. In order for a request for an interpretation to be given consideration, it must be received at least five days prior to the date fixed for the opening of bids.

Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the Specifications which, if issued, will be mailed to all prospective bidders that have purchased plans from the Engineering Services Department (at the respective addresses furnished) and shall be posted on the City of Rome Web Site not later than three days prior to the date affixed for the opening of the bids. Failure of a bidder to receive any Addendum shall not relieve him of any obligation under his bid. It shall be the full and complete responsibllity of interested parties choosing to download documents from the City of Rome website to check said site on a frequent basis to insure discovery of any addenda that may be issued. Any bid received that does not include all addenda issued shall be considered incomplete and may be rejected.

5. Substitutions: Whenever the design is based on a specific product of a particular manufacturer, that manufacturer will be shown on the Drawings and/or provided in the list of approved manufacturers in the specifications. Any item other than those so designated shall be considered a substitution.

Approval of substitutions will be made under the following provisions:

(a) If the manufacturer is named in the Drawings and/or Detailed Specifications as an approved manufacturer, products of the manufacturer meeting all specification requirements are acceptable.

(b) If the term "EQUAL TO" precedes the names of approved manufacturers in the Specifications, the Contractor may, after receiving the Notice to Proceed, submit shop drawings on the substitute product for the approval of the Engineer.

Any bidder intending to furnish substitute products is cautioned to verify that the item being furnished will perform the same functions and have the same capabilities as the item specified. The Bidder should include in his bid the cost of accessory items which may be required by the substitute product and the cost of any architectural, structural, mechanical, piping, electrical, or other modifications required to accommodate the substitution.

Approval of the Engineer is dependent on his determination that the product offered is essentially equal in function, performance, quality of manufacture, ease of maintenance, reliability, and service life to the product on which the design is based, and will require no other major modifications to the project design.

6. Site Examination: The Bidder is highly advised to examine the location of the work and to inform himself fully as to its conditions; the conformation of the ground; the character, quality, the prosecution of the work; the general and local conditions and all other matters which can in any way affect the work to be done under the Contract. The location of the wet well has been marked at the site in white paint. Failure to examine the site will not relieve the successful bidder of his obligation to furnish all products and labor necessary to carry out the provisions of his contract. One boring was completed by Ranger Consulting, Inc. of Armuchee, GA at the centerpoint of the proposed wetwell location. The boring was performed with City of Rome personnel in attendace and was advanced 2' beyond the planed wetwell bottom elevation. No rock was encountered.

The Bidder shall notify the Owner and Engineer of the date and time he proposes to examine the location of the work. The Bidder shall confine his examination to the specific areas designated for the proposed construction, including easements and public right-of-ways. If, due to some unforeseen reason, the Owner's proceedings for obtaining the proposed construction site (including easements), have not been completed, the Bidder may enter the site only with the express consent of the property owner and the Engineer.

7. Bids: All Bids must be made on the Bid forms contained herein. The Bids shall be enclosed in a sealed envelope, addressed to the City of Rome, P.O. Box Box 1433, Rome, Georgia, 30162-1433, and labeled "WALKER MOUNTAIN MSWLF PUMP STATION, Bid No. 016-16". The Bid package shall bear the name of the Utility Contractor and the licensed Electrician along with his/her valid license number thereon. Any bid package received not bearing this information shall be considered incomplete and will not be opened.

8. Bid and Contract Security: Each Bid must be accompanied by the Bid Bond provided in the Contract Documents, complete and executed, for an amount equal to at least five percent (5%) of the amount bid. The Bid Bond may be removed from the bid book to facilitate its execution, but must be reattached for submittal of the "Bid". Security may be provided in the

form of a certified check, cashier's check, or cash deposit check. No other check type will be acceptable.

No Bid shall be read aloud or considered complete unless the Bid Bond accompanies the Bid (O.C.G.A. 36-91-41(d)). If for any reason whatsoever the Bidder withdraws from the competition after opening the bids, or if he refuses to execute the Contract, the Owner will proceed on the Bid Bond.

The Surety of the Bid Bond, Performance Bond, and Payment Bond shall be a surety company authorized to do business in the State of Georgia, shall be listed in the Department of the Treasury Circular 570, and shall have an underwriting limitation in excess of 100% of the bid amount. The Bonds and Surety shall be subject to approval by the Attorney for the Owner. Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

9. Right to Reject Bids: The Owner reserves the right to reject any or all bids and to waive informalities. No bids will be received after the time set for opening Bids. Any unauthorized conditions, limitations or provisions attached to the Bid, except as provided herein, will render it informal and may cause its rejection. Unbalanced bids will be subject to rejection. Any bidder may withdraw his bid, either personally, by facsimile, or written request, at any time prior to the scheduled closing time for receipt of bids. Facsimile or written request for withdrawal must be in the possession of the Owner prior to the closing time for receipt of bids.

10. Bid Opening: Bids will be opened in public and read aloud. All bidders are welcome to be present at the opening.

11. Determination of Successful Bidder: Bids will be evaluated not only on Bid amount, but will be also be given consideration related to life expectancy of the Bid option compared with Bid amount to provide the overall best value for the project. The Contract will be awarded to the overall best responsive, responsible bidder, if awarded.

(a) Responsibility: The determination of the bidder's responsibility will be made by the Owner based on whether the bidder:

(1) maintains a permanent place of business,

(2) has the appropriate technical experience,

(3) has adequate plant and equipment to do the work properly and expeditiously, and

(4) has suitable financial means to meet obligations incidental to the work.

The bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, the bidder fails to satisfy the Owner that he is properly qualified to carry out the obligations of the Contract.

(b) Responsiveness: The determination of responsiveness will be made by the Owner based on a consideration of whether the bidder has submitted a complete Bid form without irregularities, excisions, special conditions, or alternative bids for any item unless specifically requested in the Bid form.

BID

– – – – – – – – – – – – – – – – –

TO THE CITY OF ROME, GEORGIA

Submitted: _____, 2016

The undersigned, as Bidder, hereby declares that the only person or persons interested in the BID as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this BID or in the Contract to be entered into; that this Bid is made without connection with any other person, company or parties making BID; and that it is in all respects fair and in good faith without collusion or fraud.

The Bidder further declares that he has examined the site of the work and informed himself fully in regard to all conditions pertaining to the place where the work is to be done; that he has examined the Drawings and the Specifications for the work and contractual documents relative thereto, and has read all Instructions to Bidders and General Conditions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed.

The Bidder proposes and agrees, if this BID is accepted, to contract with the City of Rome, Georgia, in the form of contract specified, to furnish all necessary products, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of **WALKER MOUNTAIN MSWLF PUMP STATION, Bid No. 016-16**, in full and complete accordance with the shown, noted, and reasonably intended requirements of the Specifications and Contract Documents to the full and entire satisfaction of the City with a definite understanding that no money will be allowed for

(DO NOT DETACH)

extra work except as set forth in the attached General Conditions and Contract Documents, for the following prices:

ITEM 1 - For furnishing all materials and performing all labor necessary to complete WALKER MOUNTAIN MSWLF PUMP STATION, including all work shown and/or specified but **NOT** included in Items 2 through 14 below, the amount of
Dollars ($_____).

ITEM 2 - GRADING COMPLETE

a. 1 ea. Lump Sum $_____

ITEM 3 - PUMP STATION COMPLETE (Including but not limited to electrical service, wet well, valve vault, appurtanaces, controls, flow meter, generator, trenching, excavation, force main, fencing, backfilling, and site restoration)

a. 1 ea. Lump Sum $_____

ITEM 4 - SELECTIVE DEMOLITION (Including but not limited to the existing pump station's electrical service, existing metering manhole, HDPE leachate sewer, fencing, air release valves, controls, appuretenances, trenching, excavation, and site restoration)

a. 1 ea. Lump Sum $_____

ITEM 5 – HDPE MANHOLE (Including lids)

a. 1 ea. (8' – 10' cut) $_____/ea. $_____

ITEM 6 - 8-INCH HDPE LEACHATE SEWER (Including but not limited to trenching, pipe installation, backfilling, and restoration)

a. 34 l.f. (6' – 8' cut) $_____/ft. $_____

b. 41 l.f. (8' – 10' cut) $_____/ft. $_____

c. 33 l.f. (10' – 12' cut) $_____/ft. $_____

(DO NOT DETACH)

ITEM 7 – AIR RELEASE VALVES IN MANHOLE (Including but not limited to trenching, excavation, manhole and valve installation, backfilling, connection to forcemain, and site restoration)

a. 2 ea. (0' – 6' cut) $_____/ea. $_____

ITEM 7 – GRAVEL ACCESS ROAD (See sheets C-101 & C-203)

a. 71 SY $_____/SY $_____

ITEM 8 – GRAVEL PAVEMENT (See sheets C-101 & C-201)

a. 449 SY $_____/SY $_____

ITEM 9 – CHAIN LINK FENCE (including all appurtenance shown on detail on C-203)

a. 225 LF $_____/LF $_____

ITEM 10 – BOLLARDS (See sheets C-101 & C203)

a. 7 ea. $_____/ea. $_____

ITEM 11 – CHECK DAMS

a. 1 ea. $_____/ea. $_____

ITEM 12 – SILT FENCE

a. 2500 LF $_____/LF $_____

ITEM 13 – SLOPE STABILIZATION

a. 1300 SY $_____/SY $_____

ADDITIONAL WORK IF DIRECTED BY ENGINEER

ITEM 14 - ROCK EXCAVATION

a. 10 c.y. $_____/c.y. $_____

(DO NOT DETACH)

ITEM 15 - REMOVAL AND REPLACEMENT OF UNSUITABLE MATERIALS

a. 10 c.y. Trench Stabilization $_____/c.y. $_____

TOTAL ITEMS 1 THROUGH 15, INCLUSIVE IN THE AMOUNT OF DOLLARS ($_____).

The Bidder agrees hereby to commence work under this Contract, with adequate personnel and equipment, on a date to be specified in a written order of the Owner, and to fully complete all work under this Contract within 120 consecutive calendar days from and including said date.

The Bidder declares that he understands that quantities for unit price items are subject to either increase or decrease, and that should the quantities of any of the items of work be increased, the Bidder proposes to do the additional work at the unit prices started herein; and should the quantities be decreased, the Bidder also understands that payment will be made on the basis of actual quantities at the unit price bid and will make no claim for anticipated profits for any decrease in quantities; and that actual quantities will be determined upon completion of work, at which time adjustment will be made to the contract amount by direct increase or decrease.

Anticipated Start Date _____.

Bidder acknowledges receipt of Addenda _____ .

Bidder:_____

By:_____

Title: _____

Address: _____

_____

_____

Phone: _____

(DO NOT DETACH)

LIST OF SUBCONTRACTORS

The following is the list of Subcontractors referenced in the Bid Form submitted by:

(Bidder).....

Dated.....……and which is an integral part of the Bid Form.

The following work will be performed (or provided) by Subcontractors and coordinated by us:

WORK SUBJECT	NAME
Pipeline Contractor……	
Concrete Contractor……..	
Electrical Contractor……..	

LIST OF LOCAL CONTRACTORS/ MATERIALS SUPPLIERS

The following is the list of Contractors/Suppliers referenced in the Bid Form submitted by:

(Bidder).....

Dated.....……and which is an integral part of the Bid Form.

The following work will be performed (or provided) by Contractors/Suppliers and coordinated by us:

WORK SUBJECT	NAME
Pipeline Contractor…….	
Concrete Contractor……	
Electrical Contractor……	
Wet Well……	
Valve Vault……..	
Metering Manhole……	
HPDE Manholes……..……	
Pumps and Pump Controls …….	
Generator ……..…….	
Propane Tanks ……...…….	

LIST OF MBE/DBE SUBCONTRACTORS/SUPPLIERS

The following is the list of MBE/DBE Subcontractors referenced in the Bid Form submitted by:

(Bidder).....

Dated.....……and which is an integral part of the Bid Form.

The following work will be performed (or provided) by MBE/DBE and coordinated by us:

WORK SUBJECT NAME

Pipeline Contractor…….

Concrete Contractor……

Electrical Contractor……...

Wet Well ……..…….

Valve Vault ……..……

Metering Manhole ……

HPDE Manholes……..……

Pumps and Pump Controls…….

Generator ……..…….

Propane Tanks ……..…….

BID BOND

STATE OF GEORGIA

COUNTY OF FLOYD

KNOW ALL MEN BY THESE PRESENTS, that we,_____ _____, as Principal, and _____ _____ Surety, are held and firmly bound unto the City of Rome, Georgia, in the sum of _____ Dollars ($_____).

Lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted to the Owner a Bid for construction of ***Walker Mountain MSWLF Pump Station, Bid No. 016-16***.

NOW THEREFORE, the conditions of this obligation are such that if the Bid be accepted, the Principal shall within ten days after receipt of conformed contract documents execute a contract in accordance with the Bid upon the terms, conditions and prices set forth therein, and in the form and manner required by the Owner and execute a sufficient and satisfactory Performance Bond and Payment Bond payable to the Owner, each in an amount of one hundred percent (100%) of the total contract price, in form and with security satisfactory to the Owner, then this obligation shall be void; otherwise, it shall be and remain in full force and virtue in law; and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid Owner, upon demand, the amount hereof in good and lawful money of the United States of America, not as a penalty but as liquidated damages.

This bond is given pursuant to and in accordance with the provisions of O.C.G.A. Section 36-10-1 et seq and all the provisions of the law referring to this character of bond as set forth in said sections or as may be hereinafter enacted and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said Principal has hereunder affixed its signature and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of _____, 2016

PRINCIPAL: _____

Signed and sealed in the presence of:

BY:_____

1. _____

Title:_____

2. _____

SURETY:_____

Signed and sealed in the presence of:

By:_____

1. _____

Title: _____

2. _____

BIDDERS DECLARATION

The bidder understands, agrees and warrants:

That the bidder has carefully read and fully understands the full scope of the specifications.

That the bidder has the capability to successfully undertake and complete the responsibilities and obligations in said specifications.

That this bid may be withdrawn by requesting such withdrawal in writing at any time prior to the opening of bids, but may not be withdrawn after such date and time.

That the City of Rome reserves the right to reject any or all bids and to accept that bid which will, in its opinion, best serve the public interest. The City of Rome reserves the right to waive any technicalities and formalities in the bidding.

That by submission of this bid the bidder acknowledges that the City of Rome has the right to make any inquiry or investigation it deems appropriate to substantiate or supplement information supplied by the bidder.

If a partnership, a general partner must sign.

If a corporation, the authorized corporate officer(s) must sign and the corporate seal must be affixed to this bid.

Bidder:

_____ _____

Name Title

_____ _____

Name Title

Affix Corporate Seal (If applicable)

NON-COLLUSION AFFIDAVIT

The following affidavit is to accompany the bid:

STATE OF GEORGIA

COUNTY OF FLOYD

_____

Owner, Partner or Officer of Firm

_____

Company Name, Address, City and State

being of lawful age, being first duly sworn, on oath says, that he/she is the agent authorized by the bidder to submit the attached bid. Affiant further states as bidder, that they have not been a party to any collusion among bidders in restraint of competition by agreement to bid at a fixed price or to refrain from bidding; or with any office of the City of Rome or any of their employees as to quantity, quality or price in the prospective contract; or any discussion between bidders and any official of the City of Rome or any of their employees concerning exchange of money or other things of value for special consideration in submitting a sealed bid for item specified.

Bidder: _____

Signature: _____

Title: _____

Subscribed and sworn to before me this _____ day of _____, 2016.

_____

NOTARY PUBLIC

CERTIFICATE OF NON-DISCRIMINATION

In connection with the performance of work under this contract, the Bidder agrees as follows:

> The Bidder agrees not to discriminate against any employee or applicant for employment because of race, creed, color, sex, national origin or ancestry. The Bidder shall take affirmative action to insure that employees are treated without regard to their race, creed, color, sex, national origin or ancestry. Such action shall include, but not be limited to the following: employment, upgrading, demotion, transfer, recruiting or recruitment, advertising, lay-off or termination, rates of pay or other compensation and selection for training, including apprenticeship.

In the event of the Bidder's non-compliance with this non-discrimination clause, the contract may be canceled or terminated by the City of Rome. The Bidder may be declared, by the City of Rome, ineligible for further contracts with the City of Rome until satisfactory proof of intent to comply shall be made by the Bidder.

The Bidder agrees to include this non-discrimination clause in any sub-contracts connected with the performance of this agreement.

_____
Bidder

_____
Signature

_____
Title

DRUG-FREE WORKPLACE CERTIFICATE

By signature on this certificate, the Bidder certifies that the provisions of O.C.G.A. Section 50-24-1 through 50-24-6 related to the "Drug-Free Workplace Act" will be complied with in full. The Bidder further certifies that:

1. A drug-free workplace will be provided for the Bidder's employees during the performance of the contract; and

2. Each contractor who hires a subcontractor to work in a drug-free workplace shall secure from that subcontractor the following written certification: "As part of the (subcontractor's name) certifies to the contractor that a drug-free workplace will be provided for the subcontractor's employees during the performance of this contract pursuant to O.C.G.A. Section 50-24-3 (b) (7)."

By signature on this certificate, the Bidder further certifies that it will not engage in the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana during the performance of the contract.

Bidder:_____

By: _____

Name: _____

Printed: _____

Title: _____

Date: _____

STATE OF GEORGIA PROMPT PAY ACT AFFIDAVIT

THIS AFFIDAVIT IS TO ACCOMPANY THE BID

GEORGIA PROMPT PAY ACT: The Georgia Prompt Pay Act was enacted by the General Assembly in 1994 and took effect January 1, 1995. This act requires owners to pay contractors within 15 days of receipt of a pay request by the owner or the owner's representative. If payment is not made the owner shall pay the contractor 1% per month interest on the delayed payment. Additionally, the contractor must pay subcontractors within 15 days of receipt of payment from the owner.

This Act is Code Section 13-11-1 (Georgia Laws of 1994, p. 1398 par. 4)

Firm Name: _____

Signature: _____

Title: _____

Subscribed and Sworn to before me this_____ day of _____, 20_____

_____
Notary Public

Form **W-9**
(Rev. December 2011)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type See **Specific Instructions** on page 2.

Name (as shown on your income tax return)

Business name/disregarded entity name, if different from above

Check appropriate box for federal tax classification:
☐ Individual/sole proprietor ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▸ _____

☐ Other (see instructions) ▸

☐ Exempt payee

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number

			–		–				

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here **Signature of U.S. person** ▸ **Date** ▸

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

STATE OF GEORGIA,
COUNTY OF _____:

NOTICE OF COMMENCEMENT

TO: CLERK OF SUPERIOR COURT OF _____ COUNTY, GEORGIA

Pursuant to O.C.G.A. § 13-10-62(a), not later than fifteen (15) days after physically commencing work on the property, the undersigned gives Notice of Commencement of improvements to property including the following information:

1. The name, address and telephone number of the contractor;
   _____
   _____
   _____

2. The name and location of the public work being constructed or a general description of the improvement;
   _____
   _____
   _____

3. The name and address of the state or the agency or the authority of the state that is contracting for the public works construction;
   _____
   _____
   _____

4. The name and address of the surety for the performance and payment bonds, if any; and
   _____
   _____
   _____

5. The name and address of the holder of the security deposit provided, if any.
   _____
   _____
   _____

Contractor: _____
By: _____
Name: _____
Title: _____

THIS DOCUMENT MUST BE FILED WITH THE CLERK OF THE SUPERIOR COURT FOR THE COUNTY IN WHICH THE PROJECT IS LOCATED AND A COPY OF THIS DOCUMENT MUST BE POSTED AT THE PROJECT SITE NOT LATER THAN FIFTEEN (15) DAYS AFTER THE CONTRACTOR PHYSICALLY COMMENCES WORK ON THE PROPERTY.

WITHIN TEN (10) CALENDAR DAYS OF THE RECEIPT OF A WRITTEN REQUEST, GIVE A COPY OF THIS NOTICE OF COMMENCEMENT TO ANY SUBCONTRACTOR, MATERIALMAN OR PERSON MAKING THE REQUEST.

CONTRACT AGREEMENT

This agreement made and entered into on the _____ day of _____, 2016, by and between the City of Rome, Georgia, part of the first part (hereinafter called the "Owner"), and _____, party of the second part, (hereinafter called the "Contractor").

WITNESSETH:

That the Contractor, for the consideration hereinafter full set out hereby agrees with the Owner as follows:

1. That the Contractor will furnish all products, tools, construction equipment, skill, and labor of every description necessary to carry out and to complete in a good, firm, substantial and workmanlike manner construction of ***Walker Mountain MSWLF Pump Station, BID NO. 016-16*** and will complete work in strict conformity with the Drawings and the Specifications, together with the foregoing Bid made by the Contractor, the Advertisement for Bids, Instructions to Bidders, General Conditions, this Agreement, Performance and Payment Bonds, and all Addenda hereto annexed which form essential parts of this Agreement, as if fully contained herein. The work covered by this Agreement includes all work as shown on the Drawings, specified, and listed in the attached Bid.

2. That the Contractor shall commence the work to be performed under this Agreement on a date to be specified in a written Notice to Proceed and shall fully complete all work hereunder within ***120*** consecutive calendar days. Time is of the essence in this Contract, and the Contractor shall pay to the Owner, not as a penalty, but as liquidated damages, the sum of Five Hundred Dollars ($500.00) for each calendar day that he shall be in default of completing the work within the time limit named herein. These fixed liquidated damages are not established as a penalty but are calculated and agreed upon in advance by the Owner and the Contractor due to the uncertainty and impossibility of making a determination as to the actual and consequential damages incurred by the Owner and the general public of Floyd County, Georgia, as a result of the failure on the part of the Contractor to complete the work on time. Such liquidated damages are cumulative and shall be in addition to every other remedy now or hereafter enforceable at law, in equity, by statute, or under the Contract.

3. The Owner hereby agrees to pay to the Contractor for the faithful performance of this Agreement, subject to additions and deductions as provided in the Specifications and Bid, in lawful money of the United States the sum of _____ and ___/100 Dollars ($_____) which sum shall also pay for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements, or from unforeseen obstructions or difficulties encountered in the prosecution of the work, and for all expenses incurred by or in consequence of the work, its, suspension

or discontinuance, and for well and faithfully completing the work and the whole thereof, as herein provide, and for replacing defective work or products for a period of one year after completion.

4. The Owner shall make monthly partial payments to the Contractor in accordance with the provisions of the Contract Documents.

5. Final payment on account of this Agreement shall be made within thirty (30) days after the completion by the Contractor of all work covered by this Agreement and the acceptance of such work by the Owner, in accordance with the provisions of the Contract Documents.

