PROJECT MANUAL FOR

SANITARY SEWER LIFT STATION TO SERVE SUNRISE SUBDIVISON

Project No. 23.008.03

City of Margaret, Alabama

October 2023

PREPARED BY:

HagerCo, LLC
1025 Montgomery Highway, Suite 110
Birmingham, AL 35216
keithlhager@icloud.com

PROPOSAL

MADE BY _____

ADDRESS _____

TO: Margaret Water & Sewer
825 Woodland Cir
Odenville, AL 35120

The undersigned, as Bidder, proposes and agrees, if this Bid is accepted, to enter into a Contract with:

Margaret Water & Sewer

in the form of Contract specified and shown in the attached Contract Documents, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation, and labor necessary to complete the construction of the work described in the Advertisement for Bids and in the Contract Documents attached hereto, which are hereby referred to and made a part hereof to the same extent as if fully set out herein, and in full and complete accordance with the shown, noted, described and reasonably intended requirements of the Plans, Specifications, and Contract Documents, to the full and entire satisfaction of the Owner, and with a definite understanding that no money will be allowed for extra work except as set forth in the attached Instructions to Bidders, General Conditions, and other Contract Documents, for the following lump sum and/or unit prices:

Taylors Cove Subdivision - UNIT PRICES FORM

1.1 BID INFORMATION

A. Bidder: _____.

B. Project Name: **Pump Station to Serve Sun Rise Subdivision**

C. Project Location: Margaret, Alabama

D. Owner: City of Margaret, Alabama – Water & Sewer Department

E. Owner Project Number: 23.008.03

F. Engineer: Hager CO, LLC

G. Engineer Project Number: 23.008.03

1.2 BID FORM SUPPLEMENT

A. This form is required to be attached to the Bid Form.

B. The undersigned Bidder proposes the amounts below be added to or deducted from the Contract Sum on performance and measurement of the individual items of Work.

C. If the unit price does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."

1.3 UNIT PRICES

Item No	Description	Approximate Quantity	Units	Unit Price	Total Cost
1	Mobilization, Site Prep and Erosion Control including Clearing of trees and Underbrush for New Site	1	LS		
2	100-gpm Submersible Sanitary Sewer Lift Station to include Pumps, Controls, Wet Well, Electrical Service, Concrete Apron, Gravel Drive, Fence and all installation connection and startup for a turnkey station, Furnished and Installed (Lump Sum)	1	LS		
3	Site Plumbing to Connect New 4" PVC lines to Station as Shown on Drawings, All-Inclusive	1	LS		
4	New 6'-0" Chain-link Fence including 12'-0" Wide Access Gate to Wet Well,	1	LS		
5	Electrical Service from Existing Meter to New Panel, including all materials and labor for a working station.	1	LS		
	Total Amount of Base Bid				
A-1	Alternate No1. Total Station Backup Generator including gas Service and Automatic Transfer Switch.	1	LS		
	Total Amount of Alternate Bid				

Grand Total of Bid (Base + Alternate) $_____.

1.4 SUBMISSION OF BID SUPPLEMENT

Respectfully submitted this ____ day of _____, 2023.

Submitted By: _____
(Insert name of bidding firm or corporation)

Authorized Signature: _____
(Handwritten signature)

Signed By: _____
(Type or print name)

Title: _____
(Owner/Partner/President/Vice President

END OF DOCUMENT

The Bidder hereby agrees to commence work under this Contract on or before a date to be specified in written "Notice to Proceed" given by the Owner, and to fully complete the Contract with 150 consecutive calendar days thereafter as stipulated in the Contract Documents. The Bidder further agrees to pay as liquidated damages, the sum of $ 250.00 for each consecutive calendar day thereafter as hereinafter provided in Article 16 of the General Conditions. The Bidder further agrees that he will not make any claim for extra compensation should completion of work under the Contract be effected in advance of the time specified hereinabove.

The Bidder 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 Plans, Specifications and Contract Documents relative to the work to be done; that he has read all special provisions furnished prior to the opening of bids; and that he has satisfied himself relative to the work to be performed.

The Bidder declares that he understands that the quantities shown in the Advertisement for Bids and in the Proposal are approximate only; and are subject to either increase or decrease and that should the quantities of any of the items of work be increased, the undersigned proposes to do the additional work at the unit prices set out herein. Actual quantities will be determined upon completion of the work.

The Bidder has attached hereto a certified check, drawn on a responsible bank or trust company, or a Bid Bond executed by a Surety Company authorized to do business in the State of Alabama and made payable to:

MARGARET WATER & SEWER

in amount of 5% Amount of Bids not to exceed $10,000.00.

The Bidder agrees that, upon receipt of the notice of acceptance this bid, he will execute the formal contract bound herein within 10 days from receipt of such notice and will furnish with the executed contract agreement proper Performance Bond and Labor and Material Bond as required by the General Conditions.

The Bidder further agrees that, in case of failure of his part to execute said Contract Agreement, and all Bonds required by the Contract Documents, within ten (10) consecutive calendar days after receipt of notice of award of Contract to him, the check or Bid Bond accompanying this Bid, and the moneys payable thereon, shall be paid to the Owner as liquidated damages for the delay and additional expense to the Owner caused by such failure on the part of the Bidder.

The Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The Bidder agrees that this bid shall be good for, and may not be withdrawn for, a period of sixty (60) calendar days after the scheduled closing time for receiving bids.

The Bidder acknowledges receipt of the following addenda:

ADDENDUM NO.	DATE:

The undersigned, as Bidder, hereby declares that the name (or names) of the only person (or persons) interested in this Proposal, as principal (or principals), is (or are) as hereinbelow set out and that no person other than that (or those) hereinbelow stated has any interest in this Proposal, or in the Contract to be entered into; that this Proposal is made without connection with any other person, firm or corporation making a proposal; and that it is in all respect fair and in good faith, without collusion or fraud.

Following are the full name and addresses of all persons, firms, and corporations interested in the foregoing bid:

_____	_____
_____	_____
Address:	Respectfully submitted:
_____	By: _____
_____	_____
	Title

Date _____

Contractor's License No. _____

(SEAL - if Bid is made by a Corporation)

NOTICE TO CONTRACTORS
ADVERTISEMENT FOR BIDS

Sealed Bids will be received by the City of Margaret – WATER & SEWER at the CITY HALL, 825 WOODLAND CIRCLE, ODENVILLE, AL 35120 until 1:00 P.M. o'clock, (LOCAL TIME), THURSDAY – November 9, 2018 for furnishing all materials, labor, tools, and equipment, and for doing the work of constructing, according to Plans, Specifications and Contract Documents on file in GUSC OFFICE of said CITY OF MARGARET - WATER & SEWER for SANITARY SEWER LIFT STATION TO SERVE SUNRISE SUBDIVISON - hereinafter described. No bids will be received after the time set forth hereinabove; and the Proposals will be publicly opened and read.