6. It is further mutually agreed between the parties hereto that if, at any time after the execution of this Agreement and the surety bonds hereto attached for its faithful performance, the Owner shall deem the surety or sureties upon such bond to be unsatisfactory, or if, for any reason, such bond ceases to be adequate to cover the performance of the work, the Contractor shall, at his expense, within five (5) days after the receipt of notice from the Owner to do so, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to the Owner. In such event, no further payment to the Contractor shall be deemed to be due under this Agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the Owner.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement under their respective seals on the day and date first above written in four (4) counterparts, each of which shall without proof or accounting for the other counterparts, be deemed an original contract.

CITY OF ROME, GEORGIA:

Signed and sealed in the presence of:

By: _____

Title: _____

1. _____

(SEAL)

2. _____

Attest: _____

Title: _____

CONTRACTOR'S NAME:

_____

Signed and sealed in the presence of:

By: _____

Title: _____

1. _____

(SEAL)

2. _____

Attest:_____

Title: _____

NOTE: If the Contractor is a corporation, the Agreement shall be signed by the President or Vice President, attested by the Secretary and the Corporate seal affixed. If the Contractor is a partnership, the Agreement shall be signed in the partnership name by one of the partners, with indication that he is a general partner.

PERFORMANCE BOND

STATE OF GEORGIA

COUNTY OF FLOYD

KNOW ALL MEN BY THESE PRESENTS, that we_____, as Principal, (hereinafter known as "Contractor"), and we_____, as Surety, do hereby acknowledge ourselves indebted and firmly bound and held unto the City of Rome, Georgia, for the use and _____ and no/100 Dollars ($_____) for the payment of which well and truly to be made, in lawful money of the United States, we do hereby bind ourselves, successors, assigns, heirs, and personal representatives.

BUT THE CONDITION OF THE FOREGOING OBLIGATION OR BOND IS THIS:

WHEREAS, the Owner has engaged the said Contractor for the sum of _____ Dollars ($_____) for construction of WALKER MOUNTAIN MSWLF PUMP STATION**, BID No. 016-16**, as more fully appears in a written agreement bearing the date of _____, 2016, a copy of which Agreement is by reference hereby made a part hereof.

NOW, THEREFORE, if said Contractor shall fully and faithfully perform all the undertakings and obligations under the said agreement or contract hereinbefore referred to and shall fully indemnify and save harmless the said Owner from all costs and damage whatsoever which it may suffer by reason of any failure on the part of said Contractor to do so, and shall fully reimburse and repay the said Owner any and all outlay and expense which it may incur in making good any such default, and shall guarantee all products and workmanship against defects for a period of one year, then this obligation or bond shall be null and void, otherwise, it shall remain in full force and effect.

And for value received it is hereby stipulated and agreed that no change, extension of time, alteration or addition to the terms of the said Agreement or Contract or in the work to be performed thereunder, or the Specifications accompanying the same shall in any wise affect the obligations under this obligation or bond, and notice is hereby waived of any such damage, extension of time, alteration or addition to the terms of the Agreement or Contract or to the work or to the Specifications.

This bond is given pursuant to and in accordance with the provisions of O.C.G.A. Section 36-10-4 et seq and all the provisions of the law referring to this character of bond as set forth in said sections or as may be hereinafter enacted, and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said Contractor has hereunder affixed its signature and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of _____, 2016. Executed in four (4) counterparts.

_____:

Signed, sealed and delivered
in the presence of:

By:_____

Title:_____

1. _____ (SEAL)

2. _____

SURETY:

Signed, sealed and delivered
in the presence of:

By:_____

Title:_____

1. _____ (SEAL)

2. _____

PAYMENT BOND

STATE OF GEORGIA

COUNTY OF FLOYD

KNOW ALL MEN BY THESE PRESENTS, that we, _____, as Principal, (hereinafter known as "Contractor"), and we, _____, as Surety, are held and firmly bound unto the City of Rome, Georgia, (hereinafter called the "Owner") in the penal sum of _____and no/100 Dollars ($_____.00) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Contractor has entered into a certain Contract with said Owner, dated _____, 2016, (hereinafter called the "Contract"), for construction of **WALKER MOUNTAIN MSWLF PUMP STATION, Bid No. 016-16**, which Contract, Drawings and Specifications for said work shall be deemed a part hereof as fully as if set out herein.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if said Contractor and all subcontractors to whom any portion of the work provided for in said Contract is sublet and all assignees of said Contractor and of such subcontractors shall promptly make payments to all persons supplying him or them with labor, products, services, or supplies for or in the prosecution of the work provided for in such Contract, or in any amendment or extension or of addition to said Contract, and for the payment of reasonable attorney's fees, incurred by the claimants in suits on this bond, then the above obligation shall be void; otherwise, it shall remain in full force and effect.

HOWEVER, this bond is subject to the following conditions and limitations:

(a) Any person, firm or corporation that has furnished labor, products, or supplies for or in the prosecution of the work provided for in said Contract shall have a direct right of action against the Contractor and Surety on this bond, which right of action shall be asserted in a proceeding, instituted in the county in which the work provided for in said Contract is to be performed or in any county in which Contractor or Surety does business. Such right of action shall be asserted in proceedings instituted in the name of the claimant or claimants for his or their use and benefit against said Contractor and Surety or either of them (but not later than one year after the final settlement of said Contract) in which action such claim or claims shall be adjudicated and judgment rendered thereon.

(b) The Principal and Surety hereby designate and appoint the _____, as agent of each of them to receive and accept service of process or other pleading

issued or filed in any proceeding instituted on this bond and hereby consent that such service shall be the same as personal service on the Contractor and/or Surety.

(c) In no event shall the Surety be liable for a greater sum than the penalty of this bond, or subject to any suit, action or proceeding thereon that is instituted later than one year after the final settlement of said Contract.

(d) This bond is given pursuant to and in accordance with provisions of O.C.G.A. Section 36-10-1 et seq and all the provisions of law referring to this character of bond as set forth in said sections or as may be hereinafter enacted, and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said Contractor has hereunder affixed its signature and said Surety had hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of _____, 2016. Executed in four (4) counterparts.

_____ :

Signed, sealed and delivered
in the presence of:

By: _____

Title:_____

1. _____ (SEAL)

2. _____

SURETY:

Signed, sealed and delivered
in the presence of:

By: _____

Title:_____

1. _____ (SEAL)

2. _____

CITY OF ROME, GEORGIA

SAVE COMPLIANCE AFFADAVIT

O.C.G.A § 50-36-1(e)(2) Affidavit

By executing this affidavit under oath, as an applicant for a (n) Contract or Services, as referenced O.C.G.A. C. § 50-36-1, from the City of Rome, Georgia, the undersigned applicant verifies one of the following with respect to my application for a public benefit:

1) _____I am a United State citizen.

2) _____I am a legal permanent resident of the United States

3) _____I am a qualified alien or non-immigrant under the Federal Immigration and Nationality Act with an alien number issued by the Department of Homeland Security or other federal immigration agency.

   My alien number issued by the Department of Homeland Security or other federal immigration agency is:_____.

The undersigned applicant also hereby verifies that he or she is 18 years of age or older and has provided at least one secure and verifiable document, as required by O.C.G.A. § 50-36-1(e)(1), with this affidavit.

The secure and verifiable document provided with this affidavit can best be classified as:_____.

In making the above representation under oath, I understand that any person who knowingly and willfully makes a false, fictitious, or fraudulent statement or representation in an affidavit shall be guilty of a violation of O.C.G.A. § 16-10-20, and face criminal penalties as allowed by such criminal statute.

Executed in_____(city),_____(state).

_____
Signature of Applicant

_____
Printed Name of Applicant

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
_____DAY OF_____, 20___

_____
NOTARY PUBLIC
My Commission Expires:

CITY OF ROME, GEORGIA

E-VERIFY COMPLIANCE AFFADAVIT

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of the City of Rome, Georgia has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned contractor will continue to use the federal work authorization program throughout the contract period and the undersigned contractor will contract for the physical performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the contractor with the information required by O.C.G.A, § 13-10-91 (b). Contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

_____
Federal Work Authorization User Identification number
(Not Required if Less than 10 Employees)

_____
Signature (if less than 10 employees)

_____
Date of Authorization

_____
Name of Contractor

_____
Name of Project

_____
Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on_____,____, 20____in_____(city)_____(state).

_____
Signature of Authorized Officer or Agent

_____
Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE_____DAY OF_____, 20_____

_____
NOTARY PUBLIC
My Commission Expires:

GENERAL CONDITIONS

1. Notice of Award of Contract: As soon as possible, and within 60 days after receipt of bids, the Owner shall notify the successful bidder of the award of the contract.

   Should the Owner require additional time to award a contract, the time may be extended by mutual agreement between the Owner and the successful bidder. If an Award of Contract has not been made within 60 days from the bid date or within the extension mutually agreed upon, the bidder may withdraw the bid without further liability on the part of either party.

2. Execution of Contract Documents: Within ten days of notification of Award of Contract, the Owner shall furnish the Contractor the conformed copies of Contract Documents for execution by him and his surety.

   Within ten days after receipt of the documents executed by the Contractor and his surety with the power-of-attorney and certificates of insurance, the Owner shall complete the execution of the documents. Distribution of the completed documents will be made upon completion.

   Should the contractor and/or surety fail to execute the documents within time specified, the Owner shall have the right to proceed on the bid bond accompanying the bid.

   If the Owner fails to execute the documents within the time limit specified, the Contractor shall have the right to withdraw his bid without penalty.

   Should either party require an extension of any of the time limits stated above, this shall be done only by mutual agreement between both parties.

3. Contract Security: The Contractor shall furnish a Performance Bond and a Payment Bond in penal sums equal to the amount of the Contract Price, conditioned upon the performance by the Contractor of all undertakings covenants, terms, conditions and agreements of the Contract Documents, and upon the prompt payment by the Contractor to all persons supplying labor and products in the prosecution of the work provided by the Contract Documents. Such bonds shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the State of Georgia and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these bonds shall be borne by the Contractor. If at any time a surety on any such bond is declared a bankrupt or loses its right to do business in the State of Georgia or is removed from the list of Surety Companies accepted on Federal bonds, Contractor shall within ten (10) days after notice from the Owner to do so, substitute an

acceptable bond (or bonds) in such form and sum and signed by such other surety as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety shall have furnished an acceptable bond to the Owner.

The person executing the bond on behalf of the surety shall file with the bond a general power of attorney, unlimited as to amount and type of bond covered by such power of attorney and certified to by an official of said surety.

4. Insurance: The Contractor shall not commence work under this contract until all insurance described below has been obtained and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved by the Contractor.

(a) Worker's Compensation: The Contractor shall procure and shall maintain during the life of the Contract Agreement, Workmen's Compensation Insurance for all of his employees to be engaged in work on the project under this contract, and in case any such work is sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation insurance for all the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation insurance. Workmen's Compensation insurance shall include Broad Form All States endorsement.

(b) Comprehensive General Liability: The Contractor shall procure and shall maintain during the life of the Contract Agreement, such Comprehensive General Liability insurance as shall protect him and any subcontractor performing work covered by this contract from claims for damages for bodily injury, including accidental death, as well as from claims for property damages, which may arise from operations under the Contract Agreement, whether such operations are by himself or by any subcontractor or by anyone directly or indirectly employed by either of them. The amount of insurance shall not be less than the following:

$1,000,000	Bodily Injury, including death, each occurrence.
$250,000	Property Damage, each occurrence.
$2,000,000	Property Damage, in the aggregate.

The insurance shall include coverage of the following hazards:

Products/Completed Operations

Independent Contractors

Contractual Liability

(c) Owner's Protective Liability: The Contractor shall procure and shall maintain during this life of the Contract Agreement, Owner's Protective Liability Insurance with the same limits as the Comprehensive General Liability.

(d) Automobile Liability: The Contractor shall procure and shall maintain during the life of the Contract Agreement, Comprehensive Automobile Liability insurance in amounts not less than the following:

$1,000,000	Bodily Injury or death to any one person.
$1,000,000	Bodily Injury, each occurrence.
$250,000	Property Damage, each occurrence.

(e) Materials and Equipment Floater: The Contractor shall procure and shall maintain during the life of the Contract Agreement, Materials and Equipment Floater Insurance to protect the interests of the Owner, Contractor, and Subcontractors against loss by vandalism, malicious mischief, and all hazards included in a standard All Risk Endorsement. The amount of the insurance shall at all times equal or exceed the full amount of the Contract. The policies shall be in the names of the Owner and the Contractor.

(f) Certificates of Insurance: Certificates acceptable to the Owner shall be attached to the signed Contract Documents when they are transmitted to the Owner for execution. These certificates shall contain the statement that "Coverages afforded under the policies will not be cancelled unless at least thirty (30) days prior to cancellation written notice has been given to the Owner, as evidenced by receipts of registered or certified mail."

5. Indemnification: The Contractor will indemnify and hold harmless the Owner, its agents and employees from and against all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from the performance of the work, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

In any and all claims against the Owner, or any of their agents or employees, by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under workmen's compensation acts, disability benefit acts or other employee benefits acts.

The obligation of the Contractor under this paragraph shall not extend to the liability of the Owner, his agents or employees arising out of the preparation or approval or drawings, opinions, reports, surveys, change orders, designs or specifications.

6. Notice to Proceed: The Notice to Proceed shall be issued following the pre-construction conference within ten (10) days of the execution of the Contract Agreement by the Owner. If there are reasons why the Notice to Proceed should not be issued within this period, the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed has not been issued within the ten (10) day period or within the period mutually agreed upon, the contractor may terminate the Contract agreement without further liability on the part of either party.

7. Suspension of Work, Termination and Delay:

(a) If the Contractor is adjudged bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or is a trustee or receiver is appointed for the Contractor or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen, materials or equipment, or if he repeatedly fails to make prompt payments to subcontractor or for labor, materials or equipment or if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the work of if he disregards the authority of the Director, or if he otherwise violates any provision of the Contract Documents, then the Owner may, without prejudice to any other right or remedy and after giving the Contractor and his surety a minimum of ten (10) days from delivery of a written notice, terminate the services of the Contractor and take possession of the project and of all products, tools, construction equipment and machinery thereon owned by the Contractor, and finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the project, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor and/or his surety shall pay the difference to the Owner. Such costs

incurred by the Owner will be determined by the Director and incorporated in a change order.

(b) Where the Contractor's services have been so terminated by the Owner, said termination shall not affect any right of the Owner against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the Owner due the Contractor will not release the Contractor from compliance with the Contract Documents.

(c) After ten (10) days from delivery of a written notice to the Contractor, the Owner may, without cause and without prejudice to any other right or remedy, elect to abandon the project and terminate the contract. In such case, the Contractor shall be paid for all work executed and any expense sustained plus reasonable profit.

8. Assignments: The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due hereunder without written consent of the Owner. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the Instrument of assignment shall contain a clause substantially to the effect that it is agreed the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior liens of all persons, firms, and corporations for services rendered or materials supplied for the performance of the work called for in this contract.

9. Subcontracting:

(a) The Contractor shall not subcontract the complete work, or any major part thereof.

(b) The Contractor shall be as fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

(c) The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.

(d) Nothing contained in this Contract shall create any contractual relation between any subcontractor and the Owner.

10. Separate Contracts:

(a) The Owner reserves the right to let other contracts in connection with this project. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their products and the execution of their work, and the Contractor and other Contractors shall properly connect and coordinate their work with each other. If the proper execution or results of any part of the Contractor's work depends upon the work of the Owner or any other Contractor the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results.

(b) The Owner may perform additional work related to the project with his own forces. The Contractor will afford the Owner reasonable opportunity for the introduction and storage of products and the execution of work, and shall properly connect and coordinate his work with theirs.

(c) If the performance of additional work by other Contractors or the Owner is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to the Contractor prior to starting any such additional work. If the Contractor believes that the performance of such additional work by the Owner of others involves him in additional expense or entitles him to an extension of the contract time, he may make a claim therefore as provided in "Changes in the Contract."

11. Laws and Regulations: The Contractor's attention is directed to the fact that all applicable Federal, State, and County laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract as though written out in full herein. The Contractor shall keep himself fully informed of all laws, ordinances and regulations of the Federal, State, County, and municipal governments or authorities in any manner affecting those engaged or employed in the work or the materials used in the work or in any way affecting the conduct of the work and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over same. If any discrepancy or inconsistency should be discovered in these Contract Documents or in the drawings or specifications herein referred to, in relation to any such law, ordinance, regulation, order or decree, he shall herewith report the same in writing to the Owner. He shall at all times observe and comply with all such existing and future laws, ordinances and regulations, and shall protect and indemnify the Owner and its agents against the violation of any such law, ordinance, regulation, order or decree, whether by himself or by his employees.

Permits and licenses of a temporary nature, including business licenses, building permits, and land disturbing permits, necessary for the prosecution of the Work shall

be secured and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified.

12. Taxes: The Contractor will pay all sales, consumer, use and other similar taxes required by the law of the place where the work is performed. The Owner will be responsible for any sales or use tax due on products furnished by the Owner to the Contractor to be incorporated into the work.

13. Notice and Service Thereof:

(a) All Notices, demands, requests, instructions, approvals, and claims shall be in writing.

(b) Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the office of the Contractor specified in the Bid (or at such other office as the Contractor may from time to time designate to the Owner in writing), or if deposited in the United States Mail in sealed, postage-prepaid envelope, or delivered, with charges prepaid, to any telegraph company for transmission, in each case addressed to such office.

(c) All papers required to be delivered to the Owner shall, unless other wise specified in writing to the Contractor, be delivered to the City Manager of Rome, Georgia. Any notice to or demand upon the Owner shall be sufficiently given if delivered to the Office of said City Manager or if deposited in the United States Mail in a sealed, postage-prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to said City Manager or to such other representative of the Owner or to such other address as the Owner may subsequently specify in writing to the Contractor for such purposes.

(d) Any such notice or demand shall be deemed to have been given or made as of the time of actual delivery or (in the case of mailing) when the same should have been received in due course of post or (in the case of telegrams) at the time of actual receipt, as the case may be.

14. Land and Right-of-Way: The Owner will provide, as indicated in the Contract Documents and prior to Notice to Proceed, the lands upon which the work is to be done, rights-of-way for access thereto, and such other lands which are designated for the use of the Contractor. The Contractor shall confine his work and all associated activities to the easements and other areas designated for his use.

If, due to some unforeseen reason, the necessary easements are not obtained, the Contractor shall receive an equitable extension of Contract Time and/or equitable

increase in the Contract Price to cover his additional costs as a result thereof. His claim therefore shall be handled as provided for under "Changes in the Contract".

15. Products, Services and Facilities:

(a) It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all products, labor (including labor performed after regular working hours, on Sundays, or on legal holidays), equipment, tools, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete place into operation, and deliver the work.

It is further understood that the Contractor's proposed construction schedule is based on a normal 40 hour work week, less recognized holidays. If the Contractor desires to work in excess of this limit, he shall submit a written request to the Owner a minimum of 5 days prior to the desired work date. The Contractor shall be responsible for any additional expenses incurred by the Owner as a result of the extended work hours.

(b) Products shall be so stored in accordance with the manufacturer's recommendations to insure the preservation of their quality and fitness for the work. Stored products to be incorporated in the work shall be located so as to facilitate prompt inspection.

(c) Manufactured products shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

(d) Products to be incorporated into the work shall not be purchased by the Contractor or the subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

(e) The Contractor shall maintain a local office with telephone in the general area of the work, and will be required to have a responsible representative on call at all times. The Contractor will also be required to maintain a crew with necessary tools and equipment available on call after normal working hours, on weekends during inclement weather and other times when work is not in progress to perform any necessary emergency repair work which may occur as a result of the work under this Contract.

16. Supervision of Work: The Contractor will supervise and direct the work. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor will employ and maintain on the work a qualified

supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site. The superintendent shall be present on the site at all times as required to perform adequate supervision and coordination of the work.

The supervisor shall have full authority to act on behalf of the Contractor and to execute the orders or directions of the Owner without delay. He shall have full authority to promptly supply products, tools, plant equipment and labor as may be required. His authority shall be such that all communication given to him shall be as binding as if given to the Contractor.

The Contractor shall employ only competent and skilled personnel. The Contractor shall, upon demand from the Owner, immediately remove any Superintendent, Foreman or workman whom the Engineer may consider incompetent or undesirable.

17. Concurrent Construction: Work by the Contractor may be concurrent with the construction ofwater and sewer services or other utilities. The Contractor shall be responsible for coordination with the utility companies and other contractors working in the area.

18. Protection of Work, Property and Persons:

(a) The Contractor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the work and other persons who may be affected thereby, all the work and all products to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

(b) The Contractor will comply with the Department of Labor, Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). He will erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the work may effect them.

(c) The Contractor will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by him or any of his subcontractors or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

(d) In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. He will give the Engineer prompt written notice of any significant changes in the work or deviations from the Contract Documents caused thereby, and shall request a change order covering the changes and deviations involved.

19. Protection of the Environment:

(a) Necessary sanitary conveniences for the use of the laborers on the work shall be erected and maintained by the Contractor, in such a manner and at such points as shall be approved by the Owner. Their use shall be strictly enforced.

(b) Should the Contractor so desire, he may locate trailers or other structures for housing tools, machinery, and supplies, but they will be permitted only at approved places, and their surroundings shall be maintained at all times in a sanitary and satisfactory manner. On or before the completion of the work, all such structures shall be removed, together with all rubbish and trash, at the expense of the Contractor.

20. Schedules, Reports and Records: The Contractor shall submit to the Engineer progress schedules, payrolls, reports, estimates, records and other data as the Engineer may request concerning work performed or to be performed.

Immediately after execution of the Contract by the Owner, and before the first partial payment is made, the Contractor shall deliver to the Engineer a construction progress schedule in form satisfactory to the Engineer, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the Progress Schedule.

The Contractor shall maintain on the project site throughout the Contract Time an up to date set of Record, or As-Built, Drawings. Record Drawings shall depict the project as actually constructed; providing elevations, dimensions, angles, details, sections, etc., as required to locate all exposed or concealed features of the construction. Special attention shall be given to recording deviations from the Contract Drawings. The locations shall be referred to easily identifiable, permanent landmarks or benchmarks, to allow future reproducibility of the measurements with a minimum of personnel and equipment.

21. Drawings and Specifications: The Drawings, Specifications, Contract Documents, and all supplemental documents, are considered essential parts of the Contract, and requirements occurring in one are as binding as though occurring in all. They are intended to define, describe and provide for all work necessary to complete the project in an acceptable manner, ready for use, occupancy , or operation by the Owner.

In case of conflict between the Drawings and Specifications, the specifications shall govern. Figure dimensions on Drawings shall govern over scale dimensions, and detailed Drawings shall govern over general Drawings.

In cases where products or quantities are omitted from the Specifications, the description and quantities shown on the Drawings shall govern.

Any discrepancies found between the Drawings and Specifications and Site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported to the Engineer, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after his discovery of such discrepancies, inconsistencies or ambiguities and prior to the Engineer's correction shall be done at the Contractor's risk.

The Engineer will furnish the Contractor three copies of the Contract Drawings and the Specifications, one copy of which the Contractor shall have available at all times on the job site.

22. Shop Drawings: The term shop drawings shall mean drawings, prints, descriptive literature, test reports samples, calculations, schedules, material lists and information and items of similar meaning.

(a) Submittals Required: The Contractor shall furnish to the Engineer for review in accordance with the procedure outlined below, shop drawings and descriptive literature for all manufactured or fabricated products. Detailed information on non-manufactures products shall be provided when requested by the Engineer. Additional information such as special drawings, schedules, calculations and curves, shall be provided as specifically required in the Contract Documents.

(b) Contractor's Review: The Contractor shall review and check drawings and submittals. He shall indicate his approval by initials and date, and shall also reference each drawing number where the item appears. If the drawings or submittals deviate from the Contract Documents, the Contractor shall advise the Engineer, in writing, of the deviation and the reasons therefore. Shop drawings and submittals originating from subcontractors shall be reviewed, initialed and dated by the Contractor.

The Contractor shall submit a minimum of four copies of all shop Drawings to the Engineer. A transmittal form shall accompany each submittal or group of submittals. A separate transmittal sheet shall be used for reference to each numbered paragraph of the specifications.

(c) Engineer Review: All submittals will be reviewed within five days of receipt, stamped, dated and initialed by the Engineer before they are returned to the Contractor.

Acceptable submittals will be marked "No Exceptions Taken". A minimum of two copies will be retained by the Engineer for the Owner's use and the remaining copies will be returned to the Contractor.

Submittals requiring minor corrections before the product is acceptable will be marked "Make Corrections Noted". The Contractor may order, fabricate or ship the items included in the submittal, provided the indicated corrections are made. Drawings must be resubmitted for review prior to installation or use of products.

Submittals marked "Amend and Resubmit" must be revised to reflect required changes and initial review procedure repeated.

The "Rejected - See Remarks" notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.

(d) Drawings For Construction: Drawings or other submittals not bearing the Engineer's "No Exceptions Taken" notation shall not be issued to subcontractors or utilized for construction purposes. No work shall be done or products installed without a drawing or submittal bearing the "No Exceptions Taken" notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer's stamp.

(e) Substitutions: In the event the Contractor obtains the Engineer's approval for the use of products other than that which is called for in the Contract Documents, the Contractor shall, at his own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.

(f) Contractor's Responsibility: Use of the "No Exceptions Taken" notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents.

The Engineer's review shall not relieve the Contractor of responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the project and compliance with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

23. Surveys: The Owner shall furnish all land surveys and establish all base lines for locating the principal component parts of the work together with suitable number of bench marks adjacent to the work as shown in the Contract Documents. From the information provided by the Owner, unless otherwise specified in the Contract Documents, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for other working points, lines, elevations and cut sheets.

The Contractor shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

24. Testing, Inspection and Rejection of Work:

(a) Testing of Materials: Unless otherwise specifically provided for in the Specifications, the inspection and testing of products to be incorporated in the work at the site shall be made by bureaus, laboratories, or agencies approved by the Owner and the cost of such inspection and testing shall be paid by the Contractor. The Contractor shall furnish evidence satisfactory to the Engineer that the products have passed the required tests prior to their incorporation into the work. The Contractor shall promptly segregate and remove rejected products from the site of the work.

(b) Inspection: The Contractor shall furnish the Engineer with every reasonable facility for ascertaining whether or not the work performed and products used are in accordance with the requirements and intent of the Specifications and Contract Documents. No work shall be done or products used without suitable supervision or inspection by the Engineer or his representative. Failure to reject any defective work or product shall not in any way prevent later rejection when such defect is discovered, or obligate the Owner to final acceptance.

(c) Rejection of Work and Materials: All products furnished and all work done that is not in accordance with the Drawings or Specifications or that is

defective will be rejected. All rejected products or work shall be removed immediately. If rejected products or work is not removed within forty-eight hours, the Engineer or Owner shall have the right and authority to stop the work immediately and shall have the right to arrange for the removal of said rejected products or work at the cost and expense of the Contractor. All rejected products or work shall be replaced with other products or work which conforms with the Drawings and Specifications.

(d) Contractor's Responsibility: Inspection of the work shall not relieve the Contractor of any of his obligations to fulfill his contract and defective work shall be made good regardless of whether such work has been previously inspected by the Engineer and accepted or estimated or payment. The failure of the Engineer to reject improper work shall not be considered a waiver of any defect which may be discovered later, or for work actually defective.

25. Time for Completion and Liquidated Damages: The Contract time shall begin on a date specified in the Notice to Proceed issued by the Engineer.

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

If the Contractor shall fail to complete the work within the contract time, or extended contract time if authorized by change orders, then the Contractor will pay to the Owner the amount of liquidated damages specified in the Contract Documents for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.
The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due to the following and the Contractor has promptly given written notice of such delay to the Owner or Engineer.

(a) To any preference, priority or allocation order duly issued by the Owner.

(b) To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

(c) To any delays of subcontractors occasioned by any of the causes specified in paragraphs (a) and (b).

26. Changes in the Contract:

(a) Changes in the Work: The Owner may at any time, as the need arises, order change within the scope of the work without invalidating the Contract Agreement. If such changes increase or decrease the amount due under the Contract Documents, or in the Time required for performance of the work, an equitable adjustment shall be authorized by Change Order.

The Engineer, also, may at any time, by issuing a field order, make changes in the details of the work. The Contractor shall proceed with the performance of any changes in the work so ordered by the Engineer unless the Contractor believes that such field order entitles him to a change in Contract Price or time or both, in which event he shall give the Engineer written notice thereof within fifteen days after the receipt of the ordered change, and the Contractor shall not execute such changes pending the receipt of an executed Change Order or further instruction from the Owner.

The Contractor shall visit the site and become familiar with all conditions of the work. No additional claim will be allowed by the Contractor for conflicts, extra work, or unforeseen conditions associated with any subsurface condition encountered, whether indicated on the Plans or not.

No claim will be allowed for unanticipated working conditions associated with, but not limited to, existing and abandoned utility lines and resulting poor trench conditions, trench collapse, underground structures, etc. The Contractor shall furnish and install sufficient sheeting, shoring and bracing to allow for construction of the work under all conditions, both anticipated and unanticipated, at no additional cost to the Owner.

The Owner reserves the right to relocate the proposed sewer lines or add additional sewer lines at the unit prices bid. No additional payment will be made for additional clearing and grubbing required by relocation of lines. Rock excavation along relocated or new lines shall be paid for at the unit price bid in the Bid.

No claim will be allowed by the Contractor for cost of downtime of men or equipment associated with any type of unforeseen condition associated with the project and/or installation of the sewer line; project shutdown by the Engineer, Owner or any governing authority that has jurisdiction over the work; or with any change or addition to the project made by the Owner.

The Owner may, when changes are minor or when changes would result in relatively small changes in the Contract Price or Contract Time, elect to postpone the issuance of a Change Order until such time that a single change order of substantial importance can be issued incorporating several changes. In such cases, the Owner shall indicate this intent in a written response to the Contractor's request for a change.

(b) Changes in Contract Price: The Contract Price may be changed only by a Change Order. The value of any work covered by a Change Order or of any claim for increase or decrease in the Contract Price shall be determined by one or more of the following methods in the order of precedence listed below:

(1) By estimating the number of unit quantities of each part of the work which is changed and then multiplying the estimated number of such unit quantities by the price bid (which price shall include the Contractor's overhead and profit) for a unit quantity thereof.

(2) The Owner shall fix the total lump sum value of the change in the work of the Contractor, and shall set out the price which shall be added to or deducted from the Contract Price (which price shall include the Contractor's overhead and profit). On any change which involves a net credit to the Owner, no allowance for overhead and profit shall be figured.

(3) By ordering the Contractor to proceed with the work and to keep and present in such form as the Owner may direct a correct account of the cost of the change together with all vouchers therefore. The cost may include an allowance for overhead and profit not to exceed 15% of the net cost. The cost may also include all items of labor or materials, the use of power tools and equipment actually used, power and all items of cost such as public liability and Workmen's Compensation Insurance, pro rata charges for foremen, also Social Security, Old Age and Unemployment Insurance. If deductions are ordered, the credits shall be the net cost. Among the items considered as overhead are included insurance other than that mentioned above, bond or bonds, superintendent, timekeeper, clerks, watchmen, use of small tools incidental job burdens and general office expenses.

In figuring changes, instructions for measurement of quantities set forth in the Specifications shall be followed.

The Contractor shall, when required by the Engineer, furnish to the Engineer an itemized breakdown of the quantities and prices used in computing the value of any change that might be ordered.

(c) Changes in Contract Time: The Contract Time may be changed only by a Change Order. Changes in the work described in (a) and any other claim made by the Contractor for a change in the Contract Time (including those allowed under "Time for Completion and Liquidated Damages") shall be evaluated by the Engineer/Owner and if the conditions warrant, an appropriate adjustment of the Contract Time will be made.

27. Payments and Completion:

(a) Contract Price: The Contract Price is the sum of the unit prices stated in the agreement for each item multiplied by the actual quantities installed of each item plus any other lump sum amounts for work set forth in the Contract. The Contract Price is the total amount payable by the Owner to the Contractor for the performance of the work set forth in the Contract.

(b) Breakdown of Cost: Before the first application for payment the Contractor shall submit to the Engineer a breakdown of cost for the various portions of the work, including quantities if required by the Engineer, aggregating the total Contract Price prepared in such form as specified or as the Engineer and the Contractor may agree upon and supported by such data to substantiate its correctness as the Engineer may reasonably require. This schedule, when approved by the Engineer, shall be used only as a basis for the Contractor's application for payment.

(c) Progress Payments: At the end of each calendar month, the Contractor shall submit to the Engineer an itemized application for payment supported by such other substantiating data as the Engineer may reasonably require covering work completed during the month.

Application for payment shall, at the Contractor's option, include the cost of products not yet incorporated into the work which have been delivered to the site or to other storage locations authorized and approved by the Engineer and Owner.

Payment for stored products shall be subject to the following conditions being met or satisfied.

(1) The products shall be received in a condition satisfactory for incorporation in the work.

(2) The products shall be stored in such manner that they will not be damaged due to weather, construction operations or any other cause.

(3) An invoice from the supplier shall be furnished for each item on which payment is requested.

(4) The Contractor shall on request of the Engineer furnish written proof from the supplier of payment (less retention equal in percentage to that being retained by the Owner) for the products no later than thirty days after receipt of payment for same from the Owner. The Owner shall have the right to deduct from the next payment estimate an amount equal to the payment for the products if reasonable and adequate proof is not submitted.

The Contractor warrants and guarantees that title to all work and products covered by an Application for Payment, whether incorporated into the project or not, will pass to the Owner upon the receipt of such payment by the Contractor, free and clear of all liens, claims, security interests or encumbrances (except retention equal in percentage to the being retained by the Owner which may be withheld from suppliers and subcontractors to guarantee completion and performance and 10% retainage will be maintained throughout the life of the contract).

(d) Certificate for Payments: If the Contractor has made application for payment as above, the Engineer will within seven days issue a Certificate for Payment to the Director, with a copy to the Contractor, for such amount as he determines to be properly due, or state in writing his itemized and specific reasons for withholding a Certificate as provided herein.

After the Engineer has issued a Certificate for Payment, the Owner shall within 15 days pay to the Contractor the amount covering work completed plus stored products, less retention and less previous payments made.

No certificate for a progress payment, nor any progress payment, nor any partial or entire use of occupancy of the project by the Owner, shall constitute an acceptance of any work not in accordance with the Contract Documents.

(e) Retention: The Owner shall retain ten percent (10%) from each properly certified estimate until said estimate reaches 50 percent of the contract value provided for by the contract documents. Thereafter, until all work has been accepted by the Owner, no additional retainage shall be withheld. The Owner reserves the right to resume retainage if a determination is made that the progress of the work schedule, or the work itself, is unsatisfactory.

Amounts retained by the Contractor from payments due to product suppliers and subcontractors (expressed as a percentage) shall not exceed that being retained by the Owner.

(f) Payments Withheld: The Director may decline to approve an Application for Payment and may withhold his certificate in whole or in part as may be necessary to protect the Owner from loss because of:

(1) Failure of the Contractor to make payments properly to subcontractors or for labor or products.

(2) Unsatisfactory prosecution of the work by the Contractor.

When the above reasons for nonpayment are corrected, then payment shall be made for amounts withheld because of such reason, not later than the next payment.

(g) Completion: ALL WORK REQUIRED BY THE CONTRACT DOCUMENTS, CONTRACT DRAWINGS AND SPECIFICATIONS MUST BE COMPLETED BEFORE THE FINAL INSPECTION IS PERFORMED. This includes, but is not limited to, the following:

(1) Sweeping the roadway clear of dirt, rocks, trash or construction material.

(2) Clearing pipes and catch basins of dirt, silt, or other debris.

(3) Restoration of the work area.

Upon completion of all work required, the Contractor shall submit completed Record Drawings to the Engineer and request in writing that the final inspection be performed. If the Engineer finds the work of the Contractor complete and acceptable in accordance with the provisions of the Contract Documents and that the Record Drawings accurately depict the complete work, he shall recommend to the Owner that the job be accepted and that final payment be made.

In the event that the final inspection deficiencies in meeting the Contract requirements, the Contractor shall complete all remaining items of work, and make adjustment found to be necessary. Upon receipt of written notice from the Contractor that the work is complete and ready for re-inspection, the Engineer will make a final inspection.

The Contractor will be notified in writing by the Owner of the final acceptance of the work. The date of final acceptance shall be the termination date for the Contractor's liability for the physical properties of the facilities and the beginning of the guaranty period.

Before final payment can be made, the Contractor must certify in writing to the Owner that all payrolls, materials bills, and other indebtedness connected with the work have been paid.

Final payment will not be made if there is disputed indebtedness or if there are liens upon the property.

Upon completion of all work if there is disputed indebtedness or there are liens upon the property, semi-final payment may, at the Owner's option, be made in accordance with the following provisions:

(1) The Owner shall retain an amount equal to the disputed indebtedness and/or liens upon the property including all related cost and interest in connections with said disputed indebtedness and liens which the Owner may be compelled to pay upon and subsequent adjudication.

(2) The Contractor shall certify to those items of work not disputed that all payables, materials bills and other indebtedness connected with the work have been paid or otherwise satisfied.

The making and acceptance of the final payment shall constitute a waiver of all claims by the Owner other than those for faulty work covered by and appearing within the guaranty period.

The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled.

28. Guarantee: The Contractor shall warrant and guarantee for a period of one year from the date of final acceptance that the completed system is free from all defects due to faulty products or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

DETAILED SPECIFICATIONS

SECTION NO. 1

EARTHWORK

1.01 - SCOPE: This section of the Specifications describes materials and equipment to be utilized and requirements for their use in performing all site preparation, including, but not limited to, erosion control, clearing and grubbing, excavation, and placement of fill. The Contractor shall furnish all materials, equipment and labor necessary to complete the work.

1.02 - TEMPORARY EROSION AND SEDIMENTATION CONTROLS: The Contractor shall provide the necessary controls to ensure that storm water, other water, and drainage from jobsite areas which have been denuded, stripped or modified of its natural existing or artificially established stabilization or protection against erosion shall pass through some type of filter or removal system before being discharged to a stream or channel and that these areas shall be kept sufficiently moist to control dust.

The Contractor shall observe all local laws and ordinances in relation to erosion and sediment control as they pertain to this project. All erosion control plans and construction shall be in accordance with the "Manual for Erosion and Sediment Control in Georgia" latest revision, the State of Georgia Erosion and Sedimentation Control Act of 1975, as amended in 1995 and Best Management Practices. All erosion control measures shall be employed to effectively control erosion and sedimentation for all rainfall events up to and including the 25-year, 24-hour rainfall.

All erosion and sedimentation control measures must be installed prior to the initiation of any construction activity. Additional erosion and sedimentation control devices shall be installed as needed, or as directed by the Engineer. Replacement and maintenance of erosion control devices shall be at the Contractor's expense.

The Engineer, or Owner, shall have the right to stop work when erosion and sediment control measures are not being implemented in accordance with Best Management Practices. No claim will be allowed by the Contractor for cost of downtime of men and equipment associated with any shutdown of the Contractor's operations for failure to maintain suitable erosion and sedimentation controls.

NOTE: If it is determined that additional silt fence not shown on the plans is necessary to prevent escape of sediment from the site, payment shall be made at the unit price bid for silt fence for that additional silt fence directed by the Engineer.

Silt dams, traps, barriers, and appurtenances shall be installed as indicated on the approved plans and working drawings, and shall be maintained in-place until no longer needed, and then removed. Hay bales which deteriorate, and filter stone which becomes dislodged shall be replaced with new materials.

Materials used in temporary erosion and sedimentation control shall meet the following requirements.

(a) Hay bales shall be clean, seed free cereal hay type.

(b) Commercial silt fence shall be of woven polypropylene construction which has been ultraviolet light (UV) stabilized. Silt fence shall be equal to Supac 4WS manufactured by Phillips Fibers Corp. Silt fence stakes shall be either steel rods not smaller than 1/2-inch diameter, fir, southern pine, or hemlock. All silt fence shall be constructed in accordance with Georgia Department of Transportation Standard Specifications section 171 for silt fence.

Type "A" silt fence shall be used at the toe of fill slopes greater than 10 feet high, parallel to streams, and for ditch checks. The fence should never run continuous; it should turn back into the fill or ground line to create small pockets to trap silt. When used as ditch checks the spacing is 100 feet for slopes of 1% to 2%; 50 feet for 2% to 3% slopes.

Type "C" silt fence may be used at the toe of fills of over 10 feet high. It should be used for ditch checks where slopes are 3% to 5% using 25' spacing. The fence should never run continuous; it should turn back into the fill or ground line to create small pockets to trap silt.

(c) Filter stone shall be crushed stone.

(d) Concrete block shall be hollow, non-load-bearing type.

(e) Silt retention barriers shall be constructed in accordance with Georgia Department of Transportation Standard Specifications Section 170.

1.03 - EXISTING UTILITIES AND OBSTRUCTIONS: The Drawings indicate underground utilities or obstructions that are known to exist according to the best information available to the Owner. Where these or unforeseen underground utilities are encountered, the location and alignment of new work may be changed, upon written approval of the Engineer, to avoid interference. The Contractor must contact the Georgia Utility Protection Center before beginning work on any portion of the project and comply with all rules and regulations applicable to utility protection.

(a) Electronic Pipe and Cable Finder: Furnish and have available at all times an electronic pipe detector, in good working order, to locate existing pipe lines or other obstructions.

(b) Relocation of Services: Before initiating any excavation, locate all utilities services to avoid interference with such services and to determine whether these services should be relocated. Repair any damage done to utilities services or pipe lines resulting from efforts to locate services or resulting from the construction operation.

NOTE: Any delay or extra cost due to encountering underground utilities or obstructions not shown on the Drawings or found in locations different from those shown on the Drawings shall not constitute a claim for additional payment, except as provided for payment for authorized additional depths.

1.04 - CONSTRUCTION ALONG HIGHWAYS, STREETS, AND ROADWAYS:

(a) General: Perform all work along highways, streets and roadways in accordance with the applicable regulations of the Georgia Department of Transportation and the City of Rome, with reference to construction operations, safety, traffic control, road maintenance and repair.

(b) Safety: Provide suitable signs, barricades and lights for protection of traffic, in locations where traffic may be endangered by construction operations. Replace all highway signs removed for construction as soon as possible. Do not close any highway, street or roadway without first obtaining permission from the proper authorities. Provide sufficient barricades and warning lights. Provide flagmen as required.

Backfill any portion of a trench excavated during the same work day. No trench shall remain open overnight.

(c) Construction Operations: Perform all work along highways, streets and roadways to least interfere with traffic.

(1) Stripping: Where earthwork or excavations occur along road shoulders, strip and stockpile all sod, topsoil and other material suitable for shoulder restoration.

(2) Trenching, Laying and Backfilling: In pipe laying operations, do not open the trench any further ahead of pipe laying than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.

(3) Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.

(d) Excavated Materials: Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off of pavement.

(e) Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material and free to drain at all times.

(f) Maintaining Highways, Streets, Roadways and Driveways: Maintain streets, highways, and roadways in suitable condition for movement of traffic until completion and final acceptance of the work.

Repair all driveways that are cut or damaged immediately. Maintain them in a suitable condition for use until completion and final acceptance of the work.

1.05 - CLEARING AND GRUBBING: Within the limits of disturbed area shown on the Drawings the site shall be cleared and grubbed to prepare for construction. Clearing and grubbing shall be performed in accordance with the following and Section 201 of the Georgia Department of Transportation Standard Specifications.

(a) Demolition of Existing Structures and Foundations: Existing structures, walls, foundations, and pavements shall be removed to the limits shown on the Drawings. Structures shall be removed to eliminate any conflicts with the proposed work. Removals shall provide a clearance of at least 24-inches from any new work, and at least 12-inches from the proposed finished grade, unless noted otherwise on the Drawings.

(b) Clearing and Grubbing: All vegetative growth such as trees, shrubs, brush, logs, upturned stumps and roots of down trees, and other similar items shall be removed and disposed of. When necessary, trees shall be felled completely. Where the tree limb structure interferes with utility wires, or where the trees to be felled are in close proximity to utility wires, the tree shall be taken down in sections to eliminate the possibility of damage to the utility.

(c) Disposal of Refuse: The refuse resulting from the clearing and grubbing operation shall be hauled to a disposal site secured by the Contractor and shall be disposed of in accordance with all requirements of federal, state, county and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property except by written consent of the owner. In no case shall any material be left on the project, shoved into embankments or trenches on the project.

When approved in writing by the Engineer and when authorized by the proper authorities, the Contractor may dispose of such refuse by burning on the site of the project provided all requirements set forth by the authorities are met. The authorization to burn shall not relieve the Contractor in any way from damages which may result from his operations.

The Contractor shall be responsible for all damages to existing improvements resulting from his operations.

1.06 - PRELIMINARY GRADING: Before beginning construction, the Contractor shall excavate and stockpile topsoil for use in preparation of the site for grassing.

1.07 - BORROW EXCAVATION: If necessary to complete the work, the Contractor shall excavate material from borrow areas, or pits, outside the right-of-way and Limits of Disturbed Area. Borrow excavation shall include hauling and placement of such material as required on the Drawings. Borrow excavation includes all necessary stripping, excavation and disposal of any unsuitable material from borrow areas. Borrow pits shall be secured by the Contractor

and approved by the Engineer. Borrow material shall meet the requirements of Section 206.02 of the Georgia Department of Transportation Standard Specifications. Construction of all borrow pits shall meet the requirements of Section 206.03 of the Georgia Department of Transportation Standard Specifications.

NOTE: No additional payment will be made for Borrow Excavation. All costs for providing the source of borrow material and the excavation, hauling, placing and compacting the approved material shall be included in the amount bid for Grading Complete.