The work of constructing said improvements will be let under one contract; the principal items of work are as follows:

Install : 1 DUPLEX – SUBMERSIBLE PUMP STATION 100gpm – Turn Key, Including all Equipment, piping, Wet Well, Concrete, Electrical Service and Connections, Gravel at Site, Fence and Site Work; ALL PLUMBING CONNECTIONS AS REQUIRED. DEMO OF OLD WET WELL AND PUMP AFTER CONNECTION.

Alternate Bid No1 – Install: Standby Generator, including Transfer Switch, Gas Service and Pad.

Plans, Specifications and Contract Documents are open to public inspection at the Business Office of City of Margaret - Water & Sewer or Copies of the proposed Contract Documents may be obtained directly from HagerCo-LLC for bidding purposes; Bidders must Contact Keith L. Hager to be included on the Bid List and upon the conditions set forth in THESE DOCUMENTS – Advertisement for Bids, at:

HagerCO-LLC
1025 Montgomery Highway, Suite 110
Birmingham, AL 35216
205.229.1738

OR Via Email Request to:

keithlhager@icloud.com

BID FORM

In order to receive consideration, make all bids in strict accordance with the following:

- Make bids upon the forms provided therefore, properly executed and with all items filled out.
- Do not change the wording of the Bid Form, and do not add to the Bid Form.
- Unauthorized conditions, limitations, or provisions attached to the proposal shall be cause for rejection of the proposal.
- Telegraphic bid or telegraphic modification of bid will not be considered.
- Bids received after the time fixed for receiving them will not be considered.
- Late bids will be returned to the sender unopened.
- Each bid shall be addressed to the Owner, and shall be delivered to the Owner at the address given in the Bid Solicitation on or before the day and hour set for receiving bids.
- Each bid shall be enclosed in a sealed envelope bearing the title of the Work, the name of the Bidder and address, and the date and hour of the bid opening.
- It is the sole responsibility of the bidder to see that his bid is received on time.
- Prior to the opening of the envelope, the names of all Bidders listed thereon shall be read aloud at the official bid opening and incorporated into the bid.
- Only items listed on the bid form will be considered for payment.
- Only the items specifically listed by quantity will be paid by the actual quantity utilized.

The Owner reserves the right to reject any or all bids, to waive any informality in any bid, and to accept any bid considered advantageous to the Owner.

No bid will be withdrawn after the time for opening of bids has passed. The Owner reserves the right to hold the bids for a period of sixty (60) days after the date of receiving the bids.

A certified check bid bond in an amount of not less than five percent (5%) of the total bid must accompany each proposal not to exceed $10,000.00. The payee of such check, or the oblige of such bond, shall be the City of Margaret - Water & Sewer, AL.

The successful bidder must furnish a Performance Bond for one hundred (100%) percent of the bid amount, and must secure his bond for a bonding company's representative or agent in the State of Alabama.

The Contractor shall obtain and pay for all licenses and permits required by the State, County, or City authorities having jurisdiction over the various phases of the work.

The attention of all bidders is called to the provisions of State Lay Governing General Contractors, as set forth in Chapter 4 (Section 65 to 82, inclusive) of Title 46 of the Code of Alabama for 1940, as amended; and bidders shall be governed by said law insofar as it is applicable. The above mentioned provisions of the Code make it illegal for the Owner to consider a bid from anyone who is not properly licensed under such code provisions. The Owner, therefore will not consider any bid unless the bidder produces evidence that he is so licensed. Neither will the Owner enter into a Contract with a foreign corporation, which is not qualified under State Law to do business in the State of Alabama.

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

_____

_____

as Principal, and _____

_____ as Surety, are hereby held and firmly

bound unto Margaret Water & Sewer

as owner in the penal sum of 5% of Bid Amount not to exceed $10,000.00 for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves our heirs, executors, administrators, successors and assigns.

Signed, this _____ day of _____, 2023.

The condition of the above obligation is such that whereas the Principal has submitted to ***Margaret Water & Sewer***

a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the:

SANITARY SEWER LIFT STATION TO SERVE SUNRISE SUBDIVISON

NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the panel amount of this obligation as herein stated.

The Surety for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers the day and year first set forth above.

_____ (L.S.)
Principal

_____
Surety

SEAL By _____

INSTRUCTIONS TO BIDDERS

RECEIPT OF BIDS

Sealed Bids will be received by Margaret Water & Sewer
. at their Business Office, 2400 Joey Adkins Road, Margaret, Alabama until 10:00 A.M. o'clock, (Local Time) Thursday – August 9th, 2018, for construction of improvements as set forth in the Advertisement for Bids.

PLANS AND SPECIFICATIONS

Plans, Specifications and Contract Documents are open to public inspection at the Business Office for the Government Utility Service Corporation for Margaret or Copies of the proposed Contract Documents may be obtained directly from HagerCo-LLC for bidding purposes upon the conditions set forth in THESE DOCUMENTS – Advertisement for Bids, at:

HagerCo-LLC
1025 Montgomery Highway, Suite 110
Birmingham, AL 35216
205-229-1738

OR

Via Email Request @ keithlhager@icloud.com

BID FORM

In order to receive consideration, make all bids in strict accordance with the following:

- Make bids upon the forms provided therefore, properly executed and with all items filled out.
- Do not change the wording of the Bid Form, and do not add to the Bid Form.
- Unauthorized conditions, limitations, or provisions attached to the proposal shall be cause for rejection of the proposal.
- Telegraphic bid or telegraphic modification of bid will not be considered.
- Bids received after the time fixed for receiving them will not be considered.
- Late bids will be returned to the sender unopened.
- Each bid shall be addressed to the Owner, and shall be delivered to the Owner at the address given in the Bid Solicitation on or before the day and hour set for receiving bids.
- Each bid shall be enclosed in a sealed envelope bearing the title of the Work, the name of the Bidder and address, and the date and hour of the bid opening.
- It is the sole responsibility of the bidder to see that his bid is received on time.
- Prior to the opening of the envelope, the names of all Bidders listed thereon shall be read aloud at the official bid opening and incorporated into the bid.
- Only items listed on the bid form will be considered for payment.
- Only the items specifically listed by quantity will be paid by the actual quantity utilized.

DEFINITIONS

The following terms as used in these Specifications and Contract Documents, are respectively defined as follows:

(a) "Contractor" or Contractors": The person, firm or corporation signing the Contract with the Owner.

(b) "Sub-Contractor": One who contract with the Contractor to perform all or any part of the Contract to be performed by the Contractor under the attached Documents.