NOTE: The borrow site shall have an approved Soil & Erosion Control Plan. The Contractor shall be responsible for development, implementation and maintenance of said plan. No separate payment will be made for the installation and maintenance of soil & erosion control devices at the Borrow Site. The costs of all labor, materials, and equipment required to install and maintain proper soil & erosion control measures at the Borrow Site shall be included in the amount bid for Grading Complete.

1.08 - BACKFILLING AND EMBANKMENT: Fill materials shall be placed as required to provide compacted subgrade for roadway and pavements and produce finished grade elevations shown on the Drawings.

(a) Material: Fill materials shall be free of organic or other perishable material and shall not contain stones or rubble. No material shall be placed when frozen. If additional material, other than that to be obtained from excavation, is required for backfilling and grading, the Contractor shall obtain such additional material from sources on-site as identified by the Engineer or sources off the work site secured by the Contractor.

NOTE: There shall be no separate payment for backfilling and embankment. The costs of these items and all costs incidental thereto shall be included in the unit price bid for the item to which it pertains.

(b) Placement: Prior to placement of any material in embankments, the area within embankments limits shall be stripped of topsoil and all unsuitable materials removed as described under Excavation. The area shall then be scarified to a depth of at least six inches.

Fill material shall be placed in continuous approximately horizontal layers extending the full width of the embankment cross-section and the full dimension of the excavation where practicable and having a net compacted thickness of not over 8 inches.

Fill materials shall be placed at optimum moisture content within practicable limits (not less than 1% below optimum). Optimum moisture shall be maintained by sprinkling the layers as placed or by allowing materials to dry before placement.

(c) Compaction: Fill materials shall be compacted and tested in accordance with Section 208 and 209 of the Georgia Department of Transportation Standard Specifications. Fill materials shall be compacted for their full depth to 95% of the maximum dry density.

Compaction of embankments shall be by sheepsfoot rollers with staggered uniformly spaced knobs and suitable cleaning devices. The projected area of each knob and the number and spacing of the knobs shall be such that the total weight of the roller and ballast when distributed over the area of one row of knobs shall be 250 psi. Placement and compaction of materials shall extend beyond the final contours sufficiently to insure compaction of the material at the resulting final surface. Final contours shall then be achieved by a tracked bulldozer shaping the face of the embankment.

If tests indicate that density of fill is less than that specified, the area shall be either recompacted or undercut, filled, and compacted until specified density is achieved.

(d) Final Grading: Upon completion of construction operations, cut and fill slopes shall be graded to finish elevations and grades shown on the Drawings. Graded areas shall be made to blend into conformation with remaining ground surfaces. All surfaces shall be left smooth and free to drain.

(e) Excess Material: Excess earth excavation and unsuitable materials to be hauled by the City of Rome. Contractor shall coordinate hauling schedule with Mr. Lee Stone at the Walker Mountain Landfill. If schedule of Walker Mountain Landfill does not align with that of the contractor, the contractor shall be responsible for hauling excess and unsuitable materisl to the existing barrow pit at the Walker Mountian Landfill. Access to said borrow pit to be scheduled with Mr. Lee Stone. Mr Lee Stone may be contacted at 706-676-7747.

1.09 - PAYMENT: No additional payment shall be made for work required in this Section of the Specifications except as specifically set forth in the Bid. The cost of all labor, materials, and equipment required by the work, and all costs incidental thereto, shall be included in the unit price bid for the work to which it pertains.

Progress payments for the Grading Complete item in the Bid shall be made on the basis of cut sheets and measurements provided by the Contractor based on cross-sections and grading templates shown in the Drawings. Volumes shall be calculated using the average end area method. No adjustments, or allowance, will be made for either expansion or compaction of materials. Progress payments shall be prorated according to the portions of the work completed in comparison to the final cross sections.

SECTION NO. 2

SANITARY SEWER AND APPURTENANCES

2.01 - PURPOSE: These Specifications describe products to be incorporated into the sanitary sewer and requirements for the installation and use of these items. The Contractor shall furnish all products and perform all labor necessary to fulfill the requirements of these Specifications. All utility work shall be performed under the direct supervision of a Georgia Licensed Utility Contractor.

2.02 - GENERAL: Supply all products and perform all work in accordance with applicable American Society for Testing and Materials (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI) or other recognized standards. Latest revisions of all standards are applicable. If requested by the Owner, submit evidence that manufacturer has consistently produced products of satisfactory quality and performance over a period of at least two years. All land disturbing activities shall be in full compliance with the Manual for Erosion and Sediment Control in Georgia, latest revision, Best Management Practices and the NPDES General Permit GAR 100002 to discharge Storm Water Associated with Construction Activity.

Where the following abbreviations or acronyms are used in these specifications, they shall mean the following:

PVC (pvc)	-	Polyvinyl Chloride
ASTM	-	American Society of Testing and Materials
ANSI	-	American National Standards Institute
AWWA	-	American Water Works Association
SDR	-	Standard Dimension Ratio
D.O.T.	-	State of Georgia Department of Transportation
PSI (psi)	-	Pound per Square Inch
PSIG	-	Pounds per Square Inch Gage
I.D.	-	Inside Diameter
HDPE	-	High Density Polyethylene
IPS	-	Iron Pipe Size
DIPS	-	Ductile Iron Pipe Size
PPI	-	Plastics Pipe Institute

2.03 - CONSTRUCTION DRAWINGS: The term construction drawings shall mean drawings, prints, descriptive literature, test reports, samples, calculations, schedules, material lists, and information and items of similar meaning.

(a) Submittals Required: The Contractor shall furnish to the Engineer for review in

accordance with the procedure outlined below, drawings and descriptive literature for all manufactured or fabricated products. Additional information such as special drawings, schedules, calculations and curves, shall be provided as specifically requested by the Engineer.

(b) City of Rome's Review: The City of Rome shall review and check drawings and submittals. The engineer shall indicate his approval by initials and date. The Contractor shall furnish the Engineer with a minimum of three copies of all submittals. A transmittal form shall accompany each submittal or group of submittals.

(c) Engineer's Review: All submittals will be reviewed, stamped, and dated by the Engineer before they are returned to the Contractor.

Acceptable submittals will be approved in writing with one copy returned to the Contractor with the remaining copies to be retained by the Engineer.

Submittals requiring minor corrections before being acceptable will be so noted. Drawings must be resubmitted for review and approval prior to installation or use of products.

(d) Drawings for Construction: Drawings or other submittals not bearing the Engineer's approval notation shall not be issued to sub-contractor or utilized for construction purposes. The Contractor shall maintain at the job site a complete set of construction drawings bearing the Engineer's approval.

(e) As-Constructed Plans: The Contractor shall provide the Engineer with two sets of as-constructed drawings which show the horizontal location of all manholes, clean outs, force main, abandoned utilities, and the elevation of all manhole pipe penetrations.

2.04 - PIPE, MATERIALS, AND ACCESSORIES: Furnish all pipe, fittings, manholes, and all other materials required for completion of the work.

(a) Shop Drawings: The City of Rome shall submit shop drawings indicating compliance with applicable ASTM, AWWA, or other referenced standards. Drawings shall fully describe physical dimensions, weights, and service ratings. Submittals shall include recommended handling and installation details.

(b) Polyvinyl Chloride Pipe (PVC):

(1) Pipe: All PVC pipe shall be Schedule 80 and conform to ASTM D 1785, unless noted otherwise on the Drawings. All PVC pipe fittings shall be Schedule 80 and conform to ASTM D 2467, unless noted otherwise on the Drawings. PVC used in the manufacture of the pipe shall be Type I, Grade I (PVC 1120). The pipe shall be

schedule 80 with flange fittings as shown on the Drawings. All fitting hardware shall be a minimum of 316 stainless steel.

Pipe shall be supplied in lengths of at least 13 feet.

(i) 1 1/2 inches and larger: Unless shown otherwise on the Drawings, pipe with diameters of on and one half inches and larger shall have bolted flange fittings and gasket seals.

(2) Acceptance: All pipe and fittings are subject to the inspection of the Engineer at the pipe plant, jobsite, or other point of delivery for the purpose of rejecting pipe not conforming to these specifications. Pipe shall be inspected after delivery for shape, cracks, uniformity, imperfect surfaces, and damage. Repaired, patched, or damaged pipe will be rejected.

(c) High Density Polyethylene Pipe (HDPE):

(1) Pipe: All Polyethylene pipe shall be manufactured in accordance with AWWA C901-2 for sizes 1-1/4" thru 3" IPS diameters and to the requirements of ASTM D3035. Pipe 4" and above DIPS and IPS sized shall be manufactured to the requirements of ASTM F714 and AWWA C906-07. Pipe for this project shall be DriscoPlex 4000 IPS Green Stripe or EQUAL.

(2) Materials: Materials used for the manufacture of polyethylene pipe and fittings shall be PE 4710 high density polyethylene meeting cell classification 345464C for black or 345464E for stripes per ASTM D 3350; and shall be listed in the name of the pipe and fittings manufacture in PPI (Plastics Pipe Institute) TR-4, "Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds", with a standard grade HDB rating of 1600 psi at 73 degrees F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.

(3) Service Identification Stripes: Permanent identification of the piping service shall be provided by co-extruding color stripes into the pipe outside surface. The striping material shall be the same material as the pipe material except for color. Stripes printed on the outside surface shall not be acceptable. Pipe shall have six equally spaced, longitudinal color stripes. The stripes for this project shall be green.

(4) Polyethylene Fittings & Custom Fabrications: Fabricated fittings shall be supplied by an approved manufacturer. All fitting and custom fabrications shall be pressure rated for the same, or greater, internal pressure rating as the mating pipe.

(5) Molded Fittings: Molded fittings shall be manufactured and tested in accordance with ASTM D 3261 and shall be so marked.

(6) Fabricated Fittings: Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to the full service pressure rating of the mating pipe. Field fabrication of fittings is prohibited.

(7) Polyethylene Flange Adapters: Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion-joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of small V-shaped grooves (serrations) to promote gasket-less sealing, or restrain the gasket against blowout.

(8) Back-up Rings & Flange Bolts: Flange adapters shall be fitted with back-up rings pressure rated equal to or greater than the mating pipe. The back-up ring bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Back-up rings and bolts shall be a minimum 316 stainless steel.

(d) Joining High Density Polyethylene Pipe (HDPE):

(1) Heat Fusion Joining: Joints between plain end pipes and fitting shall be made by butt fusion. Butt fusion procedures used shall be procedures that are in accordance with ASTM F2620. The contractor shall ensure that the persons making heat fusion joints have received training in the recommended procedure. The Contractor shall maintain records of trained personnel, and shall certify that training was received not more than 12 months before commencing construction. External and internal beads shall not be removed unless specified otherwise on the plans or by the Engineer.

(2) Joining by Other Means: Polyethylene pipe and fittings may be joined together by electro-fusion when approved by the Engineer. When joining by electro-fusion, the installation instructions of the joining device manufacturer shall be observed.

(e) Detection Tape: Detectable Mylar encased aluminum foil marking tape will be installed over **ALL** buried PVC and HDPE pipe including service lines. Tape will be green in color, at least 2-inches wide, and shall bear the printed identification "Caution: Sewer Line Buried Below". Detection tape shall be equal to Blackburn Mfg. Co. detectable underground warning tape.

(f) Tracer Wire: Tracer wire shall be a #12 gauge single strain copper wire and shall be

installed directly above **ALL** buried PVC and HDPE pipe. Tracer wire shall be secured to the pipe with tape or other method approved by the Engineer. The tracer wire shall be one continuous wire with no splices and shall be day lighted in each structure. The wire shall be secured to the rim or lid of each structure.

(g) Concrete Manholes: Provide materials for construction of manholes in accordance with the following:

(1) Precast Concrete Sections: Precast concrete sections shall meet the requirements of ASTM C 478. The minimum compressive strength of the concrete in precast sections shall be 4000 psi. The minimum shell thickness shall be one-twelfth of the inside diameter of the riser of the largest cone diameter. Lift inserts and holes shall be sized for a precision fit with the lift devices, shall comply with OSHA 1926.704, and shall not penetrate through the manhole wall. All pre-cast concrete components shall be wet-cast. All manholes shall have inverts constructed therein with said inverts being constructed of solid concrete (Class 'B' minimum). No bricks or grout shall be allowed in the construction of said inverts. Manholes with inverts constructed by the manufacturer are preferred but not required.

(2) Brick and Mortar: Brick shall be whole and hardburned, conforming to ASTM C 32 Grade MS. Mortar shall be made of one part Portland cement and two parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C 150. Sand shall meet ASTM C 53.

(3) Iron Castings: Cast iron manhole frames and covers shall be gray iron, conforming to ASTM A 48 for Class 258 gray iron and all applicable local standards. All castings shall be tough, close grained, smooth, and free from blow holes, blisters, shrinkage, strains, cracks, cold shots and other imperfections. No casting will be accepted which weighs less than 95% of the design weight. Shop drawings must indicate the design weight and provide sufficient dimensions to permit checking. All castings shall be thoroughly cleaned in the shop and given two coats of approved bituminous paint before rusting begins.

Manhole frames and covers placed on precast concrete manholes outside paved areas, unless specified otherwise by the City of Rome, shall be watertight Vulcan V-2480. Manhole frames and covers placed within paved areas shall be Vulcan V-1480 and shall be installed with a 2-inch cast iron riser as manufactured by the same manufacturer as the frame. Covers shall have the City of Rome logo and labeled with the word "SEWER".

All frames and covers shall have machined horizontal bearing surfaces, and shall be watertight.

(4) Plastic Steps: Manhole steps shall be polypropylene molded around a steel rod, equal to products of M. A. Industries. Manhole steps shall conform to ASTM C-478.

(5) Pipe Connections: Pipe connections to precast concrete manholes shall be made using a compression type rubber boot manufactured in accordance with ASTM C 923, and equal to Kor-N-Seal.

(h) HDPE Manholes and Structures: Provide materials for construction of manholes in accordance with the following:

(1) The structures shall be made of high density, high molecular weight polyethylene pipe material meeting the requirements of Class 345464C as defined in ASTM D 3350 Standard Specification for Polyethylene Plastics Molding Pipe and Fittings Materials.

(2) Material shall be joined by the extrusion weld method or the butt fusion method in strict accordance with the manufacturer's recommendations. The equipment used in the joining procedures shall be capable of meeting all conditions of the pipe or plate material manufacturer.

(3) Products shall have HDPE pipe penetrations and stub-outs for flange or butt fusion connections as shown on the Drawings. Stub-outs and penetrations other than those made from standard tees or other fittings shall be extrusion welded to the wall of the structure along with gusset plates as shown on the detail Drawings. All stub-outs and penetrations inside and outside shall be installed by the manufacturer or fabricator.

(5) Structures shall be designed by the manufacturer for all loading conditions resulting from dead and live loads as well as loading conditions resulting from transportation, installation, or flotation.

(6) The manhole and base shall be of sufficient thickness to withstand the installed height in compacted soil.

2.05 -Wet Well and Vaults: Provide materials for construction of wet well and vaults in accordance with the following:

(a) Concrete Wet well

(1) The concrete wet well shall conform to specifications for ASTM C 478 "Pre-cast Reinforced Concrete Manhole Sections", except as otherwise specified below.

(2) All sections shall have tongue and groove joints.

(3) Lifting rings or non-penetrating lift holes shall be provided for handling pre-cast sections. All lifting rings on structures shall be recessed. Non-penetrating lift holes shall be filled with non-shrink grout after installation of the sections.

(4) All joints shall receive a double row of bituminous flex type butyl sealant.

(5) All joints shall receive a 6-inch butyl wrap on the outside of the wet well centered on the joint. Said butyl wrap shall conform to AASHTO M-1988, and SS-S-210A. Prior to placement of the wrap, the wrap area shall be primed with EZ Primer or CS-75.

(6) The inside of the wet well and top slab shall be lined with an HDPE liner. The minimum liner thickness shall be 60 mils. Liner shall be installed in accordance with the manufacturers written recommendations. Liner penetrations shall be sealed in accordance with the manufacturers written recommendations. The wet well shall be provided with an external protective coating. External coating shall be a minimum of 1 mil bituminous coating.

(7) The concrete base section as a minimum shall conform to the dimensions shown on the drawings.

(8) The inside diameter of the manhole shall be 96-inches.

(9) The wet well shall be vacuum tested in accordance with ASTM-1244-93.

(b) Structurally Reinforced Thermoplastic (SRTP) Wet well and Vaults

(1) Summary: The SRTP wet well and valve vault shall be a closed profile wall high density polyethylene (HDPE) with a smooth interior waterway with an exterior structure shaped HDPE profile. The wet well and valve vault shall be completely factory-assembled units, requiring only minor adjustments in the field.

(2) QUALITY ASSURANCE

(1) Manufacturer Qualifications

(i) Wet well and valve pit manufacture shall be in the business of manufacturing SRTP structures and shall demonstrate experience with electrofusion and thermoplastic welding in accordance with AWS B2.4:2012 standards. All fabrication must be performed by AWS certified Polyethylene welding technicians. The manufacturer must provide a minimum of three project references

(3) QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) CERTIFICATION

1) The manufacturer shall be regularly engaged in the design, manufacture, assembly and production of equipment of the type specified and shall have complete responsibility for furnishing of all components in the system.

Manufacturer shall be in the business of manufacturing SRTP structures and shall demonstrate experience with electrofusion and thermoplastic welding in accordance with AWS B2.4:2012 standards. All fabrication must be performed by AWS certified Polyethylene welding technicians. The Manufacturer must provide a minimum of three project references.

(4) SUBMITALS

Shop Drawings and Manufacturer's Literature: The prefabricated SRTP manufacturer shall prepare shop drawings for the structures including structural and opening details, equipment mount and location details, and manufacturer's cut sheet for each item of equipment associated with the structures. The main component of the submittals shall be drawings provided on 11" x 17" sheet of the complete prefabricated SRTP structures prepared by the manufacturer. Manufacturer's cut sheets shall indicate dimensions, and material of construction for all equipment within the prefabricated SRTP structures.

(5) OPERATION & MAINTENANCE MANUALS

The prefabricated SRTP structure supplier shall prepare a complete operations and maintenance (O&M) manual for their structure(s). The O&M manual shall include routine maintenance requirements and spare parts lists for each major item of equipment installed within their structure(s). The names and telephone numbers of companies where spare parts and/or Georgia based trained service technicians are available shall also be included for each item of equipment.

(6) DELIVERY, STORAGE AND HANDLING

i) Deliver, store, and handle to prevent bending and damage in accordance with the manufacturer's published unit handling and installation specifications.

(ii) Transport trailer beds shall be fitted with dunnage support during shipment. Fabric straps shall be used for tie down.

(iii) All fittings and openings shall be covered to exclude road splash, precipitation, and other internal contamination.

(iv) SRTP pump stations shall be stored on clean, level and dry ground to prevent undue damage. Consult manufacturer for information regarding extended storage, if applicable.

(v) The contractor shall insure that all pump power and control cables, including the float cables, are protected from submergence until they are properly installed and sealed.

(7) WARRANTY

Provide manufacture's standard 1-year limited warranty from the date of delivery for materials and workmanship.

(8) DESIGN CRITERIA

The SRTP structures shall meet the following design criteria:

(i) Surface Loads: Wet well and valve pit shall withstand surface 300 PSF live loads when properly installed according to manufacturer's published installation manual and operating guidelines.

(ii) External Hydrostatic Pressure: The SRTP wet well shall be designed to withstand wall collapse or buckling based on the following assumptions and third party specifications:

(iii) Hydrostatic Pressure of 62.4 lbs. per square foot. Saturated soil weight of 120 lbs. per cubic foot. Soil Modulus of 700 pounds per square foot. Pipe stiffness values as specified in ASTM F2562, ASTM F2435 or ASTM F894.

(iv) Bottom Loads: The wet well bottom shall have less than 2% (vertical deflection divided by nominal diameter) of center elastic deflection (deformation) when in service in totally submerged conditions.

(v) Unit Lifting: Unit shall be designed to support self-weight while suspended in air during installation. No lifting holes through the wet well structure are permitted.

(vi) Anti-flotation design for the wet well shall be designed by the manufacturer or his representative and shall be certified to by a Professional Engineer licensed to practice in the State of Georgia. Said design shall be provided along with and incorporated into the Shop Drawings for the project. All cost associated with the design and installation of said anti-flotation components shall be included in Item 2 - "PUMP STATION COMPLETE".

(9) PRODUCT STORAGE AND CAPACITY

(i) Size: The wet well shall be an SRTP profile wall cylinder with a nominal inside diameter as shown on plan details.

(ii) Pump Station stall be capable of storing water products with a specific gravity up to 1.2.

(iii) Pump Station shall be designed for a maximum, continuous, hot water event of 100 degrees Fahrenheit.

(10) MATERIALS

(i) SRTP Pump Station shall be manufactured with closed profile high density polyethylene resin conforming to ASTM F894.

(ii) HDPE Materials supplied under this specification shall be high density, high molecular weight PE 3408 polyethylene compound that meets or exceeds ASTM D3350.

(iii) High density polyethylene (HDPE) SDR-11 butt-fusion pipe and fitting shall be used for all wet well piping and penetrations. All HDPE pipe shall adhere to the Plastic Pipe Institute in PPI TR-4 with HDB ratings of 1600 psi (11.04 MPa) at 73 degrees Fahrenheit (23 degrees Celsius) and 800 psi (5.52 MPa) at 140 degrees Fahrenheit (60 degrees Celsius).

(iv) All HDPE flanges internal and external to the vessel shall utilize stainless steel backing rings. All nuts and bolts used with said backing rings shall be 316 stainless steel and shall have an anti-seize lubricant applied thereto.

(v) HDPE encapsulated concrete base shall be 4,000 psi concrete reinforced with 316SST threaded rod per manufacturer's design specifications to accommodate pump base mount.

(vi) HDPE pump discharge piping shall be structurally supported with HDPE PE3408 pipe supports fully factory welded to the SRTP wet well.

(11) APPURTENANCES

(i) Pump Base Discharge Elbow Anchors: Anchors shall be type 316 stainless steel threaded studs or wedge type expansion anchors of at least ¾-inches in diameter. Anchors shall be sized based on submersible pump working load requirements.

(ii) Pump Guide Rails: SRTP wet well shall be equipped with 316 stainless steel guide rails to guide the pumps into proper alignment with the discharge elbow. The guide rails shall extend from the discharge elbow to the upper guide holder on the access door or wall. All guide rail piping and bracing inside the Wetwell structure shall be 316 stainless steel. The guide rail diameter and guide rail bracing spacing shall be as recommended by the pump manufacturer. Intermediate guide rail braces shall be 316 stainless steel if required by the pump manufacturer.

(12) VENTULATION

(i) Wet well ventilation shall comply with all applicable codes.

(ii) ALUMINUM ACCESS HATCHES

(iii) Hatches shall be designed to meet 300 PSF live loading requirements.

(iv) Hatches shall have a ¼" thick, one piece, mill finish, extruded aluminum frame.

(v) The inside frame shall have a door support ledge on two (2) sides.

(vi) The frame and ledge shall be supported by an HDPE framed opening.

(vii) The hatch door panels shall be ¼" aluminum diamond plate.

(viii) Doors shall open to 90-degrees with T-316 stainless steel hold open arms. Hold open arms shall have vinyl gripped handles.

(ix) Doors shall not require more than 30 pounds of lifting force to open. Doors shall close flush with the frame and shall lock positively when shut.

(x) Hinges and all fastening hardware shall be T-316 stainless steel.

(xi)) Provide flush T-316 stainless steel spring loaded slam lock operable with a stainless steel removable key from the top. Provide a stainless steel turn handle with vinyl grip for operating lock from the bottom.

(xii) Provide flush lifting handle and recessed padlock hasp covered by a hinged lid flush with the surface. Owner shall provide locks for hatches.

(xiii) All hatches shall be furnished with an integral safety grate.
(xiv) Approved Manufacturer: Halliday or equivalent.

(13) INSTALLATION

(1) The Contractor shall install the pump station according to the pump station manufacturer's published specifications and Installation Guide and

shall perform all tests and measurements as noted in the installation instructions and project specifications.

(i) Install all components accurately and to the elevations indicated in the plans.

(ii) The pump station and anti-flotation collar, shall be designed and installed to prevent buckling and/or floating under saturated soil conditions and an empty wet well as indicated on the plans with no backfill in-place.

(14) FIELD QUALITY CONTROL

1) Start-Up Service: The initial startup of the prefabricated SRTP pump station shall be performed by the local qualified factory representative of the pump station manufacturer. It shall be the responsibility of the local factory representative to supervise the startup and instruct the owner's personnel in the proper operation and maintenance procedures for the entire prefabricated SRTP pump station.

(i) Concrete: All concrete shall be as specified in Section No. 4.

(ii) Grout: Grout which is required by the Drawings or Specifications, and is not otherwise specified, shall be composed of one part cement and three parts sand. Grout shall have a maximum water cement ratio of 5.0 U.S. gallons of water per 94 lb. bag of cement.

(iii) Non-Shrink Grout: All grout shall be non-metallic, non-shrink type. Cement shall be Type III. Grout shall meet the following requirements:

Criteria	Test Method	Results
Workability	ASTM C-191	Initial set time not less than 60 min.
Compressive Strength	ASTM C-109 (restrained condition)	1 day - 3000 psi
Shrinkage	ASTM C-827	No shrinkage after placement and no shrinkage after set.

Grout shall be mixed and placed in accordance with the recommendations of ACI, and the grout manufacturer's published recommendations. Grout shall be equal to Five Star Grout manufactured by U.S. Grout Corporation.

(iv) Reinforcing Steel: Bar reinforcing steel shall conform to the requirements of ASTM A 615 Grade 40, as amended to date.

2.05 – SANITARY SEWER PUMP STATION: The contractor shall furnish and install all components of the sanitary sewer pump station as shown on the construction documents. Components include, but are not limited to, pumps, wet well, valve vault, valves, flowmeter, air relief valves, manholes, piping, excavation, shoring, backfilling, etc. Contractor to also furnish and install all electrical wiring and control panels to ensure proper functioning of the pump station in accordance with manufacture's requirements. Contractor also shall furnish and install means of emergency back-up power to the pump station by way of a propane gas generator as specified in the construction documents.

The two submersible pumps for this station shall be manufactured by the Flygt Corporation and shall be Model NP3171.185 Type MT with a 277 mm diameter impeller, 460 V/ 3 phase / 60 Hz 35 HP 3550 RPM motor. Pumps shall be rated Class 1 Div 1 explosion proof. Pumps shall be provided with vibration dampening base elbows. Pump housings shall be EPO coated. Pump volutes and base elbows shall be EPO coated inside and out.

The Contractor shall provide one spare submersible pump to the City of Rome. The spare pump shall be manufactured by the Flygt Corporation and shall be Model NP3171.185 Type MT with a 277 mm diameter impeller, 460 V/ 3 phase / 60 Hz 35 HP 3550 RPM motor. Pumps shall be rated Class 1 Div 1 explosion proof. Pumps shall be provided with vibration dampening base elbows. Pump housings shall be EPO coated. Pump volutes and base elbows shall be EPO coated inside and out. The spare pump shall be palletized or crated and prepared for storage at a location directed by the City of Rome.

The generator control panel and electrical components shall be as specified in Section 16210 and shown on the Drawings.

The flowmeter for this station shall be Rosemount Model 8750W. Flow meter shall be provided with a remote transmitter and data logger. The data logger shall be Telog Series 31 Analog Voltage Recorder and be capable of transferring data to a laptop computer without removing the data logger. The flowmeter transmitter and data logger shall be housed in a NEMA 4X cabinet installed on the control panel rack.

The wetwell shall be provided with an internal protective HDPE liner. The minimum liner thickness shall be 60 mils. Liner shall be installed in accordance with the manufacturers

written recommendations. Liner penetrations shall be sealed in accordance with the manufacturers written recommendations. The wetwell shall be provided with an external protective coating. External coating shall be a minimum of 1 mil thick bituminous coating.

The valve vault and flow meter manhole shall be provided with an internal and external protective coating. Coating shall be a minimum of 1 mil thick bituminous coating.

The contractor shall furnish and install all materials and apparatus as required by the contract documents. All electrical work shall be under the supervision of a licensed Electrician by the State of Georgia. All electrical construction shall be in accordance with the National Electric Code, 2011 Edition, OSHA, the Georgia State Electrical Code and all current, local, state and federal requirements.

All necessary equipment and labor to construct sanitary sewer pump station shall be included in the lump sum price bid. No additional payment will be made for the construction of the pumping station or its components.

2.06 - HANDLING MATERIALS:

(a) Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves, and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. Any materials dropped or dumped will be subject to rejection without additional justification.

(b) Handling: Handle pipe, fittings, valves and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front loader. Do not use material damaged in handling.

(c) Distribution: Distribute and place pipe and materials to not interfere with traffic. Do not string pipe more than 1,000 feet beyond the area where pipe is being laid. Do not obstruct drainage ditches.

(d) Storage: Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas.

2.07 - CONSTRUCTION ALONG HIGHWAYS, STREETS, AND ROADWAYS: Install sanitary sewer lines and appurtenances along highways, streets, and roadways in accordance with the applicable regulations of the Georgia Department of Transportation and City of Rome and/or Floyd County with reference to construction operations, safety, traffic control, road maintenance and repair. All signage, barricades, and other traffic controls shall be installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) latest revision.

(a) Protection of Traffic: Provide and maintain suitable signs, barricades and lights for

protection of traffic. Replace all highway signs removed for construction as soon as possible. Do not close any highway, street, or roadway without first obtaining permission from the proper authorities. Provide sufficient barricades and warning lights. Provide flagmen as required.

Backfill any portion of the trench excavated during the same work day. No trench shall remain open overnight within a roadway unless plated with steel running plates.

(b) Construction Operations: Perform all work along highways, streets and roadways to least interfere with traffic.

(i) Stripping: Where the pipe line is laid along road shoulders, strip and stockpile all sod, topsoil and other material suitable for shoulder restoration.

(ii) Trenching, Laying and Backfilling: Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.

(iii) Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.

(c) Excavated Materials: Do not place excavated material along highways, streets and roadways. All material removed from wet well area, valve vault area, and along trench lines and around manholes to be loaded directly onto trucks and trucked off site to a permitted disposal area. Onsite stock piling of excavated material is prohibited. Sweep all scattered excavated material off of pavement and load onto the disposal truck immediately.

(d) Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material and free to drain at all times.

(f) Maintaining Highways, Streets, Roadways, and Driveways: Maintain streets, highways, and roadways in suitable condition for movement of traffic until completion and final acceptance of the work. Use steel running plate to maintain traffic until pavement replacement is completed.

Repair all driveways that are cut or damaged immediately. Maintain them in a suitable condition for use until completion and final acceptance of the work.

2.08 - CLEARING: Where limits of clearing are shown on the Drawings, all trees, growth, debris, stumps and other objectionable matter shall be removed before trenching. Clearing of the construction easement is permitted with special care taken to adhere to the requirements of

Sections 21, 22 and 23 of these specifications. The Contractor shall be responsible for all damages to existing improvements resulting from his operations.

(a) Clearing and Grubbing: All vegetable growth such as trees, shrubs, brush, logs, upturned stumps and roots of down trees, and other similar items shall be removed and disposed of. When necessary, trees shall be felled completely. Where the tree limb structure interferes with utility wires, or where the trees to be felled are in close proximity to utility wires, the tree shall be taken down in sections to eliminate the possibility of damage to the utility.

(b) Disposal of Refuse: The refuse resulting from the clearing and grubbing operation shall be hauled to a disposal site secured by the Contractor and shall be disposed of in accordance with all requirements of federal, state, county and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property except by written consent of the property owner. In no case shall any material be left on the project, shoved into embankments or trenches on the project.

When approved in writing by the Director and when authorized by the proper authorities, the Contractor may dispose of such refuse by burning on the site of the project provided all requirements set forth by the authorities are met. The authorization to burn shall not relieve the Contractor in any way from damages that may result from his operations.

2.09 - EXCAVATION: Excavate all materials encountered, including rock, and dispose of excess excavated material not required for backfilling immediately. Perform all excavation in accordance with applicable local, state, and federal regulations, including those authorized by the Occupational Safety and Health Act of 1970 (PL 91-596), as amended.

All construction shall comply with the Department of Labor, Occupational Safety and Health Administration (OSHA), 29CFR Part 1926, Subpart P, and Revised July 1, 1997.

(a) Dimensions: Excavate trenches to the depths shown on the Drawings to accommodate the required bedding and for manhole and other structures.

Excavate the top portion of the trench to any width that will not cause unnecessary damage to adjoining structures, roadways, pavements, utilities, trees, or private property.

Excavate the lower portion of the trench to a width no greater than the outside diameter of the pipe plus 24 inches. Maintain this width up to two feet above the pipe.

(b) Earth Excavation: Excavate and prepare the trench bottom to support the pipe

uniformly throughout its length.

(c) Rock Excavation:

(i) Definition of Rock: Any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 18,000 pounds (Caterpillar Model 215 or equal), and occupying an original volume of at least one-half cubic yard.

(ii) Excavation: Where rock is encountered, excavate to the minimum depth and width that will provide 6 inches clearance beyond the outside diameter of the pipe.

(iii) Blasting: Provide experienced workmen to perform blasting. Conduct blasting operations in accordance with all existing ordinances and regulations. Protect all structures from the effects of the blast. Repair any resulting damage.

(iv) Removal of Rock: Do not use excavated rock as backfill material. Dispose of rock that is surplus or not suitable for use as rip rap.

(d) Bracing and Sheeting: When required by regulations, for safety of workers, or to prevent damage to adjoining structures, roadway pavements, utilities, trees, or private property which are specifically required to remain, provide bracing and sheeting.

(i) Timber: Timber for shoring, sheeting, or bracing shall be sound and free of large or loose knots and in good condition. Size and spacing shall be in accordance with OSHA regulations.

Remove bracing and sheeting in units when backfill reaches the point necessary to protect the pipe and adjacent property. Leave sheeting in place when in the opinion of the Director it cannot be safely removed. Cut off sheeting left in place at least two feet below the surface.

(ii) Steel Sheet Piling: Continuous lock joint steel sheet piping may be substituted for timber sheeting when approved by the Engineer. Steel piling may be removed, without cutting, provided the rate of removal is kept in pace with the tamping and backfilling operations to assure complete filling of the void created by the withdrawal of the piling. Complete withdrawal of the piling in advance of the tamping and backfilling will not be permitted. Piling, where ordered to be lift in place by the Director for reasons of safety, will be cut off where directed.

(e) Dewatering and Trench Stabilization: Dewater excavation continuously to maintain a water level below the bottom of the trench.

Wherever the material at the bottom of the trench is unsuitable or the proper installation of the pipe, the Engineer will direct the removal and replacement of the unsuitable material.

When so directed, undercut the trench and backfill with crushed stone bedding material. Place and compact this material to bring the trench to the required grade.

2.10 - EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS: It is the responsibility of the City of Rome to locate all existing utilities along the path of his construction and to properly notify the Utilities Protection Center "Call Before You Dig" (1-800-282-7411) or (811) prior to the beginning of any excavation or construction. The Drawings indicate underground utilities or obstructions that are known to exist according to the best information available to the Owner. Where these or unforeseen underground utilities are encountered, the location and alignment may be changed, upon written approval of the Engineer, to avoid interference.

(a) Electronic Pipe and Cable Finder: Furnish and have available at all times an electronic pipe detector, in good working order, to locate existing pipe lines or other obstructions.

(b) Relocation of Services: Before the pipeline is laid, locate all utility services to avoid interference with such services and to determine whether these services should be relocated. Repair any damage done to utility services or pipe lines resulting from efforts to locate services or resulting from the construction operation.

(c) Water Service Interruption: The City of Rome shall take all necessary precautions to prevent any interruption of water service to any residential or commercial water customer. In the event that project conditions require the interruption of any service for a period greater than four hours, the City of Rome shall provide temporary service to the customer in a manner that is acceptable to the Director.

2.11 - LAYING PIPE: Lay the pipe to conform accurately to the alignment and grade shown on the Drawings. Maintain 10 ft. horizontal separation and 18-inch vertical separation between all water and sewer lines as recommended in the 1997 Edition of the Recommended Standards for Wastewater Facilities, Great Lakes-Upper Mississippi River Board of State Health and Environmental Managers, Section 38.31. Unless otherwise indicated on the plans, the minimum cover over a gravity sewer pipe shall be 36-inches.

(a) Handling: Use suitable tools and equipment to handle and lay pipe. Prevent damage to the pipe. Examine all pipes for cracks and other defects as it is laid. Do not lay pipe or other materials that are known to be defective. If any pipe or other material is discovered to be defective or damaged after being laid, remove and replace it.

(b) Sequence: Excavate, lay the pipe and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe, close the end with a plug.

(c) Placing and Joining:

PVC Pipe: Clean pipe and fittings thoroughly before laying. Before making the joint, clean the sealing surfaces of dust, dirt, gravel, and other foreign substances. Immediately after jointing bring the pipe to final alignment and grade.

NOTE: Any pipe which has its alignment, grade or joints disturbed after installation shall be taken up and re-laid.

2.12 - BEDDING: Bed pipe and manholes in accordance with the Drawings and the following specifications.

NOTE: The bedding of PVC pipe and ductile iron pipe shall be installed in the same manner in full compliance with the detail shown on the Drawings and as stated below.

(a) Materials: Bedding materials and haunching materials shall be Class "IA" materials as set forth in latest revision of ASTM D 2487. Crushed stone bedding material shall meet the requirements of Georgia Department of Transportation Specification 800.01 for No. 57 stone. Materials in the initial backfill area (that is from the spring line of the pipe to 18-inches over the pipe) shall be Soil Class III material (ASTM D 2487), or better, as determined by the engineer.

(1) Class "IA" Materials - Class IA materials provide maximum stability and pipe support for a given density due to the angular interlock of particles. With minimum effort these materials can be installed at relatively high densities over a wide range of moister contents. Said materials consist of angular, crushed stone or rock, crushed gravel, broken coral, crushed slag, cinders or shells; large void content, contain little or no fines.

(2) Class "II" Materials – Class II materials, when compacted, provide a relatively high level of pipe support. In most respects, they have all the desirable characteristics of Class IB materials when densely graded. However, open graded groups may allow migration and the sizes should be checked for compatibility with adjacent material. Typically, Class II materials consist of rounded particles and are less stable than angular materials unless they are confined and compacted.

(i) Class “III” Materials – Class III materials provide less support for a given density than Class I or Class II materials. High levels of compactive effort may be required unless moisture content is controlled. These materials provide reasonable levels of pipe support once proper density is achieved.

(b) General: Prepare the trench bottom to support the pipe uniformly throughout its length. Bell holes at each joint shall be provided at each joint to permit the joint to be assembled properly while maintaining uniform pipe support. In rock trenches, bed pipe in at least six inches of suitable bedding material.

(c) Gravity and Pressure Sewers: Lay all pipe with Class '1A' stone bedding unless shown or specified otherwise.

(d) Manholes: Excavate to a minimum of 12 inches below the planned elevation of the base of the manhole. Place and compact stone bedding material to the required grade before constructing the manhole.

2.13 - MANHOLES: Construct manholes as shown on the Drawings:

(a) Precast Concrete: Handle sections carefully to prevent cracking or chipping. If preformed openings must be enlarged or altered, or if new openings must be made in the field, minimize the amount of material removed to provide closely matched surface. If lifting holes at anytime fully penetrate the manhole base, riser, or cone that section shall be rejected and must be replaced with a new one.

(1) Excavate to the required depth and remove materials that are unstable or unsuitable for a good foundation. Prepare a level, compacted foundation for the required bedding extending 12 inches outside the base of the manhole. Provide uniform bedding of the bottom section to prevent uneven loading.

(2) Thoroughly clean sockets and spigots to remove dirt and other foreign materials that may prevent sealing. Unroll the Butyl Sealant rope directly against base of spigot. Leave protective wrapper attached until sealant is entirely unrolled against spigot. Do not stretch. Overlap from side to side, not top to bottom.

(3) Set risers and cones so that steps align, taking particular care to clean, prepare and seal joints.

(4) After joining manhole sections, apply the butyl sealant sheet around the outside perimeter of the joint. This sealant shall be butyl rubber based conforming to Federal

Specifications SS-S-210A, AASHTO M-198, Type B - butyl rubber.

(5) Install watertight boots in accordance with manufacturer's recommendations to produce a watertight structure.

(6) Lift holes leaving less than two (2) inches of wall thickness shall be plugged from the outside using non-shrink grout, and then covered with butyl sealant sheet.

(b) Brick: Bed the bottom and sides of every brick in mortar. Apply a smooth coat of mortar, 3/4-inches thick, on the inside and outside.

(c) Inverts: Form channels as shown on the Drawings, rounded, and troweled smooth. Maintain consistent grade through the invert. Seal the connection of pipes to precast concrete manholes with watertight compression type rubber boots.

(d) Top Elevations: Build manholes outside of paved areas 24 inches above ground unless otherwise shown on the plans or directed by the Engineer. Build manholes in paved areas to existing grades.

2.14 - CONNECTIONS TO EXISTING SEWERS AND MANHOLES: Connections to existing manholes, catch basins, boxes, or sewers shall be made in the locations shown on the Drawings.

(a) Manholes: Connections to precast concrete structures shall be made by coring the structure to receive the pipe to be connected. Pipe/manhole connectors shall be used to secure the pipe to the structure and achieve a watertight seal in accordance with the manufacturer's instructions. Once secured to the connector, adjust the pipe to grade with bedding material.

Pipe shall be cut flush with the inside wall of the structure to which it is connected.

(b) Sewers: Connections to existing PVC sewers shall be made by saw cutting pipe so that a precast concrete manhole base may be slip-fit around the pipe, and the existing pipe secured to the manhole base using compression type rubber boots.

NOTE: The escape of raw sewage from the City of Rome sanitary sewer system onto the ground or into a receiving stream is prohibited. The Contractor shall be responsible from all fines and cleanup costs associated with any spill associated with this project.

2.15 – GEOTEXTILE FABRIC: Geotextile fabric shall be a non-woven type of polypropylene; polyethylene or polyamide.

(a) Minimum Requirements: Provide fabric on rolls with a protective wrapping to

protect the fabric from UV degradation and abrasion prior to installation. Fabric shall be free of any chemical treatment or coating which reduces permeability, and shall be inert to chemicals commonly found in soil.

The fabric shall meet the following minimum requirements:

Tensile strength, wet, lbs.	120	ASTM D-1682
Elongation, wet, %	40	ASTM D-1682
Coefficient of Permeability, cm/sec	0.10	----------
Puncture strength, lbs.	80	ASTM D-751
Mullen burst strength, psi	250	ASTM D-3786

(b) Placement: The fabric shall be placed as shown on the Drawings, or as directed by the Engineer, so as to completely separate the existing subgrade from the fill or embankment. The fabric shall be lapped at its edges a minimum of 12-inches with the overlap made by the preceding roll in the direction of fill material placement. The edges between adjacent rolls of fabric shall be sufficiently overlapped to insure a permanent separation between existing soil subgrade and fill material placed above the fabric.

The placement of fabric shall immediately precede the placement of the fill, embankment material or gravel. Fabric shall not be left uncovered for more than 36 hours. Vehicles should not be permitted to pass over any uncovered fabric to prevent puncturing or other damage to the material.

(c) Manufacturers: Geotextile fabric shall be equal to SUPAC-4NP manufactured by Philips Fibers Corporation.

2.16 - BACKFILLING: Backfill carefully to restore the ground surface to its original condition. Dispose of surplus material.

(a) Backfill Under Roads: Compact backfill underlying pavement and backfill under dirt and gravel roads to 95% of the maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D 698).

(b) Initial: Place initial backfill material carefully around the pipe above bedding in uniform 6-inch layers to a depth of at least 18 inches above the pipe bell. Compact each layer thoroughly with suitable hand tools to 95% of the maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D698). Do not disturb or damage the pipe. Backfill on both sides of the pipe simultaneously to prevent side pressures. Initial backfill material is earth material excavated from the trench that is clean and free of rock, organics, and other unsuitable material. If materials excavated from the trench are not suitable for use as initial backfill material, obtain suitable materials elsewhere.

(1) Suitable soil material shall be those defined as suitable by the Unified Soil Classification System (USCS) in ASTM D-2487. This shall include materials outlined in soils class IA, II, and III and in general include inorganic sands, silts and clays.

(2) Unsuitable soil material shall be those defined as unsuitable by the Unified Soil Classification System (USCS) in ASTM D-2487. This shall include materials outlined in soils class IV, and V and in general shall include organic silts and clays, peat, muck or other highly organic soils.

(3) Granular Material, when used for backfilling of trenches, shall consist of a granular soil, sand, crushed stone, or mixture of these, all of which pass a 3/4-inch sieve, 80% of which pass a 3/8-inch sieve, and not more than 12% pass a No. 200 sieve. Material shall be free of organic matter and debris.

(4) Crushed Stone, when used for backfill of trenches, shall consist of sound, durable "crusher-run" rock, all of which passes a 2-inch sieve. Material shall be free of organic matter and debris.

(c) Final: After initial backfill material has been placed and compacted, backfill with general excavated material. Final backfill material shall not contain more than 1/3 broken rock, of which no single stone or boulder shall weigh more than 50 pounds. Place backfill material in uniform layers and thoroughly compact with heavy power tamping tools of the "Wacker" type. Areas not under pavement shall be compacted to a density equal to or greater than adjacent undisturbed earth. Trenches shall be tested as requested by the Engineer by qualified geotechnical personnel that he has approved prior to testing.

(d) Settlement: If trenches settle, refill and grade the surface to conform to the adjacent surfaces.