(c) "Work at Site of Project": Work to be performed, including work normally done at the location of the project.

(d) "Purchaser, Owner, Authority": City of Chelsea, Alabama

(e) "Engineer" or "Engineers": HagerCo-LLC, or their duly authorized representative.

(f) "Days": Calendar days, unless otherwise specified.

(g) "Proposal": Wherever "Proposal" is used, it shall mean "Bid".

PROPOSAL FORM

The Engineers will furnish Bidders with a form of Proposal. No bid will be considered unless submitted on such form. All papers bound with, or attached, to the Proposal Form (including Instructions to Bidders, General Conditions, Specifications, Contract Documents, etc.) are a necessary part thereof and must not be detached.

The Bidders shall complete the Proposal Form in manner prescribed, using ink for writing in both words and figures. Words and figures may be typed. The Bidder must sign the Bid correctly and legibly; and shall state his interest, title, or office in the company submitting the Bid. If the Bid should be made by an individual, his full name and address shall be shown; if made by a firm or partnership, the full name and address shall be shown; if made by a firm or partnership, the full name and address of each member of the firm or each partner shall be shown; and if made by a corporation, the full names and addresses of the president, secretary and treasurer shall be shown.

Should the Proposal Form not be fully completed in ink by the Contractor, the Bid will be deemed to be informal and may be rejected. In case of any discrepancy between any price written and that shown in figures, the price written shall be used for determination of the Bid.

Bidders shall not attach any conditions or provisions to the Documents nor alter the Proposal Form in any manner whatsoever.

BIDS

Bids shall be enclosed in a sealed envelope, endorsed

“SEALED BID”

“DO NOT OPEN”

“Contractor’s License Number”

and addressed to:

Margaret Water & Sewer

.

825 Woodland Circle
Margaret, AL 35004

The Contractor shall also show, on the outside of the envelope, his name, address, and State Registration No.

No Bid will be received after the time specified in the "Notice to Contractors", (Advertisement for Bids).

Any Bidder may withdraw his bid, either personally or by telegraphic or written request, at any time prior to the scheduled closing time for the receipt of bids.

No Bidder may withdraw his bid for a period of sixty (60) days after the date set for opening thereof, as set forth in the "Notice to Contractors", (Advertisement for Bids).

The right is reserved to reject any or all bids, to waive any informality in any bid, and to accept and bid considered advantageous to the Owner.

AWARD OF CONTRACT

The Contract, if awarded, will be awarded to the lowest and best bidder as soon as practicable, provided a satisfactory bid has been received.

GUARANTY

Each Bidder must enclose with his Proposal a certified check or bid bond in the amount of not less than five per cent (5%) of the total bid. The payee of such check or the obligee of such bond shall be Margaret Water & Sewer

Certified checks and bid bonds shall be returned to all bidders, other than the low and two next low bidders, when the low bids have been determined. Those of the three low bidders will be returned after execution of the Contract.

If a bidder to whom a contract is awarded shall refuse or neglect to execute the contract and furnish security in the amount required within ten (10) days after the notice has been given him of such award, his certified check or bidders bond shall be forfeited to the Owner as liquidated damages for such refusal or neglect.

The successful bidder will be required to furnish, through an authorized agent in the State of ALABAMA , a Performance Bond, Labor and Material Bond, Employer's Liability and Workmen's Compensation Insurance, Public Liability and Property Damage Insurance, and shall furnish proof of

carriage of all of the above insurance all as set out in detail under "General Conditions" of these Specifications. The Performance Bond and the Labor and Material Bond must be countersigned by an agent whose office is located in the State of ALABAMA, and who is authorized to do business in the State of ALABAMA.

INTERPRETATIONS

If any person contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of the Plans, Specifications, or other proposed Contract Documents, he may submit a written request to the Engineers for interpretations thereof. The persons submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addendum duly issued, and copy of such addendum will be mailed or delivered to each person receiving a set of such documents. The Owner will not be responsible for any other explanation of or interpretation of the proposed documents.

COMMENCEMENT AND COMPLETION OF WORK

Following the execution of the Contract by the Owner and the Contractor, the Contractor will be authorized to commence work by written order form the Owner. The Contractor shall then commence work on the project within the time stated in the Proposal, unless such time stated is extended by mutual agreement between the Owner and the Contractor, and shall fully complete all work under the Contract with the number of consecutive calendar days specified in the Contract.

FAMILIARITY WITH LAWS

The Bidder is assumed to have familiarized himself with all state laws and with all local ordinances and regulations which, in any manner, may affect the conduct of the work, or those engaged or employed on the work, and no pleas of misunderstanding will be considered.

The attention of all bidders is called to the provisions of the State Law governing General Contractors and Sub-Contractors as set forth in Chapter 4 (Sections 65 to 82, inclusive of Title 46 of the Code of Alabama of 1940, as amended; and bidders shall be governed by the provisions of said Law insofar as they are applicable. The above mentioned provisions of the Code prevent the Owner from considering a bid from anyone who is no licensed in accordance with the provisions of the Code. The Owner will, therefore, not consider any bid unless the bidder produces evidence that he is duly licensed and registered in accordance with the provisions of the Code of Alabama.

ASSIGNMENT OF CONTRACT

The Contractor shall not assign his Contract, nor any part thereof, nor any moneys due, or to become due thereunder, without prior written approval of the Owner. In case the Contractor, with the consent of the Owner assigns all or any part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to prior valid claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of work under his Contract.

SUB-CONTRACTING

No part of the Contract shall be sublet without the prior written approval of the Owner. The Contractor shall, following execution of the Contract, immediately submit to the Owner the names of sub-contractors whom he proposes to employ on the project.

EXECUTION OF CONTRACT

The Contract Documents shall be executed in THREE (3), each counterpart of which shall be considered as an original counterparts or copies.

QUALIFICATIONS OF BIDDERS

A bidder being considered for award of the Contract shall present satisfactory evidence showing that he has the necessary capital, organization, facilities, and equipment to perform the work under the Contract; and showing that he has contracted for and performed similar work in a satisfactory manner.

1. SUPPLEMENTAL INFORMATION FOR BIDDERS - NONDISCRIMINATION IN EMPLOYMENT

Contracts for work under this proposal will obligate the contractors and subcontractors not to discriminate in employment practices.

Bidders must submit with their initial bid a signed statement as to whether they have previously performed work subject to the President's Executive Order No. 11246 or any previous Executive Order dealing with nondiscrimination in Federally assisted construction contracts (11114 or 10925).

Bidders must, if requested, submit a compliance report concerning their employment practices and policies in order to maintain their eligibility to receive the award of the contract.