(e) Additional Material: Where final grades above the pre-existing grades are required to maintain minimum cover, additional fill material will be shown on the Drawings. Utilize excess material excavated from the trench if the material is suitable. If excess excavated materials are not suitable, or if the quantity available is not sufficient, provide suitable additional fill material.

2.17 - INSPECTION: Clean gravity sewers before requesting a final inspection. Where any obstruction is met, clean the sewers by means of rods, swabs, or other instruments. When requested by the Engineer, flush out lines and manholes before final inspection.

Pipe lines shall be straight and show a uniform grade between manholes. Inspection of sewers shall

include visual inspections and/or lamping. Correct any discrepancies discovered during inspection.

2.18 - TESTING: All tests shall be performed in the presence of the Engineer. The Contractor must advise the Engineer at least 48 hours before tests are to be conducted.

(a) HDPE Gravity Sewer Pipe: HDPE gravity sewer pipe shall be tested for deflection and water tightness. The cost for all testing shall be included in the unit price for the pipe.

Deflection tests on HDPE pipe shall be mandrel tests in accordance with ASTM D2122. Maximum allowable deflection shall be 5%.

The Contractor shall furnish all materials and labor to test the lines for deflection.

After installation and backfilling, all HDPE pipe shall be subjected to a low-pressure air test in accordance with "Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe" UNI-B-98, as published by the Uni-Bell PVC Pipe Association.

(1) The Contractor shall furnish all test equipment. Each test section shall be clean of debris and free of obstructions. After all openings have been plugged and adequately braced to withstand the test pressure, the internal pressure shall be raised to approximately 4.0 psi. When the pressure has stabilized at or above the minimum starting pressure of 3.5 psi, the test time shall be started. The time it takes for the internal pressure to drop 0.5 psi below the starting test pressure must exceed the minimum times shown in the following chart:

Test Time for Various Pipe Sizes

Pipe Size In Inches	Min. Time (min:sec)	Length for Min. Time (ft.)	Time for Longer Length (sec.)
4"	1:53	597	0.190L
6"	2:50	398	0.427 L
8"	3:47	298	0.760 L
10"	4:43	239	1.187 L
12"	5:40	199	1.709 L
15"	7:05	159	2.671 L
18"	8:30	133	3.846 L
24"	11:20	99	6.837 L
30"	14:10	80	10.683 L
36"	17:00	66	15.384 L

(2) All test equipment including control valves and test gauge shall be piped to the ground surface. As a safety precaution, no personnel will be allowed in manholes

adjacent to the test section during the time the test section is pressurized.

(3) Any line or segment of line failing to meet the test shall be repaired by the Contractor and then shall be retested. All visible leaks regardless of the size and regardless of the time of discovery (before or after the test) shall be repaired by the Contractor.

(4) The completed sewer shall be tested between manholes with lanterns or reflected light and must show a good clear view form manhole to manhole without obstructions. Any sewer showing deviation from line or grade, in the opinion of the Engineer, shall be repaired by the Contractor at his own expense.

(5) The Owner, at his own expense, shall have the option of conducting a television inspection of the complete or any portion of the completed gravity sewer. All defective material and workmanship, deformed or misshaped pipe, leaking or faulty joints and any undue deviation from line or grade shall be repaired by the Contractor at his own expense regardless of the results of the pressure test.

(b) Manholes and Wet Well: All precast concrete manholes and wet well shall be vacuum tested. The Contractor shall provide all necessary equipment to perform the tests. Manholes shall be vacuum tested after assembly, backfilling and installation of the frame and cover as follows:

(1) Plug pipes with suitably sized and rated pneumatic or mechanical pipeline plugs. Place plugs a minimum of 6" beyond the manhole wall and brace to prevent displacement of the plugs or pipes during testing.

(2) Position the vacuum tester head assembly to seal against the interior surface of the top of the cone section and inflate according to the manufacturer's recommendations.

(3) Draw a vacuum of 10" of mercury, close the valve on the vacuum line and shut off the pump.

(4) Measure the time for the vacuum to drop to 9" of mercury. The manhole shall pass when the time to drop to 9" of mercury meets or exceeds the following:

Manhole I.D., (inches)	48	60	72 & Larger
Time, (seconds)	60	75	90

(5) If the manhole fails the test, remove the head assembly, coat the manhole interior with a soap and water solution, and repeat the vacuum test for approximately

30 seconds. Leaking areas will have soapy bubbles. Make the necessary repairs and repeat the test until the manhole passes. The cost for all testing shall be included in the unit price for manholes and Pumping Station.

(c) HDPE Force main: When the force main is complete seal said force main at the receiving manhole and at the flange adapter outside the valve vault and fill the force main with water, bleed out all air and make a leakage test in accordance with the latest revision of AWWA C600.

(1) Preparation: Provide a test pump, an accurate water meter, and all other accessories required to make the test. Provide a corporation stop at each high point on the pipe to bleed off air. Provide and remove all temporary bulkheads, plugs, and flanges required to perform the pressure test.

(2) Test Pressure and Leakage: Test the pipe line at 150 psi measured at the lowest point. Leakage shall not exceed 0.11 gallons per hour per inch diameter per thousand feet. Test for a minimum of two hours. Test pressure shall not vary by more than 5+/- psi for the duration of the test.

When testing against closed gate valves, an additional leakage per closed valve of 0.0078 gallons per hour per inch diameter of nominal valve size shall be allowed.

If leaks are detected, locate, repair, and retest. If results are not totally satisfactory, the Engineer may require testing for a longer period of time.

All cost associated with the testing of the force main shall be included in the unit price for Pump Station.

2.19 – EROSION AND SEDIMENT CONTROL: The Contractor shall observe all local laws and ordinances in relation to erosion and sediment control as they pertain to this project. All erosion control plans and construction shall be in accordance with the "Manual for Erosion and Sediment Control in Georgia" latest revision, the State of Georgia Erosion and Sedimentation Control Act of 1975 as amended in 2000, and Best Management Practices. All erosion control measures shall be designed to effectively control erosion and sedimentation for all rainfall events up to and including the 25-year, 24-hour rainfall.

The Contractor shall designate one individual to be responsible for implementation and maintenance of erosion and sedimentation controls on a 24-hour, everyday basis if required. The Contractor shall furnish to the Engineer the individual's name, address and 24-hour telephone number and notify the Engineer of any updates as necessary.

All erosion and sedimentation control measures must be installed prior to the initiation of any construction activity. Additional erosion and sedimentation control devices shall be installed as needed, or as directed by the Engineer. In no case shall the Contractor be allowed to install more than 400 feet of gravity sewer line until site stabilization and cleanup have been completed along that section. In addition, sewer line trenches shall not be excavated more than 400 feet in advance of pipe laying operations.

The Contractor shall use all means necessary to control dust on and near the work and on and near all off-site borrow areas when dust is caused by the operations during performance of the work or if resulting from the condition in which the Contractor leaves the site. The Contractor shall thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors and concurrent performance of work on the site.

The costs of additional erosion and sediment control measures and devices that may be required due to failure of the Contractor to adhere to Best Management Practices in a timely manner shall be borne in full by the Contractor.

The City of Rome Public Works Division, Water and Sewer Division or Building Inspection Department shall have the right to stop work when erosion and sediment control measures are not being implemented in accordance with Best Management Practices. No claim will be allowed by the Contractor for cost of downtime of men and equipment associated with any shutdown of the Contractor's operations.

When directed by the Engineer, silt fence and other erosion control measures may be removed. All silt fence must be removed by hand. Any established vegetation disturbed by the removal of silt fence or other erosion control structures must be repaired and stabilized immediately.

2.20 – RIP RAP Rip Rap shall be dumped and handled into place to form a compact layer to the design thickness. Stone Rip Rap shall be placed into a thickness of not less than 12-inches and not more than 24-inches.

a) Materials All stone for rip rap shall be sound, durable pieces meeting the quality requirements of Class A or B coarse aggregate and shall be resistant to the action of air and water, and in all other respects suitable for use as rip rap. Materials not meeting these requirements shall not be used unless approved by petrographic analysis. Flat, slabby and shaley pieces are not acceptable. Stone for rip rap shall meet one of the following:

(1) TYPE 1: For severe drainage conditions or moderate wave action: The largest pieces of material shall have a maximum approximate volume of two cubic foot. At least 35% of the mass shall be comprised of pieces which weigh 125 pounds or more.

(2) TYPE 3: For general use normal drainage conditions: The largest pieces of

material shall have a maximum approximate volume of one cubic foot. At least 35% of the mass shall be comprised of pieces which weigh 15 pounds or more.

The remainder of Types 1 or 3 shall be well graded down to the finest sizes. Rock fines shall comprise a maximum of 10% of the total mass. Rock fines are defined as material passing a No. 4 sieve.

2.21 – SILT FENCE Silt Fence shall be installed as required by the Drawings.

a) Materials – Filter Fabrics shall be composed of strong rot-proof synthetic firers formed into a fabric of either the woven or nonwoven type. Either type of fabric shall be free of any treatment or coating which might significantly alter its physical properties after installation. The fabric shall contain stabilizers and/or inhibitors to make the filaments resistant to deterioration resulting from exposure to sunlight or heat. The fabric shall be a pervious sheet of synthetic fibers oriented into a stable network so that the fibers retain their relative position with respect to each other under normal handling, installation, and service conditions. Edges of the fabric shall be finished to prevent the outer yarn from pulling away from the fabric. Fabrics shall be free of defects or flaws which would significantly affect its physical and/or filtering properties. The fabric may be manufactured with pockets for posts, hems with cord, or with posts pre-attached using staples or button head nails. The manufacturer shall have either an approved color mark yarn in the fabric or label the fence with his company's name and product trade mane at a minimum of 100 foot intervals. During all periods of shipment and storage, the fabric shall be wrapped in a heavy-duty protective covering which will protect the cloth from sunlight, mud, dust, dirt, and debris. The fabric shall not be exposed to temperature greater than 140 degrees F.

(1) FILTER FABRICS FOR TYPE "A" AND "B" FENCES: Filer fabric used in the construction of Type "A" and "B" fences may be either the woven or nonwoven type. In the construction of woven fabrics silt tape yarns will be allowed in one direction (warp or fill) only.

(2) FILTER FABRICS FOR TYPE "C" FENCES: Filter fabric used in the construction of Type "C' fences shall be a non-calendared woven fabric constructed with monofilament yarns only.

Installation: Silt fence shall be installed in the locations as shown on the Drawings. A trench 4 to 6 inches in depth shall be excavated with equipment such as a trenching machine or motor grader; or if equipment cannot be operated on the site, by hand.

Post installation shall start at the center of the low point (if applicable) with the remaining posts spaced a maximum of 6 part for Types "A" and "B" and 4 feet apart for Type "C". Posts shall be

installed with at least 18 inches in the ground. Where an 18 inch depth is impossible to achieve, the posts shall be adequately secured to prevent overturning of the fence due to sediment loading.

2.22 – ABANDONMENT OF EXISTING PUMP STATION: The existing pump station shall be kept operational during construction to convey leachate from the LF to the City's sewer system during construction. The existing station will be taken off-line and undergo selective demolition upon completion of new pump station installation, testing, inspection and acceptance.

SECTION NO. 3

PROTECTION AND RESTORATION OF WORK AREA

3.01 - GENERAL: Return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is started.

3.02 - MAN-MADE IMPROVEMENTS: Protect, or remove and replace with the Owner's approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, and other improvements that may be encountered in the work.

3.03 - CULTIVATED GROWTH: Do not disturb cultivated trees or shrubbery unless approved by the Owner. Any such trees or shrubbery which must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.

3.04 - CUTTING OF TREES: Do not cut trees for the performance of the work except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stored over root system of trees within 30 days to allow proper natural watering of the root system. Repair any damaged tree over 3-inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the work area and disposed of by the Contractor. No stumps, wood piles, or trash piles will be permitted on the work site.

3.05 - STREAM AND DITCH CROSSING: Work near stream and ditch crossings shall be performed in a manner to minimize the effects of silt and erosion. All work shall be performed in accordance with Best Management Practices as set forth in the State of Georgia Erosion and Sedimentation Control Act. Clearing and excavation shall be kept to a minimum. At all points where banks of streams or drainage ditches are disturbed by excavation or where natural vegetation is removed, carefully compact backfill and place rip rap to prevent subsequent settlement and erosion.

This requirement applies equally to construction along the side of a stream or drainage ditch as well as crossing stream or drainage ditch. Place rip rap a distance of not less than 10 feet upstream and 10 feet downstream from any disturbed area. Extend rip rap from 1 foot below streambed to top of bank. Place to conform to the natural slope of the stream bank.

Use only one method, either (a) or (b), throughout the job.

(a) Stone Rip Rap: All stone for riprap shall be sound, durable pieces meeting the quality requirements of Class A or Class B course aggregate and shall be resistant to the action of air and water, and in all other respects, suitable for use as riprap as described in section 805 of the Georgia Department of Transportation Standard Specifications. All riprap shall be Type 3.

Imbed stone rip rap by hand so as to form a compact layer at least 12 inches thick. Place rip rap in such a way that the smaller stones are not segregated but evenly distributed. Place chinking stones in the crevices between the larger stones so that a dense, well-graded mass is produced.

(b) Sand-Cement Bag Rip Rap: Use cement sacks or burlap bags having a capacity of from 1 to 2 cubic feet. Do not use bags previously used for sugar or chemicals. Fill bags with a mixture of one part Portland Cement to five parts sand.

Imbed bags by hand to form a compact layer at least 12 inches thick. Place with over lapping joints. The finished surface shall not deviate from that specified by more than 3 inches at any point.

3.06 GRASSING: Prior to planting, top soil stockpiled from excavation, borrow areas, or obtained from other sources shall be placed on all areas to be grassed to a minimum depth of 4-inches. The finished surface shall present a smooth, uniform, loose, well-broken soil without large clods, rocks, roots, or other unsatisfactory materials. Top soil shall be defined as soil in its unaltered state as having a Ph range of 5.5 – 6.5 and containing more than 80 percent of the nutrients necessary for plants to produce sustainable growth.

NOTE: No separate payment shall be made for the placement of top soil, grassing, or sod, but shall be included in the Bid Item for Pumping Station.

NOTE: No separate payment shall be made for the incorporation of lime into soil to bring it into the required Ph range for classification as top soil, but shall be included in the Bid Item for Pumping Station.

Grass surfaces by hydro seeding with a mixture of fertilizer, seed, mulch, and water at the following rates:

Fertilizer (12-12-12)	1500 lbs/acre
Bermuda Seed	60 lbs/acre
Fescue Seed	200 lbs/acre
Mulching Material	1500 lbs/acre

Mulching material shall be Conwed-2000, Weyerhauser Silva Fiber, or equal.

3.07 - DISPOSAL OF RUBBISH: Dispose of all materials cleaned and grubbed during the construction of the project in accordance with the applicable codes and rules of the appropriate regulatory agencies, county, state and federal.

3.08 - PAYMENT: No additional payment shall be made for work required in this Section of the Specifications except as specifically set forth in the Bid. The cost of all labor, materials, and equipment required by the work shall be included in the unit price bid for the work to which it pertains.

SECTION NO. 4

CONCRETE WORK

4.01 - SCOPE: This section of the Specifications describes materials and equipment and requirements for their use in constructing all concrete work. The Contractor shall furnish all materials and equipment and perform all labor necessary to fulfill the requirements of these Specifications.

4.02 - GENERAL: Submit concrete design mix and shop drawings on reinforcing, admixtures, and curing compound for review prior to any work. Shop drawings with this information shall be submitted for all precast or cast-in-place concrete work.

All formwork, reinforcing, inserts, and other items to be built into the concrete work shall be correctly positioned, secured, inspected, and approved prior to placing concrete.

4.03 - MATERIALS: Materials for use in concrete work including admixtures, aggregates, cement, form material, reinforcing and water shall be in accordance with the following:

(a) Cement: All cement shall be one brand of Portland Cement. All cement shall be Type I and meet the requirements of ASTM C 150. One bag of Portland cement shall be considered to weigh 94 lbs.

(b) Aggregates: Aggregates shall conform to requirements of ASTM C 33.

(c) Water: Mixing water for concrete shall be fresh, clean and potable.

(d) Admixtures: For each one hundred pounds of cement the following amount of admixture shall be provided in accordance with the manufacturer's recommendations.

(1) For air temperatures below 70 degrees F., provide 3-6 ozs. of Master Builders Pozzolith 344-N (or 122-N) or 3-6 oz. of Monex Resources' Relcrete HW.

(2) For air temperatures above 70 degrees F., provide 3 oz. of Master Builders Pozzolith 300-R or 3 oz. of Monex Resources' Relcrete TR.

(3) An air-entraining admixture conforming to the requirements of ASTM C 260, Master Builder's MB-AE 10, Monex Resources' Air 30, or equal, shall be used in all concrete exposed to freezing temperatures. The air content of freshly mixed air-entrained concrete, as determined by the method of ASTM C 233, shall be not less than 3 nor more than 6 percent. The air-entraining admixture is in addition to the admixture specified in (1) or (2) above.

(e) Formwork:

(1) Form Material: Forms shall be of plywood or architectural type steel panel forms.

(2) Form Oil: Form oil shall be non-staining, solvent base type oil equal to Dura-Guard as manufactured by Standard Oil Company.

(3) Form Ties: Form ties shall have a minimum working strength of at least 3,000 pounds when fully assembled and shall be of the snap or break type with a water stop in the center. Ties shall be free of cones, washers or other devices which will leave a hole larger than 7/8 inch diameter in the exposed surface of the concrete. Ties shall be such that when forms are removed no metal shall be within 1-1/2 inches of the finished surface.

(4) Chamfer Strips: Chamfer strips shall be placed in forms for exposed edges of beams, slabs, and curbs. Chamfer strips shall have a minimum dimension of 3/4-inch.

(f) Reinforcing Steel: Reinforcing steel shall be properly supported and secured in position before concrete is placed.

(1) Reinforcement Bars: Bar reinforcing steel shall conform to the requirements of ASTM A 615 Grade 40.

The reinforcement shall be bent cold to the shapes indicated on the plans. This shall be done in the shop, before shipment, and not in the field, unless otherwise noted on the plans or directed by the Engineer.

(2) Wire Fabric: Wire fabric for concrete reinforcement, shall conform to the requirements of ASTM A 185.

(3) Bending: Hooks of 90 degrees shall have a radius of bend on the axis of the bar of not less than four bar diameters plus an extension of five bar diameters at the free end.

(g) Grout: Grout which is required by the Drawings or Specifications, and is not otherwise specified, shall be composed of equal parts of cement and sand. Grout shall have a maximum water:cement ratio of 5.0 U.S. gallons per 94 lb. bag of cement.

(h) Non-Shrink Grout: All grout shall be non-metallic, non-shrink type. Cement shall be Type III. Grout shall meet the following requirements:

Criteria	Test Method	Results

Workability	ASTM C-191	initial set time not less than 60 min.
Compressive Strength	ASTM C-109 (restrained condition)	1 day - 3,000 psi
Shrinkage	ASTM C-827 and CRD 588	no shrinkage after placement and no shrinkage after set.

Grout shall be mixed and placed in accordance with the recommendations of ACI, and the grout manufacturer's published recommendations.

Grout shall be equal to Five Star Grout manufactured by U.S. Grout Corporation.

(i) Epoxy Bonding Compound: Epoxy bonding compound shall be 100% solids with a minimum bond strength of 2100 psi at 14 days. Epoxy bonding compound shall be equal to Rezi-Weld 1000 by W.R. Meadows.

(j) Curing Compound: Curing compound shall be an acrylic based compound conforming ASTM C 309, Type I, Class B. The curing compound shall form a moisture impermeable film which retains a minimum of 95 percent of the mixing water beyond the required curing time. Curing compound shall be equal to Meadows Sealtight CS-309.

4.04 - PLACING AND FASTENING OF REINFORCING: Unless otherwise called for, installation practices of the American Concrete Institute shall be strictly followed.

All reinforcement shall be furnished in full length as indicated on the plans. No splicing of bars or wire, except where shown on the plans, will be permitted without permission of the Engineer.

Splices which are permitted shall have a lap of not less than forty times the diameter of the bar, unless otherwise shown. Splices shall be well distributed or otherwise located at points of low tensile stress.

4.05 - CONCRETE COMPOSITION: Concrete shall be proportioned by weight to give an ultimate compressive strength of 4,000 psi at 28 days when sampled and tested in accordance with ASTM C 31 and C 39. Concrete shall contain not less than 517 pounds of cement per cubic yard of concrete. Ready-mix concrete shall be mixed and transported in accordance with ASTM C 94.

4.06 - TESTING: Concrete for all structures, pads or slabs requiring over ten (10) cubic yards of concrete shall be tested. All testing shall be performed by an independent laboratory, selected by the Contractor, approved by the Engineer, and paid for by the Contractor.

(a) Required Tests: The following tests of materials and concrete are required to be conducted in accordance with the current ASTM Standards.

(1) Test Cylinders: Cylinders shall be made and cured in accordance with ASTM C 31. One set of five cylinders from the same batch of concrete shall be made for each days placing of concrete.

Two cylinders from each set shall be broken at 7 days and two at 28 days in accordance with ASTM C 39. The test results shall be the average of the strengths of the cylinders tested at 28 days. One cylinder shall be held as a spare to be broken at 56 days in the event that cylinders broken at 28 days do not meet specified values.

All sampling, molding, transporting, storing, curing, preparation for breaking, and testing of cylinders shall be the responsibility of the laboratory and shall be performed by qualified laboratory personnel. The Contractor shall supply wheelbarrows, shovels, mixing boards, and shaded area for molding cylinders, and similar equipment required by the laboratory representative for molding test cylinders.

(2) Slump Tests: At least two slump tests shall be made on each day that concrete is placed. One slump test shall be made at the time cylinders are made for compression tests. Tests shall meet ASTM C 143.

(b) Test Results: The laboratory shall send one copy of all reports to the Engineer, one copy to the Contractor and one to the ready mix plant. Concrete test reports shall include slump tests and state where the concrete was used in the structure.

4.07 - PLACING CONCRETE: Before concrete is placed, steel forms shall be uniformly coated with form oil and wood forms shall be thoroughly wetted.

Concrete shall be placed to avoid the segregation or separation of aggregates, and displacement of reinforcing.

All concrete shall be placed in daylight, and the placing of concrete in any portion of the work shall not be begun if such work cannot be completed during daylight.

Concrete shall not be placed when the atmospheric temperature is below 40 degrees F. If after placing concrete the temperature drops below 40 degrees F., the Contractor shall enclose, heat and protect the work in a manner to keep the air surrounding the fresh concrete at a temperature of not less than 45 degrees F. for a period of 5 days after concrete is placed.

Concrete shall be compacted by the use of mechanical internal vibrating equipment supplemented by hand spading. Vibrating shall not be used to transport concrete within forms. Internal vibrators shall maintain a speed of at least 5,000 impulses per minute when submerged in concrete.