Successful bidders must, if requested, submit a list of all subcontractors who will perform work on the project and written signed statements from authorized agents of the labor pools with which they will or may deal for employees on the work, together with supporting information to the effect that said labor pools' practices and policies are in conformity with Executive Order 11246 and that said labor pools will affirmatively cooperate in or offer no hindrance to the recruitment, employment and equal treatment of employees seeking employment and performing work under the contract or, a certification as to what efforts have been made to secure such statements when such agents or labor pools have failed or refused to furnish same prior to the award of the contract.

Successful bidder must be prepared to complying all respects with the Contract Provisions regarding nondiscrimination, as stipulated under the Labor Standards. SECTIONS 10, 11, 12, 13, AND 14 HEREIN APPLY.

CONTRACT AGREEMENT

THIS AGREEMENT, made and entered into as of the _____ day of _____ in the year of _____, by and between the

City of Margaret Water & Sewer

(hereinafter called the Owner), and

_____

(hereinafter called the Contractor).

WITNESSETH: That the Owner and the Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows.

Article I. CONTRACT DOCUMENTS. The Contract Documents shall consist of: this Agreement, Contractor's Proposal, Contractor's Bid Bond; Notice to Contractors (Advertisement for Bids); Instructions to Bidders; General Conditions, Supplemental Conditions; performance Bond; Labor and Material Payment Bond; all Addenda issued prior to the submittal of the Proposal; all Modifications issued and agreed upon by the Owner and the Contractor prior to and subsequent to the execution of this Agreement; and the Plans (Contract Drawings) and Specifications as prepared by:

HagerCo-LLC
1025 MONTGOMERY HIGHWAY, SUITE 110
BIRMINGHAM, ALABAMA 35216
PHONE: 205-229-1738
keithlhager@icloud.com

and as on file in the office of the Owner. The documents enumerated hereinabove form the Contract and all are as fully a part of the Contract as if attached to this Agreement and/or fully set forth herein.

Article II. SCOPE OF WORK. The work to be done under this Contract by the Contractor, at his own cost, shall consist of furnishing all labor, materials, supplies, tools and equipment, and of performing all work necessary to construct and fully complete the project entitled,

18.014.02 - SANITARY SEWER LIFT STATION TO SERVE SUNRISE SUBDIVISON
all in accordance with the Contract Drawings and Specifications and with the requirements and provisions of the Contract Documents, all of which for this Contract.

Article III. TIME OF COMPLETION. The work to be performed under this Contract shall be commenced within 10 calendar days after the date on which the Notice to Proceed is issued. The work shall be fully completed within 150 calendar days after the date on which the Notice to Proceed is issued, subject however, to such extensions of time as may be authorized in accordance with the provisions of the Contract Documents.

Should the work under this Contract not be fully completed within the time specified, it is understood and agreed that there will be deducted from the periodic and final estimates of work performed by the Contractor a sum computed at the rate of $250.00 per day for each additional day required to fully complete the work, beginning from the specified date of completion and extending to the date of final acceptance of the work. It is understood and agreed that the sum thus deducted is extra cost and expense caused by the delay in the completion of the work. It is also understood and agreed that, in the event that the work should be completed in advance of the completion date specified, the Contractor will make no claim for extra payment therefor.

Article IV. CONTRACT PRICE. The Owner shall pay the Contractor in full payment for performance of work under this Contract, in accordance with the price or prices set forth in the Proposal submitted by the Contractor, which Proposal is bound herewith and made a part hereof to the same extent as if fully set out herein, but subject to such additions and deductions as provided for in the Contract Documents, the sum of:

_____ ($).

The Contract Price shall be equitably adjusted to compensate for any changes in the work or extra work as may be ordered by the Owner.

Article V. CHANGES IN WORK AND EXTRA WORK. The Owner shall have the right to increase or decrease quantities of work to make changes in the work, and to require the Contractor to perform extra work necessary for the satisfactory completion of the project.

Where new and/or unforeseen items of work are found to be necessary for the satisfactory completion of the project, and where the character of the work is such that a reasonable price for the performance of the work cannot be established by use of contract prices or combinations thereof, such new and/or unforeseen items of work shall be classed as Extra Work.

Where the satisfactory completion of the project requires that changes in work be effected or extra work be ordered, the procedure to be followed in such cases shall be in accordance with the provisions of the Articles of the General Conditions relating to CHANGES IN WORK, and PAYMENT FOR EXTRA WORK.

Article VI. PROGRESS PAYMENT. The Owner shall, on or before the 15th day of each calendar month, make a progress payment to the Contractor in amount equal to value of work performed on the project through the closing date of the preceding estimate period plus value of materials stored, but less ten percent (10%) of the combined values and less previous payments made. The ten percent (10%) retained percentage may be held by the Owner until the value of work completed at end of any estimate period equals or exceeds fifty percent (50%) of the total amount of the Contract, after which time, if the Owner and the Engineer deem that satisfactory progress is being made, the retained percentage may be reduced to five percent (5%) of the total of the value of completed work plus value of materials stored. When the work has been substantially completed, reviewed by the Owner and the Engineer, and found to be in accordance with the provisions of the Contract Documents, the retain age may be reduced to such an amount as would reasonably cover the cost of correction of minor items of work heretofore found to be faulty and the cost of work remaining to be done in order to effect the completion of all of the work in full accordance with the provisions of the Contract Document.

Any payment for materials stored shall be in accordance with the provisions of Article 36 and 45 of the General Conditions relating to storage of materials and payment for materials stored, respectively.

Article VII. FINAL PAYMENT. Final payment, constituting the entire balance of the Contract Price, shall be paid by the Owner to the Contractor within thirty days after the acceptance of the work. The work will not be accepted until the Contractor has certified that he has completed all of the work in full accordance with the provisions of the Contract Documents, the Owner and the Engineer have completed the final review of the work and found that it has been fully completed in accordance with the provisions of the Contract Document, the Contractor has advertised completion of the work in accordance with Article 47 of the General Conditions, and the Contractor has presented to the Owner satisfactory evidence that all indebtedness connected with the work has been fully paid and satisfied, all as set forth in Article 47 of the General Conditions.

Article VIII. MISCELLANEOUS PROVISIONS. Terms used in this Agreement which are defined in the General Conditions and in the Instructions to Bidders shall have the same meaning as designated in those component parts of the Contract Documents.

The Contract Documents, which constitute the entire agreement between the Owner and the Contractor are listed in Article I of this Agreement and, except for Modifications issued after the execution of this Agreement, are enumerated hereinbelow. The signatures which appear hereunder shall have the same force and effect as if appearing on all of the Contract Documents enumerated as follows:

1. Contract Agreement	Pages C-1 thru C-6
2. Proposal	Pages P-1 thru P-9
3. Bid Bond	Pages BB-1 thru BB-2
4. Advertisement for Bids	Pages A and B
5. Instructions to Bidders	Pages IB-1 thru IB-8
6. General Conditions	Pages GC-1 thru GC-27
7. Supplementary Conditions	Pages GC-28
8. Performance Bond	Pages PB-1 thru PB-3
9. Specifications	Pages 1-00 Thru 7-00
11. Drawings	1 thru 3
12. Addenda	

IN WITNESS HEREOF, the said Contract has hereunder executed this Agreement by his signature shown hereon, and said Owner has hereunder executed this Agreement by affixing hereto his corporate seal and by signature of his corporate officer(s) as shown, on the date first written above, in THREE (3) counterparts, each of which shall, without proof or accounting for the other counterpart deemed an original.

ATTEST:

Margaret Water & Sewer

By: Isaac Howard
Title: Mayor

ATTEST:

Bidder:

By:
Title:

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____

_____, hereinafter called the Principal, and hereinafter called the Surety, do acknowledge, ourselves to

be held and firmly bound unto ***Margaret Water & Sewer***

_____

herinafter called the Owner, in the penal sum of
_____ ($_____).

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

THE CONDITION OF THIS OBLIGATION OR BOND IS THIS:
Whereas, the Principal has entered into a certain written contract with the Owner, bearing the date of _____, 2023 for the construction of:

SANITARY SEWER LIFT STATION TO SERVE SUNRISE SUBDIVISON

a copy of which contract is attached hereto, incorporated here by reference, and made a part of to the same extent as if set herein in full, and the Principal and Surety are bound under Bond which shall remain in full force and effect until all of the work under the Contract has been fully completed in full accordance with the covenants, terms, conditions, agreements and provisions of the Contract.

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform all his duties, undertakings and obligations, all in accordance with the covenants, terms, conditions, agreements and provisions of the Contract during the original term thereof, and during any extensions thereof which may be granted by the Owner with or without the consent of the Surety, and if the Principal shall satisfy all claims and demands incurred under the Contract, shall fully correct all faulty work, shall fully indemnify and save harmless the Owner from all costs and damages whatsoever which the Owner may suffer by reason of any failure on the part of the Principal to do so, and shall fully reimburse and repay the Owner for any and all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise it shall remain in full force and effect.

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or to the Specifications accompanying the same, shall in any wise affect the obligation of the Surety under this Bond and the Surety does hereby waive notice of any such change, extension of time, or alteration or addition to the terms of the Contract or to the work or to the Specifications.

PROVIDED FURTHER, that no final settlement between the Owner and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in THREE(3) counterparts, each one of which shall, without proof of or accounting for the other counterparts, be deemed an original, on this the _____ day of _____, 20_____.

ATTEST:

_____
Principal

By_____
(Principal) Secretary

By _____

Title:

_____

_____
Address

_____
Witness as to Principal

_____
Address

_____
Surety

ATTEST:

_____
(Surety Secretary)

By _____
Attorney-in-Fact

_____

_____
Address

_____
Witness as to Surety

_____

_____
Address

Countersigned _____

_____
Resident Agent of Surety

♦ ♦ ♦

GENERAL CONDITIONS

♦ ♦ ♦

INDEX

1. LOCATION OF THE WORK

The location of the work is shown on the Contract Drawings and described in the preface to the specifications. The Owner will provide access to the work site (or sites) as shown on the Drawings.

2. WORK TO BE PERFORMED

The work to be performed under this Contract shall include, but without limitation, the furnishing of all materials, labor, tools, appliances, equipment, transportation and services necessary to accomplish the work, and the complete of the work as shown on the Plans and as specified.

3. CONTRACT DOCUMENTS

The Contract Documents are comprised of the following documents, and shall include all additions, deletions and modifications incorporated in these documents before execution of the Contract Agreement.

a. Advertisement for Bids (Notice to Contractors), listing date and time for receipt of bids, principal items of work, and requirements for bidding.
b. Instructions to Bidders containing information for use of contractors preparing a Proposal.
c. Proposal shall be tendered on Proposal Form bound in with the Contract Documents. The Proposal shall be properly executed and guaranteed as specified in the Instructions to Bidders.
d. Bid Bond (or cashiers check) shall accompany the Proposal, and shall guarantee that the Bidder will enter into an agreement with the Owner for construction of the work should the Contract be awarded to him.
e. Addenda to Contract Documents issued during the time of bidding (before receipt of bids) or forming a part of the Contract Documents issued to the Contractor for the preparation if his Proposal, shall be covered in the Proposal, and shall be made a part of the Contract. Receipt of each Addendum shall be acknowledged in the Proposal.
f. Contract Agreement covers the performance of the work described in the Contract Document including all supplemental addenda thereto and all general and special provisions pertaining to the work or materials therefore.
g. Bonds shall be furnished by the Contractor at the time of execution of the Contract Agreement, shall be in form prescribed by the Owner, shall be with a Surety Company authorized to do business in the State in which the work is located, and shall be countersigned by a resident agent of the Surety Company in that State. Bonds shall be as follows:

1. Performance Bond in an amount equal to 100% of the Contract Amount as a guaranty of good faith on the part of the Contractor to execute the work in accordance with the terms of the Contract.
2. Labor and Material Payment Bond : N/A

h. General Conditions outline certain responsibilities of the Owner and the Contractor (who are the parties to the Contract Agreement) and also those responsibilities delegated by the Owner to the Engineer who acts as the agent of the Owner. Supplemental General Conditions or Special Provisions, when required, are bound in the Contract Documents following the General Conditions, and are a part of the Contract.

i. Drawings (Plans) and Specifications show and describe the work performed; and it is the intent of the Drawings and Specifications that the Contractor shall furnish all labor, tools,

materials, equipment, transportation and services necessary for the proper execution of the work so shown and described, unless specifically noted otherwise. The Contractor shall execute all work so described in full conformance with the Plans, Specifications and all Contract Documents; shall perform all incidental work necessary to complete the project in an acceptable manner; and shall fully and satisfactorily complete all work, facilities, and improvements, ready for use, occupancy and operation by the Owner.

All discrepancies found between the Drawings and Specifications and site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported by the Contractor to the Engineer, who shall promptly correct such inconsistencies or ambiguities in writing. After discovery of such inconsistencies or ambiguities by the Contractor, any work done by the Contractor on any part of the project affected by such inconsistencies or ambiguities before receipt of written instructions (corrections) from the Engineer shall be at the Contractor's risk.

Responsibility for adequacy of the design and for sufficiency of the Drawings and Specifications shall be borne by the Owner. The complete requirements of the work to be performed under the Contract shall be set forth in Drawings and Specifications supplied by the Owner through the Engineer or by the Engineer as representative of the Owner. The Drawings and Specifications shall be considered to be inseparable documents, and in considering them, the Contractor shall use both instruments in performing the work in accordance with there combined intent.