Keys shall be formed in all construction joints as indicated on the Drawings and as directed by the Engineer.

4.08 - FINISHING: All exposed concrete surfaces shall be finished to 2 inches below finish grade. Concrete not exposed to view, therefore not specified to be finished, shall have rough edges tooled off and shall be pointed and spot finished to fill irregularities.

(a) Vertical Surfaces: When concrete has set sufficiently to permit, forms and form ties shall be carefully removed. All depressions resulting from removal of form ties and all other holes and rough places shall be thoroughly wetted with water and pointed with sand cement grout.

After pointed surfaces have set sufficiently to permit, all surfaces specified to be finished shall be kept wetted with water, and rubbed with a carborundum stone of medium fineness, or other equally good abrasive, to bring the surface to a smooth rubbed finish and to remove all form and tie marks.

(b) Slabs: After the concrete has been placed, struck off, consolidated and leveled, it shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared and the mix has hardened sufficiently that the weight of a man standing on it leaves only a slight imprint on the surface. The surface shall then be consolidated by handfloating with wood floats.

Immediately after the floating has been completed, exposed surfaces shall be given a coarse transverse scored texture by drawing a broom or burlap belt across the surface.

4.09 - CURING: A curing compound as previously specified shall be applied to all concrete surfaces except those which are to receive future concrete or mortar. The compound shall be applied in accordance with the manufacturer's recommendations.

4.10 - IMPERFECT OR DAMAGED WORK: Imperfect or damaged work, or any work damaged before final acceptance shall be satisfactorily removed and replaced in accordance with the requirements of the Drawings and Specifications. Removal and replacement of concrete work shall be done in such a manner that the strength of the structure will not be impaired.

4.11 - CLEANING: Upon completion of the work, all forms, equipment, protective coverings and rubbish resulting therefrom shall be removed from the premises. Finished surfaces shall be left in a condition satisfactory to the Engineer.

4.12 - PAYMENT: No separate payment shall be made for work required in this section of the Specifications except as specifically set forth in the Bid. The cost of all required work and all costs incidental thereto shall be included in the amount bid in the Bid for the item to which the work pertains.

SECTION 16000

ELECTRICAL

PART 1 GENERAL

1.01 DESCRIPTION

A. The work covered by this Section of these Specifications includes but is not necessarily limited to the following items of work:

1. Electrical service, distribution equipment and control equipment for pump station.
2. Coordination with utility for power and metering.

1.02 NOT USED

1.03 CODES AND PERMITS

A. All work shall be done in accordance with the 2014 Edition of the National Electrical Code, applicable local ordinances and regulations of local utility company. All permits and inspections certificates shall be paid for by the Contractor.

1.04 DRAWINGS

A. The drawings indicate the general arrangement of equipment. Install electrical work to suit field conditions.

B. Do not scale drawings. Dimensions required for layout of equipment hall be obtained from dimensioned plans unless specifically indicated on electrical plans.

1.05 CUTTING, PATCHING, EXCAVATING & BACKFILLING

A. All cutting and patching required to carry out the work shall be provided under other Specification Sections.

B. All excavation and backfilling required to install conduit shall be provided under this Section. Backfill shall be compacted as required under other Specification Sections.

1.06 MATERIALS

A. Materials specified by manufacturer's name shall be used unless substitution is allowed by a similar clause.

B. All materials shall be new and in accordance with applicable standards, i.e., Underwriters' Laboratories National Electrical Manufacturer Association (N.E.M.A.), Institute of Electrical and Electronic Engineers (I.E.E.E.), United States of American

Standards Institute (U.S.A.S.I.), U.L. approved equipment shall bear U.L. label. Similar material shall be the product of one manufacturer.

C. Materials of the same type shall be the product of one manufacturer.

1.07 SHOP DRAWINGS

A. The Contractor shall submit for review by the Engineer a complete schedule and data of materials and equipment to be incorporated in the work. Submittals shall be supported by descriptive material, such as catalogs, cuts, diagrams, performance curves, and charts published by the manufacturer, to show conformance to specification and drawing requirements; model numbers alone will not be acceptable. Complete electrical characteristics shall be provided for all equipment.

B. Submittals shall be made for each of the following items:

Material List	Circuit Breakers
Automatic Transfer Switch	Wiring Devices
Generator	Surge Protection
Level Control System	Light Fixture
Control Panel	Reduced Voltage Solid State Starter
Level Transducer	Float Switches

C. Each individual submittal item for materials and equipment shall be marked to show specification section and paragraph number which pertains to the item.

D. Prior to submitting shop drawings, review the submittal for compliance with the Contract Documents and place a stamp or other confirmation thereon which states that the submittal complies with Contract requirements. Submittals without such verification will be returned disapproved without review.

1.08 SERVICE

A. Electrical service shall be as follows, field coordinate the service with the Georgia Power. See plans for site specific requirements.

1. 3 phase, 4W, 480/277 Wye. Service shall be aerial originating in a weather head adjacent to a utility furnished service drop.

B. Meter sockets, conduit and conductors for metering shall be installed by the Contractor in accordance with the standards of the Utility Company. Coordinate installation of metering equipment with Utility Company to provide a complete metering system.

C. Provide surge protection at the service in accordance with IEEE 587 as shown on the drawings.

PART 2 - PRODUCTS

2.01 BRANCH CIRCUIT BREAKERS – DUPLEX PUMP CONTROLLER

A. Provide circuit breakers as an integral part of the duplex pump controller.

B. Branch circuit breakers shall be bolt-on, quick-make, quick-break, NEMA Rated thermal magnetic type. Three pole breakers shall be common internal trip. Tie handles are not acceptable. Breakers shall be ambient compensated type at 50 degrees C.

C. Each circuit shall be identified.

D. Provide an equipment grounding bar for termination of equipment ground conductors.

E. Minimum interrupting rating shall be as shown on the drawings.

F. Breaker shall be product of Eaton, Square D or GE.

2.02 DEVICES

2.03 DUPLEX RECEPTACLES shall be a NEMA 5-20R ground fault type installed within duplex pump control panel.

2.04 GROUNDING

A. Grounding conductors shall be green insulated copper.

B. Ground rods shall be 3/4 inch x 10 foot copperweld. Three ground rods shall be driven in a delta arrangement, 20 ft. apart. Top of ground rod shall be driven to 12" below finish grade.

2.05 CONDUIT SYSTEM

A. Provide complete conduit system including boxes, fittings, supports, etc. Conduits shall be rigid galvanized conduits above grade and schedule 80 PVC below grade, unless noted otherwise.

B. Transition from below grade PVC to above grade rigid shall be made with a rigid galvanized steel elbow and not a PVC elbow. Provide corrosion resistant tape over conduit passing through concrete.

C. Seal off fittings shall be O.Z. Gedney type EYS fittings with epoxy sealing compound.

D. Terminate conduits to enclosures with threaded hubs.

2.06 CONDUCTORS

A. Provide all conductors specified or required for proper operation of systems. Conductors shall be copper and shall be No. 12 AWG unless otherwise indicated. Use No. 12 Type THHN THWN conductor for AWG sizes No. 10 and smaller and Type THW for all other conductors and where indicated.

B. All conductors shall have size, grade of insulation, voltage and manufacturer's name permanently marked on the outer cover at regular intervals and shall be readable from all junction boxes and panels.

2.07 JUNCTION BOXES

A. Junction boxes shall be NEMA 4X stainless steel hinged door boxes, see drawing for required dimensions.

B. Furnish and install power terminal block for termination of pump power cables and terminal strip for termination of control conductors as required.

2.08 CIRCUIT BREAKERS

A. Circuit breakers shall be of the ampacity, class, and NEMA Rated as shown on the drawings, terminals shall be suited for 60 degrees C or 75 degrees C conductors. All separately mounted breakers shall be in NEMA 4X stainless steel enclosures. Breakers used for service disconnects shall be labeled as such. Factory installed ground terminals and neutrals (S/N) shall be provided in all enclosures. Breakers shall be Eaton, Square D or G.E.

2.09 SURGE PROTECTION

A. Surge protection shall be as indicated on the plans. Verify catalog number and ratings before ordering.

B. Provide manufacturers product data and connection diagrams.

2.10 REDUCED VOLTAGE SOLID STATE STARTER

A. Reduced voltage solid state starter shall be NEMA sized for use with the specific horsepower, three phase 460 volt squirrel cage induction motor indicated on the plans. The reduced voltage solid state starter shall be of the solid state type using SCR’s to provide reduced voltage starting with high starting torque and smooth stepless acceleration to full speed. Maximum motor in-rush current during starting shall be 250% of normal motor full load amps. Acceleration shall be set for 30 seconds from start to full voltage. Reduced voltage starter shall be mounted in the pump control panel.

B. Provide shorting contactor to remove SCR's from the system once the motor reaches full speed. The shorting contactor shall be NEMA rated. IEC contactors are not acceptable.

C. Current sensing for motor overload shall be electronic type set at 115% of normal motor full load amps. The electronic overload device shall allow for motor starting current up to 350% of motor full load amps for not more than 40 seconds. Overload beyond limits specified herein shall trip the motor control circuit in less than 1 Hz. The electronic current sensing device shall also provide phase imbalance protection to remove the motor from the line should voltage levels be unbalanced more than 7-1/2%. The control system shall also remove the motor from the line within 45 seconds should the motor become stalled for any reason.

D. Provide programmable controlled stop on torque ramp, 0.5 to 60 seconds.

E. Control power shall be 120 volts AC from the pump control panel. The electronic control shall contain pilot lamps to indicate the following:

1. Control Power On
2. Trip Condition Due to Load Unbalance.
3. Trip Condition Due to Overload or Locked Rotor

F. An oil-tight pilot lamp indicating motor running shall be mounted on the compartment door.

G. Provide products of Square D, GE or Eaton.

2.11 PUMPING STATION DUPLEX CONTROL PANEL

A. Pump Station panel shall be basic float/relay type controller. Panel type/design to be approved by City of Rome prior to control panel being ordered. Failure to obtain panel design approval by the City of Rome shall relieve the City of Rome from any financial obligation for payment of panel not approved by the City of Rome.

B. Furnish and install one duplex control panel housed in a NEMA 4X stainless steel enclosure with door-within-door construction for operation on 480 volt, 3 phase, 3 wire 60 hertz service.

C. For each pump motor there shall be included an individual motor circuit breaker, with a reduced voltage solid state (RVSS) starter, hand-off-auto selector switch, green running light and elapsed time meter and amp meter for Phase B. Provide slide block for each pump breaker pair. Provide door mounted pilot lamps for a high level alarm and phase failure/under voltage alarm. Provide alarm light mounted as shown on drawings. Provide 20 amp single pole breakers in control panel to serve auxiliary loads shown on the drawings. Provide phase failure/under voltage relay to deenergized motors and to provide signal alarm to SCADA radio. All components shall be NEMA rated.

D. Circuit breakers shall be precalibrated to match motors and control characteristics and factory sealed to ensure trip setting in tamperproof. A 24 volt control circuit transformer with disconnect and overload protection shall be included with an automatic electrical alternator for use with the level sensor function.

E. Note that only the 24 volt control voltage shall be ised in the wet well sensor circuits. The reminder of the contriols shall be designed to operate on 120 volt, 60 hertz, and single phase. The complete unit shall be completely tested and inspected at the factory prior to shipment. Complete electrical diagrams, dimensional drawings, and functional description shall be provided for approval by the Engineer.

F. Provide the following features and components in the control panel.

1. Control Requirements: Control operations shall be as follows
    a. The pump controller shall provide for duplex operation of the pump station. The pump controller shall be compatible with pumps operating with RVSS starters.
    b. The pump controller shall call for lead pump to start and stop, lag pump start and stop. The controller shall automatically alternate the pumps to equalize runtime on the two pumps.
    c. Following the complete pumping cycle, the controller shall automatically select the first lag pump from the previous cycle to be the lead pump in the next cycle.
    d. The controller shall accept a high-level float input that will cause a station alarm and call the two pumps to progressively start. The controller shall also accept a low-level float input that will cause a station alarm and stop all pumps in a controlled sequence.
    e. The civil engineer shall determine the required rate of decrease in the wet well level for pump speed reduction.
    f. Acceptable pump station duplex controllers:
        1) HydroRanger 200
    g. Acceptable pump station level probes:
        1) Ultrasonic Transducer
    h. Provide controls so all pumps do not operate 1 minute after transfer to emergency or to normal power. Set controls so only one pump can start at a time.
2. Components:
    a. Enclosure: The controls shall be mounted in a NEMA 4X stainless steel control panel. All control devices shall be mounted in the inner door. Motor circuit breakers and RVSS's shall be NEMA rated.
    b. Two Pump Alternator
    c. Elapsed Time Meters: Per pump required – door mounted.
    d. Hand – off – Auto switch per pump – door mounted.
    e. High level pilot lamp – door mounted.
    f. Phase failure/under voltage pilot lamp – door mounted.
    g. AMP Meter –B Phase-Door Mounted.

h. RVSS starters for each pump provided.
i. Motor Circuit breaker for each pump provided.
j. Protective relays and auxiliary relays. Relays shall be 8 or 11 pin round.
k. Terminals block for all connections.
l. Vaportight and waterproof alarm light with wire guard mounted as shown on drawings.

3. SCADA Points
   a. Provide the following points for transmission via the Owner's SCADA system. Provide a labeled terminal strip in the control panel for the following points:
      1) Voltage Phase – A
      2) Voltage Phase – B
      3) Voltage Phase – C
      4) Pump 1 Run
      5) Pump 2 Run
      6) Pump 1 Fail
      7) Pump 2 Fail
      8) High Water Level –Wet Well
      9) Generator Run
      10) Generator Alarm (Common)
      11) Generator Fail (Common)

      Coordinate generator alarm points with SCADA system. Provide serial/analog/digital interface as required.

PART 3 - EXECUTION

3.01 CONDUIT SYSTEMS

A. Exposed conduits shall be installed parallel or at right angles to structures.

Support exposed conduits at 5 foot intervals. Individual runs of conduits shall be supported by one hole conduit straps; groups of conduits shall be supported on Unistrut Channel with Uniclip Stainless Steel Conduit Supports.

B. Conduit supports devices, i.e., straps, channel, etc., shall be attached to structure with machine bolts on steel.

C. Rigid galvanized steel conduit shall be attached to sheet metal enclosures with threaded type hubs and shall only penetrate the enclosure bottom. All rigid conduit stub ups not attached to enclosures or attached to nonmetallic enclosures shall be terminated with insulated throat, grounding bushing.

D. All conduits installed below grade shall be schedule 80 PVC and shall be installed 24 inches below finished grade. Where conduits turn up provide rigid galvanized elbow.

E. Protect conduits against dirt, concrete, etc., with conduit plugs. Plug shall remain in place until all masonry is complete.

F. All conduits entering or exiting concrete shall be protected with two coats of 3M Scotchrap pipe primer and two overlapping layers of 3M Temflex 1100 tape.

G. All conduits entering electrical equipment from below grade and wet well shall be sealed at both ends with electrical putty.

3.02 CONDUCTORS

A. All conductors shall be color-coded as follows:

1. 230/120 volt single phase 3 wire system – Phase A: Black, Phase B; Red, Neutral; White
2. 480/277 volt three phase 4 wire system – Phase A: Brown, Phase B: Orange, Phase C: Yellow, Neutral: Grey
3. All ground conductors - Green

Branch circuits must be connected as indicated.

B. Splices in branch circuit conductors shall be made with Skotchlok insulated connectors, Ideal Wing Nuts, or Buchanan Steel Crimping Sleeves, and nylon caps. Splices in motor junction boxes, wiring troughs and splices in conductors larger than No. 8 AWG shall be made with split bolt connectors, taped with Scotch No. 88 Tape.

C. Only one conductor shall be installed under terminal of individual circuit breakers. Provide multiple conductor termination lugs when required.

3.03 EQUIPMENT CONNECTIONS

A. All equipment requiring electrical connections shall be connected under this section of these specifications. Where electrical connections to equipment requires specific locations, such location shall be obtained from shop drawings. Do not scale drawings for location of conduit stub-ups to serve specific equipment.

B. Electrical circuits to equipment furnished under other sections of these specifications are based on design loads. If actual equipment furnished has loads other than design loads, electrical circuits and protective devices shall be revised to be compatible with equipment furnished and in compliance with the National Electrical Code at no additional cost to the Owner.

C. Equipment furnished under other sections of these specifications to be connected under this section of the specifications shall consist of, but not be limited to, the following:

1. Pumping Station Equipment

D. The Contractors attention is directed to other sections of these specifications, where equipment requiring electrical service is specified, to become aware of the scope of work under this section of these specifications requiring electrical service and connections to equipment specified elsewhere.

3.04 GROUNDING

A. The neutral conductor shall be grounded to a ground rod system. The system grounding conductors shall be Bare Copper. Refer to the drawings and provide a conductor as required.

B. All non-current carrying parts of electrical equipment shall be grounded. The continuity of the ground shall be maintained using a green insulated grounding conductor installed in all raceways.

C. Ground rods shall be installed with the top of the rod 12 inches below finished grade. Connections to ground rods shall be made with chemical weld connections.

D. The grounding electrode conductor from the service bonding point to the ground loop shall be installed in Schedule 80 PVC conduit. The conductor shall not be exposed above grade or indirect contact with concrete.

E. Upon completion of the ground rod installation the Contractor shall record the ground reading. This ground reading shall not be taken within 48 hours of rainfall. Results of ground readings shall be forwarded immediately to the Engineer. Provide three rods minimum so that the resistance to ground is below 25 OHMS.

F. Grounding terminal of receptacles shall be grounded to grounding conductor and to outlet box with green insulated pigtail with 10/32 washer head machine screw.

3.05 SURGE PROTECTION

A. Surge protection equipment shall be mounted where shown on the drawings. Connections shall be made to the service entrance conductors with conductors as specified on the plans.

B. Grounding shall be provided in accordance with manufacturers recommendations and requirements.

3.06 EQUIPMENT IDENTIFICATION

A. All electrical equipment shall be identified.

B. Electrical equipment shall be identified by engraved nameplate(whit face/red core). Surface mounted equipment shall be identified on the outside cover. Equipment

operating on 480 volt system shall be identified with orange paint. Identify "Pump Control Panel", "Surge Protection Enclosure", and "Automatic Transfer Switch".

3.07 GUARANTEE AND TEST

A. Upon completion of the project all systems shall be tested for proper operation as directed by the Engineer or his representative. Equipment covers, i.e., panelboard, motor controls, etc., shall be removed where required for inspection of internal wiring. The Contractor shall furnish the personnel, tools and necessary equipment to inspect and test the system.

B. Where ground readings are required, the Contractor shall provide a typewritten copy of certification of ground reading. Data shall indicate date readings were taken and lowest resistance recorded.

C. All systems and component parts shall be guaranteed for one year from date of final acceptance of the completed project. Defects found during this guarantee period shall be promptly corrected at no additional cost to the Owner.

3.08 MEASUREMENT AND PAYMENT

A. All measurement and payment for work included in this Section of the Specifications shall be in accordance with the Measurement and Payment section of the specifications.

END OF SECTION

SECTION 16210

ENGINE DRIVEN EMERGENCY POWER SUPPLY SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. The work required under this section of the specifications consists of the installation of the complete Engine Driven Emergency Power Supply System. All materials and devices which are an integral part of this system shall be provided under this section of the specifications.

B. Definition: The Emergency Power Supply System (EPSS) shall consist of one or more engine driven generator sets, each of which contains an engine directly coupled to an electric generator, together with the necessary switchgear, controls, accessories, transfer devices, and fuel supply to provide electric power for the duration of any failure of the normal power supply.

1. Automatic Transfer Switch (ATS): An automatic transfer switch is self-acting equipment for transferring one or more load conductor connections from one power source to another.

1.03 QUALITY ASSURANCE

A. The following specifications and standards are incorporated into and become a part of this specification by reference.

1. National Fire Protection Association (NFPA):
   a. NFPA-37 Combustion Engines
   b. NFPA-70 National Electrical Code
   c. NFPA-110 Emergency and Stand-By Power Systems
2. Electrical Generating Systems Association (EGSA) Standards:
   a. EGSA CEP2 Codes for Emergency Power by States and Major Cities
   b. EGSA GTD3 Glossary of Standard Industry Terminology and Definitions
   c. EGSA ECB1 Performance Standard for Engine Cranking Batteries
   d. EGSA TSS1 Performance Standard for Transfer Switches for use with Engine Generator Sets
   e. EGSA BCES1 Performance Standard for Battery Chargers

f. EGSA ICAE1 Performance Standard for Electric Generator Set Instrument Control and Auxiliary Equipment

3. Institute of Electrical and Electronics Engineers (IEEE) Standards:
   a. IEEE 446 IEEE Recommended Practices for Emergency and Standby Power Systems
   b. IEEE 472 Voltage Surge Withstand Capabilities
4. National Electric Manufacturers Association (NEMA) Standards:
   a. MG-1 Motors and Generators
   b. ICS1-109 Test and Test Procedures for Automatic Transfer Switches
   c. ICS2-447 A.C. Automatic Transfer Switch
5. Underwriters Laboratories Inc. (UL) Publications:
   a. UL 1008 Automatic and Non-Automatic Transfer Switches
6. American National Standards Institute (ANSI):
   a. C37.90a Voltage Surge Withstand Capability

B. Acceptable Manufacturers: Products of the following manufacturers, which comply with these specifications, are acceptable:

1. Engine Driven Generator Sets:
   a. Cummins N-Power
   b. Catapillar
   c. MTU
   d. Kohler
2. Transfer Switches:
   a. Kohler Model KCP with MPAC 1200 controller
   b. ASCO 7000 Series
   c. Cummins OTPC Series

C. Equipment Dimensions:

1. Dimensions indicated on the drawings are maximum allowable and shall not be exceeded. Where equipment of acceptable manufacturers listed exceeds the maximum dimensions, products of such manufacturers shall not be acceptable.

D. Coordination:

1. Review shop drawings submitted under this and other sections, as well as other divisions, to insure coordination between work required among different trades. Coordinate the installation sequence with other contractors to avoid conflicts and to provide the fastest overall installation schedule. Coordinate installation with architectural and structural features, equipment installed under other sections of the specifications, and electrical equipment to insure access and to insure clearance minimums are provided.

1.04 SUBMITTALS

A. Refer to the SHOP DRAWINGS, PRODUCT DATA AND SAMPLES Section for required procedures.

B. Manufacturer's Product Data:

1. Submit material specifications and installations data for products specified under Part 2 - Products to include:
   a. Engine driven generator sets
   b. Transfer switches

C. Shop Drawings: Submit shop drawings to indicate information not fully described by the product data to indicate compliance with the contract drawings. Submittals containing less than the information listed below will be rejected.