4. INSURANCE

The Contractor shall not commence any work on the project until he obtains, at his own expense, all required insurance; and the Contractor shall not, at any time, conduct any operations on the project or associated with the project unless such operations are covered by the specified insurance. Such insurance must have the approval of the Owner as to limit, form, and amount. The Contractor shall not permit any sub-contractor to commence work on the project until the same insurance requirements have been complied with by such sub-contractor (sub-contractors). The insurance coverage shall be maintained throughout the full period of the contract. Any insurance bearing on adequacy of performance shall be maintained after completion of the project for the full guaranty period.

As evidence of specified insurance coverage the Owner may, in lieu of receipt of actual policies, accept certificates issued by the insurance carrier showing such policies to be in force for the specified period.

Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from his operations under this Contract.

The types of insurance that the Contractor shall be required to obtain and maintain for the full period of the Contract are listed herein below:

a. Workmen's Compensation and Employer's Liability Insurance shall be in strict accordance with the requirements of the current and applicable Workmen's Compensation Laws of the State. The insurance shall

cover all of the Contractors employees employed or associated with the project; and where any part of the work is subcontracted, the Contractor shall require the subcontractor to provide similar Workmen's Compensation and Employer's Liability Insurance for all employees of the subcontractor unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this Contract is not protected under the Workmen's Compensation Statute, the Contractor shall provide, adequate coverage for the protection of all employees on the project not otherwise protected under applicable provisions of the Statutes relating to Workmen's Compensation and Employer's Liability Insurance.

b. Comprehensive General Liability Insurance shall protect the Contractor and any subcontractors performing work under this Contract from any claims for bodily injury, for sickness or disease, for death, for personal injury, and for property damages which may arise either directly or indirectly out of, or in connection with, the performance of work under this Contract. The minimum limits of coverage shall be as follows:

Bodily Injury $1,000,000 ea. occurrence, $2,000,000 aggregate
Property Damage $1,000,000ea. occurrence, $2,000,000 aggregate
Personal Injury $1,000,000 ea. occurrence, $2,000,000 aggregate
Excess Liability Umbrella $2,000,000ea. occurrence, $2,000,000 aggregate

The naming of minimum limits of coverage shall not be construed as limiting the Contractor's responsibility to provide contractual coverage sufficiently broad to insure the provisions of the Article of these General Conditions relating to Indemnity, or limiting the responsibilities of the Contractor as outlined under the aforesaid Article.

c. Comprehensive Automobile Liability Insurance shall protect the Contractor and subcontractor performing work under this Contract form any claims fro bodily injury, for death, and for property damages, which may arise wither directly or indirectly out of, or in connection with, the performance of work under this Contract. The minimum limits of coverage shall be as follows:

Bodily Injury $1,000,000 per person, -$1,000,000ea. occurrence
Property Damage - $500,000ea. occurrence

The naming of minimum limits of coverage shall not be construed as limiting the Contractor's responsibility to provide contractual coverage sufficiently broad to insure the provisions of the Article of these General Conditions relating to Indemnity, or limiting the responsibilities of the Contractor as outlined under the aforesaid Article.

d. Property Insurance shall afford protection against physical damage to the insured property during the entire construction period. Insurable portions of the project shall be covered on a completed value basis; and at any given time, the dollar coverage provided shall be the actual value of the insurable portions of the completed work, the value of the insurable portions of the work in progress, and the value of the insurable portions of stored materials. The named insured shall be the Owner, the Engineer, the Contractor, and all Sub-Contractors. The policy by its own terms or by endorsement shall specifically permit partial or beneficial occupancy or use prior to completion or acceptance of the entire work.

Perils named in the policy shall be Fire and Lightning, Extended Coverage, Vandalism and Malicious Mischief, and Additional Perils when named in Special Insurance Provisions under Supplemental General Conditions.

e. Special Insurance Provisions, when required shall be as set forth in the Article relating to Special Insurance Provisions under Supplemental General Conditions.

5. INDEMNITY

The Contractor shall hold harmless, indemnify and defend the Owner and the Engineer, and each of their officers, agents and employees, from and against all loss or expense (including costs and attorney's fees) by reason of any or all suits, action or claims of any character, name or description brought for or on account of any injuries or damages received or sustained by any person or persons, by any property, or by the Contractor or actions of his employees in connection with the prosecution of the work, or by or on account of any claim arising from or any amounts recovered under the Workmen's Compensation Law or any other law, ordinance, or decree, except only such injury or damage as shall have been occasioned by the sole negligence of the Owner or Engineer.

6. PATENTS AND ROYALTIES

The Contractor shall pay the costs of all royalties, license fees and patent fees involved by use, or manner of use, in the work of all designs, devices, materials, equipment or processes, and the Contractor shall provide for such use or manner of use by legal agreement with the owner of the patent or a duly authorized license of such owner. All such costs referred to hereinabove shall be included in the price bid for the work under this Contract.

The Contractor shall save harmless the Owner and the Engineer from any and all loss or expense by reason of use, or manner of use, in the work of any design, device, material, equipment or process covered by letter of patent or copyright; and the Contractor shall defend all suits resulting from claims for royalties, license fees or patent fees on designs, devices, materials, equipment or processes purchased by the Contractor for use in the work, and from

claims for royalties, license fees or patent fees involved by use, or manner of use, of such items by the Owner.

7. LICENSES AND PERMITS

All licenses and permits necessary for the prosecution of the work shall be secured and paid for by the Contractor at no expense to the Owner other than as reflected in the price bid for the work.

8. COMPLIANCE WITH LAWS, ORDINANCES AND REGULATIONS

The Contractor shall comply with all Federal, State, and Local Laws, Ordinances and Regulations, which in any manner affects the work or the conduct of the work; shall comply with all orders and decrees as may have been adopted or as may be enacted by bodies or tribunals having any legal jurisdiction or authority over the work. The Contractor shall file all reports and give all notices as required for compliance with the above. The Contractor shall indemnify and save harmless the Owner and the Engineer against any suits or actions of any kind or nature brought, or may be brought, against them for any claim or liability arising from or based upon the violation by the Contractor, his subcontractors, his agents, his representatives, his employees, or employees of his sub-contractors.

9. SAFETY

The Contractor shall at all times comply with the requirements of "Safety and Health Regulations for Construction", Occupational Safety and Health Administration, U.S. Department of Labor, and shall be responsible for filing all reports and data with the authority having jurisdiction. In the prosecution of his work the Contractor shall observe all precautions and safety provisions as outlined in the "Manual of Accident Prevention in Construction", as published by the Associated General Contractors of America, to the extent that such provisions are not inconsistent with applicable laws or regulations.