1. Shop drawings for the engine driven generator sets shall contain not less than the information listed as follows:
   a. Certification that the engine driven generator set(s) furnished will serve electrical loads indicated including motor starting loads with type(s) of starting indicated. Provide computer generator load analysis report.
   b. Continuous and stand-by rating of engine driven generator set(s) including voltage and phase.
   c. Frequency and voltage regulation with maximum instantaneous voltage dip and time of recovery to stable operation.
   d. Output voltage adjustment range in percentage of rated plant voltage.
   e. Alternator type and method of connection to prime mover.
   f. Components contained in alternator instrument panel.
   g. Rating of engine at operating speed, engine cycle and number of cylinders.
   h. Type of engine lubrication system and verification of components specified.
   i. Type of engine governor.
   j. Components contained in engine instrument panel.
   k. Fuel consumption at rated load.
   l. Starting batteries including ampere hour rating.
   m. Verification that all accessories specified are to be provided. This includes cold weather starting aid with rating and voltage indicated, exhaust system with muffler type indicated, and outdoor housing (where applicable) with verification of space available within housing for batteries.
   n. Line and machinery constants of the generator furnished.
2. Shop drawings for the transfer switch shall contain not less than the information listed as follows:
   a. List of accessories contained in the control panel.
   b. Withstand rating in RMS symmetrical amperes.

D. Quality and Service:

1. All materials and parts of the EPSS shall be new and unused. Each component shall be of current manufacture from a firm regularly engaged in the production of such equipment. Units and components offered under these specifications shall be covered by the manufacturer's parts and labor warranty for a minimum of five years from date of Owner acceptance of the project on a new machine, a copy of which shall be included in the shop drawings submittal.
2. Submittals will be accepted only on engine driven generator sets and transfer switches which can be properly maintained and serviced without requiring the Owner to stock spare parts or wait longer than twenty-four hours for service. Submittals shall include the nearest location of permanent parts outlet from which parts may be obtained and written assurance that trained service personnel will be available on twenty-four hour's notice. Units with service centers more than 50 miles from project site will not be accepted.

E. Record Drawings

1. Include in each set one set of operating, maintenance, and parts manuals covering all components for the EPSS. Each supplier shall provide instructions to the Owner in operation and maintenance of his equipment, both in written form and with on-site personnel for a minimum of eight hours.
2. A schedule of each motor, indicating actual horsepower and means of starting, connected to the EPSS shall be provided to the Owner with the record drawings.

PART 2 PRODUCTS

2.01 ENGINE DRIVEN EMERGENCY POWER SUPPLY (EPS)

A. Engines

1. The engine driven emergency power supply (EPS) shall be an internal combustion natural gas driven prime mover. The generator set shall have the following characteristics:
   a. 125 KW Capacity (minimum*)
   b. 156 KVA Capacity (minimum*)
   c. 480Y/277 Volts
   d. 60 Hertz
   e. 0.8 Power Factor
   f. 3 Phase
   g. 4 Wire

   Maximum one-step load at 0.8 P.F. is KW in step, the load to be served by this generator set consists of 7.5 KVA non-inductive load plus 70 HP total motor horsepower. The motors shall be started as shown in the following table:

Sequence	HP	Code Letter	Starting Method

1. 1 7.5KVA
2. 2 35hp (39A) F RVSS
3. 3 35hp (39A) F RVSS

* The generator shall be capable of starting and running the loads as shown. Maxim voltage dip is 20%.

2. The rated net horsepower of the engine at the generator synchronous speed, with all accessories, shall not be less than that required to product the KW specified in paragraph 1 above. The horsepower rating shall take into account generator efficiency and all accessory losses such as fans, battery charger, etc. The generator set shall be capable of producing the specified KW (without overload) for the duration of the power outage, under the following ambient conditions:
   a. Altitude: 500 feet above mean sea level.
   b. Air temperature at engine intake: 104 degrees F.
   c. Humidity Range: 25 - 95 %.
3. Included with the shop drawing submittal shall be the manufacturer's estimate of supply fuel and oil consumption for the engine. The engine shall have an oil filter with replaceable elements and a lube oil cooler.
4. The engine shall be equipped with a suitable governor (engine speed control) to maintain frequency within limit specified below by controlling engine and generator speed. Manufacturer shall indicate in submittal data whether mechanical, hydraulic, electrical, or hybrid governors are provided.
   a. Type: Droop - ±1/4% maximum
   b. Stability: ±1/2% maximum steady state frequency variation at any constant load from no load to full load.
   c. Regulation: 5% maximum frequency deviation between no-load steady state and full load steady state.
   d. Transient: 3 seconds maximum recovery time for maximum motor start.
5. The engine shall be electric start, provided with a solenoid energized motor with either positive engagement or clutch drive to the engine.

   The engine starting batteries shall be sealed lead-acid recombination type. Batteries shall be rack mounted inside the weatherproof plant housing to minimize the distance from the batteries to the starter.

6. A float type battery charger, compatible with the batteries selected, shall be furnished at the engine which shall maintain the starting batteries at full charge. The charging system shall permit charging from either the normal or the emergency power source. It shall have an equalize rate and a float rate charging system. An ammeter and voltmeter shall indicate the charge rate and the circuit shall be protected by either fuses or circuit breakers. The charger or charging circuit shall be so designed that it will not be damaged during the engine cranking cycle, for example, by a current limiting charger or a crank disconnect relay. It shall also be capable of recharging a discharged battery in

12 hours while carrying normal loads. The charger shall be equipped with alarm relays as required for remote annunciation equipment. Provide stranded wire between battery charger and termination points on the generator. Terminate with Stacon connectors.

7. The engine shall be liquid cooled. The type of liquid cooling system shall be unit mounted radiator - consideration shall be given for air temperature rise across the engine in addition to ambient. Minimum capacity shall be rated for 100°F. minimum engine ambient temperature plus air temperature rise across the engine.
    a. Provide an electric heater, thermostatically controlled, in the engine coolant system as a cold weather starting aid. Heater shall be for operation on 120 or 230 volt single phase A.C. for 1500 watt units and shall be permanently connected to a circuit from the pump station electrical system. Heater shall maintain 70°F. to 90°F. Provide isolation valves or quick-connect couplings to isolate heater.
8. Air Supply/Exhaust System
    a. Cleaner: An air cleaner and silencer shall be furnished, located and mounted as recommended by the engine manufacturer.
    b. Exhaust: An exhaust system of suitable size, configuration, and material in accordance with engine manufacturer's recommendations shall connect the exhaust outlet of the engine to a silencer. The type of silencer shall meet the requirements of engine manufacturers and shall be commercial. The silencer shall be located on top of the outdoor enclosure.
    c. The exhaust system including silencer shall be of such size that back pressure on the system will not exceed the back pressure permitted by the engine manufacturer's recommendation. A flexible connection shall be mounted at the engine exhaust outlet and the discharge end shall be protected against entry of precipitation. Piping and silencer within reach of personnel or with 8'-0" of finished floor or grade shall be protected by screening and shall be insulated with two inches of calcium silicate insulation with aluminum jacket. All exhaust piping shall be gas tight. Exhaust shall exit vertically.
9. The engine instrument panel shall be mounted at the engine and shall contain the following:
    a. Oil pressure gauge to indicate lubricating oil pressure.
    b. Temperature gauge to indicate cooling medium temperature.
    c. Hour meter to indicate total actual running time.
    d. Battery charging meter to indicate satisfactory performance of battery charging means.
    e. Other instruments as recommended by the manufacturer for proper maintenance.

B. Generator

1. The generator shall be an engine-driven single or two bearings type, synchronous, brushless, conforming to applicable standards. It shall be connected to the engine flywheel by means of a flexible type coupling for single bearing generators and elastic coupling for two bearing generators.
2. The generator shall be rated for 40°C. ambient. Class of insulation shall be NEMA Class F. The voltage regulation shall be plus or minus 2% from no load to full load with plus or minus 5% speed change and a 15°C. rise in ambient. The generator voltage dip from no load to full load shall not exceed 20%.
3. The generator shall be capable of sustaining at least 250% of rated current for at least ten (10) seconds under a three phase symmetrical short by inherent design or by the addition of an optional current boost system. A resettable line sensing circuit breaker shall be furnished which protects the generator from damage due to its own high current capability. This breaker shall not trip within the ten seconds specified above to allow selective tripping of downstream fuses or circuit breakers under a fault condition.
4. The generator shall be a permanent-magnet type generator.
5. Provide 120 volt condensation heater with thermostat.

C. Voltage Regulation

1. The generator shall be equipped with a volts-per-hertz type voltage regulator to maintain voltage within limits specified below:
   a. Stability: ±2% maximum voltage variation at any constant load from no load to full load.
   b. Regulation: 4% maximum voltage deviation between no load steady state and full load steady state.
   c. Transient: 30% voltage dip or overshoot on one-step application or removal of 0.8 power factor full load.
   d. Transient: 3% seconds maximum voltage recovery time with application or removal of 0.8 power factor full load.

D. Generator full main line circuit breaker.

1. A main line circuit breaker shall be supplied to protect the generator and controls from overloads and/or short circuits in the load. It shall be rated as indicated on the drawings. Interrupting current shall be 14000 amps RMS minimum. Breakers shall comply with UL 489 and NEMA AB-3.

E. Start and Stop Controls

1. Automatic starting and stopping controls shall be furnished to start the engine automatically when the normal electrical power fails or falls below specific limits and to stop the engine automatically after the normal power supply resumes. The signal for starting or stopping the engine shall be sensed through an auxiliary contact in the automatic transfer switch. The controls shall be capable of operating at 50% of normal DC system supplied voltage.

2. The cranking cycle shall be initiated by manual start, loss of normal power at the transfer switch, clock exerciser, or the manually operated test switch at each ATS.
3. Crank control and the time delay relays shall provide a minimum of 4 crank attempts of at least 7 seconds each, separated by appropriate rest periods. A sensing device shall automatically disconnect the starting circuit when the engine has started. If the engine has not started at the completion of the starting program, the overcrank signal shall indicate. The engine starting controls shall be locked out and no further starting attempts shall take place until the overcranking device has been manually reset.
4. A selector switch shall be incorporated in the automatic engine start and stop controls. It shall include an "off" position that prevents manual or automatic starting of the engine; a "manual" position that permits the engine to be started manually by the pushbutton on the control cabinet and run unloaded; an "automatic" position that readies the system for automatic start or stop on demand or the automatic load transfer switches or of the programmed exerciser.
5. A remote manual stop station similar to a weatherproof break-glass station shall be provided mounted on the face of the automatic transfer switch and shall be tied into the engine controls to stop the engine when activated. Provide laminated plastic label with 1/4" minimum engraved letters to read "EMERGENCY GENERATOR SHUTDOWN". Background to be red and core to be white.

F. Instrumentation

1. Local engine control and safety panel shall be provided, containing the following:
   a. Automatic remote start capability.
   b. "Manual-Off-Auto" switch.
   c. Controls to shut down and lock out the prime mover under the following conditions: failure to start after specified cranking time, overspeed, low lubricating oil pressure, high engine temperature, operation of remote manual stop station.
   d. Battery powered individual alarm indication to annunciate visually at the control and safety panel the occurrence of any condition itemized below; contacts or circuits for a common audible alarm signaling locally. Test switch shall be provided to test the operation of all lamps.

Indicator Function	Level 1	
(At Battery Voltage)	C.V.	S
i. Overcrank	X	X
ii. Low Water Temp.< 70°F (21°C)	X	X

iii.	High Engine Temp.Pre-alarm	X	
iv.	High Engine Temp.	X	X
v.	Low Lube Oil Pressure Pre-alarm	X	
vi.	Low Lube Oil Pressure	X	X
vii.	Overspeed	X	X
viii.	EPS Supplying Load	X	
ix.	Control Switch Not In Auto Pos.	X	
x.	Battery Charger Malfunctioning	X	
xi.	Low Voltage in Battery	X	
xii.	Lamp Test	X	
xiii.	Contacts for Local & Remote Common Alarm	X	
xiv.	Audible Alarm Silencing Switch		
xv.	Emergency Stop	X	X

Key:

C.V. -- Control Panel-Mounted Visual Indication
S -- Shutdown of EPS
X -- Required

e. Controls to shutdown the prime mover upon removal of initiating signal or manual emergency shutdown.
f. A.C. voltmeter with selector switch off position and positions for phase to phase and phase to neutral.
g. A.C. ammeter with selector switch with positions for each phase.
h. Frequency meter -- digital electronic type.
i. Voltage adjusting rheostat to allow plus or minus 5% voltage adjustment.
j. Manual reset circuit breaker.
k. Water temperature gauge.
l. Manual stop/start control.
m. Elapsed time meter.
n. Panel lights.
o. Indicator lights for signals from engine instrument panel.
p. Light to indicate switch has been left in the "off" position.

2. All instruments, controls, and indicating lights shall be properly identified. All wires shall be individually identified and must agree with the wiring diagram provided. All wiring shall be harnessed or flexibly enclosed. Terminals on all

terminal blocks shall be individually identified. All instrumentation must be isolated from engine generator set vibration.

G. Enclosures and Connections:

1. All electrical enclosures, i.e, terminal cabinets, wireways, circuit breaker enclosures, etc., shall be of adequate size to provide minimum bending radii as required by the NEC for the size conductor actually terminated within or passing through the enclosure.
2. All factory provided enclosures shall have gasketing and finish appropriate for the environment in which the unit is to be mounted. All wiring, wiring harness, etc., shall be protected from the elements, such as direct sunlight, moisture, etc. or shall be UL listed for direct exposure to the applicable elements. Include written documentation of the above with the shop drawing submittal.

H. Provide flexible fuel connections at supply piping. Flexible hoses shall be steel reinforced type. Provide solenoid valve in series with gate valve in supply line. Solenoid valve shall be powered from generator batteries and shall be open only when generator is running.

2.02 TRANSFER SWITCH(ES)

A. Transfer switch(es) shall be rated at not less than as indicated on the drawings at rated voltage. Transfer switch(es) shall be rated and marked for total system load.

B. Transfer switch(es) serving three phase four wire loads shall be four pole. Provide programmed transition type switch with intermediate position.

C. Transfer switch(es) shall be the automatic type with molded case device power contact assemblies.

D. Transfer switch(es) shall be mounted on the equipment backboard in a NEMA 4X stainless steel enclosure. Enclosure shall have hinged door with three point latching and provisions for pad locking.

E. Operation shall be inherently double-throw whereby all contacts move simultaneously. Electrical spacing shall be equal to or exceed those listed in Table 15.1 of UL-1008. Only those main contact structures specifically designed for transfer switch service shall be acceptable. An overload or short circuit shall not cause the switch to go to a neutral position. A manual operating handle shall be provided. All main contacts shall be silver alloy type protected by arc quenchers and, for switches rated 600 amps and larger, by arching contacts. Operating transfer time shall be 1/15 second or less on switches rated below 600 amps. The transfer sequence shall be “Open Transition”.

F. All switch and contacts, coils, springs and control elements shall be removable from the front of the transfer switch without removal of the switch panel from the enclosure and without disconnecting power conductors or drive linkages. Control and sensing relays shall be continuous duty industrial type with minimum contact rating of ten amps.

G. Transfer switch shall be rated to withstand in RMS symmetrical amperes not less than the available symmetrical RMS amperes when protected by the circuit protective device on the line side of the transfer switch. Withstand rating of switch shall be based on switch contacts not welding under fault conditions.

H. The switch shall be rated for service entrance.

I. The control panel for each automatic transfer switch shall contain the following accessories and Features.

1. ATS Control Panel
    a. The automatic transfer switch(es) shall provide a control panel mounted into the front of the switch. This control panel shall display source condition information including:
    b. AC voltage for each phase of normal and emergency source. All three phases shall be displayed on a single screen for viewing of voltage balance and on 4-wire systems, line to neutral voltage shall be displayed for each phase.
    c. Frequency of each source.
    d. Display source status including indication whether source is/is not connected.
2. The ATS control panel shall allow the operator to make adjustments to and/or set nominal voltage and frequency of the ATS, frequency sensor operation set points, time clock functions, and load sequence functions. The operator may also enable/disable ATS functions, set up exercise and load test operation conditions, normal system time delays for transfer, time delay to start, stop, transfer and retransfer. These parameters may only be accessed following password input from the authorized operator.
3. The display shall include real time clock data, including date, time (HH:MM:SS) and log total operating hours for the control system.
4. The display shall include a service history for the ATS and a fault history on the ATS.
5. Adjustable 0.5 to 6 second time delay on starting of EPS to override momentary power dips and interruptions of the normal services. Time delay shall be factory set at 1 second.
6. Time delay on transfer to emergency adjustable from 0 to 60 seconds, factory set at 0 seconds.
7. Test switch on enclosure door to simulate failure of the normal power source. ATS shall transfer load to the EPS.

8. Push button to bypass time delay on re-transfer to normal.
9. Close differential voltage sensing shall be provided on all phases of the normal power supply. The pickup voltage shall be adjustable from 85% to 100% of nominal and the dropout voltage shall be adjustable from 75% to 98% of the pickup value. The transfer to emergency will be initiated upon reduction of normal source to 85% of nominal voltage and re-transfer to normal shall occur when normal source restores to 95% of nominals.
10. Independent single phase voltage and frequency sensing of the emergency source. The pickup voltage shall be adjustable from 85% to 100% of nominal. Pickup frequency shall be adjustable from 90% to 100% of nominal. Transfer to emergency upon normal source failure when emergency source voltage is 90% or more of nominal and frequency is 95% or more of nominal.
11. A time delay on re-transfer to normal source. The time delay shall be automatically bypassed if the emergency source fails and normal source is available. The time delay shall be field adjustable from 0 to 25 minutes and factory set at 15 minutes.
12. An unloaded running time delay for emergency generator cool-down, factory set at 5 minutes.
13. Provide adjustable timed intermediate position in both directions.
14. Pilot light for indicating switch in normal position (include fuses and auxiliary contact).
15. Pilot light for indicating switch in emergency position (include fuses and auxiliary contact).
16. An exerciser for exercising standby power plant on a weekly basis shall be provided in the transfer switch. Exerciser shall be set to exercise standby plant for one half hour per week under load. Time of plant exercise shall be set in field. Exerciser timer shall have reserve power back-up, either by battery or spring-wound clock, to ride through power outages to the switch.
17. Auxiliary contact (gold plated) which closes when normal source fails. (Closed after override delay of 0.5 to 6 seconds).
18. Auxiliary contact (gold plated) which opens when normal source fails. (Opens after override delay of 0.5 to 6 seconds).
19. Auxiliary contacts on same shaft as main contacts (closed on normal.)
20. Auxiliary contacts on same shaft as main contacts (closed on emergency).

2.03 FUEL SUPPLY

A. Provide propane vapor service to the generator. Coordinate with the City of Rome's designated vendor. Tanks and piping by vendor.

PART 3 EXECUTION

3.01 EPS INSTALLATION

A. The plant shall be anchored to a concrete base whose overall dimensions shall exceed the outside dimensions of the plant base by 12" in each direction. Base depth shall be 12". Reinforce base with No. 5 bars 12" on center in both directions. Use not less than 6-3/4" galvanized anchor bolts.

B. The plant shall be on a welded steel base with a minimum of six vibration isolators, with two each located under the generator mounting, the engine front support, and midway between front and rear mounts, on each side of the steel base. Isolators shall consist of steel springs designed specifically for this application, mounted on rubber plates to block high frequency vibrations.

C. Provide a laminated sign at the service entrance equipment indicating type and location of on-site emergency power sources.

D. For exterior installations, the EPS shall be provided in outdoor, weatherproof housing with removable panels for access to equipment. Provide aluminum, sound attenuating (71 dBa), weatherproof housing. The starting batteries shall be rack mounted within the housing. Furnish service light and switch within weatherproof housing.

E. Extend 120 volt emergency power circuits for battery charger and cold weather starting aids from the building wiring system.

3.02 TRANSFER SWITCH INSTALLATION

A. Wall mounted transfer switch(es) shall be installed with top of switch no more than seven feet above finished floor. Locate transfer switch(es) to provide working clearance and full accessibility as required by the National Electrical Code.

B. Lace and group conductors installed in transfer switch with nylon tie straps. Only one conductor shall be installed under terminals. Form and train conductors in enclosure neatly parallel and at right angles to sides of box. Uninsulated conductor shall not extend beyond one-eights inch from terminal lug. Conductors shall be installed such that no stresses are transferred to terminal lugs.

C. Mounting and Support

1. Mounting
    a. Enclosure shall be secured to structure by a minimum of eight (8) fastening devices. A 1.5 inch minimum diameter round washer shall be used between head of screw or bolt and enclosure.

b. Enclosures shall be mounted where indicated on the drawings or specified herein. Support from the structure with fastening device specified.
c. Attach enclosure directly to masonry, concrete, or wood surfaces.
d. Mount enclosure on metal channel (strut), which is connected to structure with fastening device specified, for installations on steel structure, sheet metal equipment enclosure, or sheet rock walls.
e. Where enclosure is not indicated on a wall or structure, construct a metal channel (strut) free standing frame secured to floor, pad, or other appropriate building structure. Refer to the detail on the drawings for frame installation and construction information.
f. Do not splice conductors in enclosure. Where required, install junction box or wireway adjacent to transfer switch and splice or tap conductors in box. Refer to number of conductors in a conduit limitation defined in the WIRES AND CABLES section of the specifications and do not exceed.
g. Conductors not terminating in transfer switch shall not extend through or enter transfer switch enclosure.
h. Install push-in knock-out closure plugs in any unused knock-out openings.
i. Cleaning and Adjustment
    1) After completion, clean the interior and exterior of dirt, paint and construction debris.
    2) Touch up paint all scratched or marred surfaces with factory furnished touch up paint of the same color as the factory applied paint.

3.03 TESTING

A. Submit verification letter to Engineer indicating successful completion of sequence of operations testing and certification that all functions are operational. Letter to request load testing approval and schedule of proposed test. Prior to load test, written approval must be provided by Engineer. Representatives of the generator and transfer switch shall be present. The local authority having jurisdiction shall be given advance notification of the time of the final test in order that he may witness the tests.

B. A failure of any test or any component during a test will require a complete retest program at no additional cost to the Owner.

C. Provide all fuel, lubricants and other consumables for testing.

D. An on-site acceptance test shall be conducted as a final approval test for all Emergency Power Supply Systems.

1. The test shall be conducted after completion of the installation with all EPSS accessory and support equipment in place and operating.

2. Test Results. The EPSS shall perform within the limits specified for Level I installation per NFPA-110.

3.04 SPARE PARTS

A. At least three sets of an instruction manual(s) for all major components of the EPS shall be supplied by the Manufacturer(s) of the EPS and shall contain:

1. A detailed explanation of the operation of the system.
2. Instruction for routine maintenance.
3. Detailed instructions for repair of the EPS and other major components of the EPS.
4. Pictorial parts list and part numbers.
5. Pictorial and schematic electrical drawings of wiring systems, including operation and safety devices, control panels, instrumentation and annunciators.

END OF SECTION

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