The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property affected directly or indirectly by his operations during the performance of the work; and this requirement shall not be limited in application to normal working hours, but shall apply continuously twenty-four (24) hours per day until acceptance of the work by the Owner.

The duty of the Engineer to inspect the work in order to determine its acceptability in accordance with the Specifications and to conduct construction review of the Contractor's performance for the benefit of the Owner, shall not be construed as a duty to review the adequacy of the Contractors safety measures on or near the construction site and/or to direct the actions of the Contractor's employees in the performance of the work as such a duty is not included in the responsibilities of the Engineer.

10. WARNING SIGNS AND BARRICADES

The Contractor shall provide adequate signs, barricades, warning lights and watchmen; and shall take all necessary precautions for the protection of the work and the safety of the public. Existence of all barricades detours, and obstruction shall be clearly indicated by warning signs

and by suitable signal lights which shall continuously function from end of daylight to beginning of daylight and during all other periods of poor visibility such as rain, hail, sleet, snow, fog, smog, etc. Barricades shall be of substantial construction and shall be painted in such a manner and with such paint formulation as would result in rapid identification during periods or poor visibility. Where work is located on, adjacent to, or across highways or roads, provisions, for control of traffic shall be in accordance with the State "Manual on Uniform Traffic Control Devices for Streets and Highways".

11. PUBLIC CONVENIENCE

The Contractor shall at all times so conduct his work as to insure the least possible obstruction to traffic, to insure the least possible inconvenience to the general public and the residents in the vicinity of the work, and to insure the least possible inconvenience to the general public and the residents in the vicinity of the work, and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of the proper authorities. Fire hydrants on or adjacent to the site of the work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions hall be made by the Contractor to insure the safe use of sidewalks. The proper functioning of all gutters, sewer inlets, drainage ditches, and irrigation ditches shall be insured by constant clean-up along with the work and by provision of temporary facilities where required; and natural surface drainage shall not be obstructed.

12. SANITARY PROVISIONS

The Contractor shall be responsible for the sanitary conditions in the areas in which he is working, and shall provide and maintain such sanitary accommodations for the use of his employees and of his subcontractor's employees in compliance with the requirements and regulation of the State Board of Health and other authorities having jurisdiction.

13. EXISTING CONSTRUCTION AND FACILITIES

Where new construction under this Contract is adjacent to or crosses highways, railroads, streets, roads, access facilities, or utilities under the jurisdiction of State, County, City or other Public Agency, public utility or private entity, the Contractor shall secure written permission from the proper authority and shall furnish such bond (Cash or Surety as required), or insurance agreement as may be required before executing such new construction. A copy of the written permission and bond or insurance agreement (when required) must be filed with the Owner before any work is done. The Contractor shall replace and/or repair all existing construction, utilities or facilities damaged in the execution of work under this Contract. The Contractor will be required to furnish releases from all authorities affected by the work before final acceptance of the work under this Contract.

14. AVOIDANCE OF POLLUTION CONTRIBUTION DURING CONSTRUCTION OPERATIONS

The Contractor shall employ all safeguards and observe all precautions necessary to minimize contribution of pollution to the watercourses during the construction operations. The Contractor shall conduct excavation and backfilling operations in such a manner as to avoid concentration of run-off over freshly excavated or backfilled areas. The Contractor shall intercept and direct surface drainage around excavated areas; shall construct temporary terraces or dikes where necessary to prevent erosion and loss of soil from excavated areas; and

shall insofar as is possible, minimize stream pollution resulting from soil transported in run-off from the construction site. At the conclusion of the work all temporary facilities shall be removed and all areas disturbed by construction operations shall be restored to as good condition as when found, or as required by these Specifications.

15. USE OF CHEMICALS

All chemicals used during construction of the project or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reagent, or of other classification, must show approval of EPA, USDA, or FDA, according to the purpose for which the particular chemical is to be used. Use of all such chemicals and disposal of residues there from shall be in strict accordance with the instructions of the manufacturers of the respective chemicals.

16. COMMENCEMENT, PROSECUTION, AND COMPLETION OF THE WORK

Following the execution of the Contract by the Owner and the Contractor, a written Notice to Proceed shall be given to the Contractor by the Owner. The Contractor shall commence work on the project in good faith within the number of days specified in the work order, and shall thereafter prosecute the work regularly, uninterruptedly, with all reasonable diligence, and with such force as to secure the completion of the work within the specified Contract time.

The time allowance specified in the work order for commencement of work shall be the number of consecutive calendar days specified in the Proposal for starting the work. The time allowance for completion of the work shall be the number of consecutive calendar days specified in the Proposal for completion of the work subject, however, to any extensions of time as may be provided for herein. It is intended that the date of issuance of the work order will coincide with date of the work order should be subsequent to the date of execution of the Contract, the time allowance for starting the work shall be reckoned from the date of the work order, and the time specified for completion of the work shall be reckoned from the date of the work order.

Should the work under this Contract not be completed within the time specified, it is understood and agreed that there will be deducted from the monthly and final estimates of work performed by the Contractor a sum computed at the rate of $250.00 per day, beginning from the stated date of completion and extending to the date of final acceptance of the work. It is understood and agreed that the above deduction is not a penalty, but money due to reimburse the Owner for the extra cost and expense caused by the delay in the completion of the work. It is also understood and agreed that, in the event that the work should be completed in advance of the scheduled date of completion, the Contractor will make no claim for extra payment therefore.

The Owner may grant an extension of time for completion of the work when prosecution of the work is delayed or, halted by occurrences beyond the Contractor's control, such as strikes lockouts, acts or omissions on the part of the Owner, fire or other catastrophes, provided however that the Contractor shall immediately give written notice to the Owner of the cause of such delay. The Owner shall not suffer any loss or expense as a result of such occurrences or delays, except when caused by any act or omission on the part of the Owner; and the Contractor shall not be allowed any damages or claims for extra compensation resulting from such occurrences or delays, except when caused by any act or omission on the part of the Owner.

17. CONSTRUCTION SCHEDULE

The Contractor shall, following execution of the Contract, promptly prepare and submit to the Engineer a schedule of construction operations so planned as to insure completion of the work within the time limit stated in the Proposal. In the event that the Contractor should, at any time, for any reason, fall behind said schedule, he shall promptly increase his work to expedite the work and to insure that it shall be fully completed within the stated time limit. The Contractor shall not be allowed additional compensation for employment such measures.

The construction schedule shall show the proposed dates of commencement and completion of each of the various subdivisions and shall show the anticipated amount of each monthly payment that will become due the Contractor in accordance with the progress schedule.

18. SUPERVISION OF THE WORK

The Contractor shall be responsible for planning, scheduling, organization and prosecution of the work in accordance with the Plans, Specifications and Contract Documents.

Observations, construction reviews, tests, recommendations or approvals by the Engineer, or by persons other than the Contractor, shall in no way relieve the Contractor of his obligation to complete all work in accordance with the Plans, Specifications and Contract Documents. All work shall be done under the direct supervision of the Contractor. The Contractor shall be responsible for construction means, methods, technique and procedures, and for providing a safe place for the performance of the work by the Contractor, by all subcontractors, by all suppliers, and by the employees of all of those heretofore named. The Contractor shall also be responsible for safe access to the work, safe use of the work, safe working conditions, and safe occupancy of the work by and/or for all authorized persons.

The Contractor shall maintain on the project a qualified superintendent who is acceptable to the Owner, and who shall provide the efficient supervision required fro the successful and satisfactory completion of the work. The superintendent shall have the authority to act in behalf of the Contractor, and all communication with the superintendent shall be considered a communication with the Contractor. The Contractor's superintendent shall be responsible for coordinating the work of all Subcontractors, and he shall be present on the site of the work at all times as required to adequately perform his supervisory duties and to coordinate the work of all Subcontractors.

19. SUBCONTRACTORS

The Contractor may utilize the services of specialty subcontractors on those parts of the work, which under normal contracting practices, are performed by subcontractors. No part of the work, however, shall be sub-let by the Contractor without the prior written approval of the Owner, or the Engineer acting upon the instructions of the Owner. Following the execution of the Contract, the Contractor shall submit in writing for review by the Owner the names of Subcontractors to whom he proposes to subcontract portions of the work. The early selection of Subcontractors, in the case where the Contractor proposes to subcontract any part of the work, is essential to the proper organization of the work, and the Contractor shall therefore submit any names of proposed Subcontractors upon or before request by the Owner. The names of proposed Subcontractors so submitted shall not be changed except at the request of or with the approval of the Owner.

The Contractor shall be responsible to the Owner for the acts, deficiencies, and omissions of his Subcontractors and of their direct and indirect employees to the same extent as he is responsible for the acts, deficiencies, and omissions of his own and those of his employees.

The Contractor shall bind all Subcontractors to the terms of the General Conditions and Contract Documents insofar as they are applicable to work under subcontract, and shall insert in all agreements with Subcontractors appropriate provisions such as 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.

Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any Subcontractor and the Owner.

For convenience of reference, to facilitate organization of the work, and for convenience in evaluating working progress, the Specifications have been separated into titled Sections. Such separation shall not, however, operate to make the Owner or the Engineer an arbiter to establish limits to the contracts between the Contractor and Subcontractors. The general charge to the Contractor is that all work shall be fully completed in accordance with the Plans, Specifications and Contract Documents.

20. CONTRACTOR'S RESPONSIBILITIES WITH RESPECT TO WORK BY OTHERS

The Owner may place portions of the work on the project under separate contracts. The Contractor shall cooperate with other contractors with regard to use of the site, storage of materials, and execution of their work.

It shall be the Contractor's responsibility to inspect all work performed by other contractors, which in any manner affects his work, and to report to the Owner the existence of any irregularities or discrepancies, which will not permit him to complete his work in a satisfactory manner. The failure of the Contractor to notify the Owner of the existence of such irregularities or discrepancies shall indicate of such of other contractors has been satisfactorily completed and is in condition to receive his work.

The Contractor shall keep himself informed of the progress and performance of other contractors; and, where the lack of progress or poor performance (defective workmanship) on the part of other contractors will affect the Contractor in the performance and completion of his work, he shall immediately notify the Owner of the existence of such conditions. Failure of the Contractor to keep himself informed of the status and condition of work being performed by other contractors on the project, where the status or condition of such work will affect the performance of his work, and failure of the Contractor to notify the Owner of status or conditions unfavorable to the proper coordination, performance, and completion of his work, shall be construed to be acceptance by the Contractor that the status and condition of work being performed by other contractors is satisfactory for the proper coordination, performance, and completion of his work.

21. SUNDAY, HOLIDAY, AND NIGHT WORK

Work on Sundays and Holidays, or at night, will be permitted only when the Contractor has received the written permission of the Owner. Work at such times may be required when special connections to existing systems are to be made, when new facilities are to be placed in service, when existing facilities are to be taken out of service, when it is more advantageous to

the utilities involved, or when an emergency arises in the work schedule. In such cases the permission of the Owner shall be received, the work scheduled well in advance and arrangements made for prosecution of the work with all safety and minimum inconvenience to the public. All work necessary to be performed on Sundays and Holidays, or at night shall be so performed without additional expense to the Owner.

Maintenance work normally required for protection of persons, or for protection of the work or property, will be permitted at any time.

Work during an emergency threatening bodily injury, loss of life, or property damage shall be performed in accordance with the provisions of Article 22. of the General Conditions.

22. EMERGENCY WORK

The Contractors shall at all times guard against bodily injury or loss of life; and the Contractor shall at all times prevent damage to the Owners property, to his own work on the site, and to adjacent property. In the case of the development of an emergency which should threaten loss of life, injury to persons, or damage to property, the Contractor shall furnish and install all necessary materials and equipment and shall perform all work as could possibly be accomplished to prevent loss of life, bodily injury, or damage to property. Nothing stated hereinabove shall be construed as limiting the Contractor's Conditions and Contract Documents, to protect life and property and to pay claims resulting from loss of life, bodily injury, or damage to property. The substance of this Article of the General Conditions is that, in case of an emergency, the Contractor shall act with all speed, with all force, and in an expeditious manner, to avert loss of life, bodily injury, and property damage.

23. CHANGES IN WORK

The Owner shall have the right to increase or decrease quantities of work as established by the number of units of various items of work set forth in the Proposal Form, to make changes in the work, and to require the Contractor to perform extra work necessary for the satisfactory completion of the project. Such increases, decreases, changes, and extra work shall not invalidate the Contract. Should the Contract Price or the Contract Completion Time be affected by such increases, decreases, changes or extra work, the compensation and time shall be adjusted at the time when such increases, decreases, changes or extra work items are ordered.

24. EXTRA WORK

Where new and/or unforeseen items of work are found to be necessary for the satisfactory completion of the project, and where the character of the work is such that a reasonable price for the performance of the work cannot be established by use of contract prices or combinations thereof, such new and/or unforeseen items of work shall be classed as Extra Work. No Extra Work shall be undertaken except by written order from the Owner. The Contractor shall, upon receipt of written order from the Owner, perform such Extra Work and furnish such materials as may be required for the proper completion or construction of the whole work contemplated. In the absence of such written order no claim for extra compensation by reason of performance of Extra Work shall be allowed. Extra Work shall be performed in accordance with the Specifications and Contract Documents, insofar as they are applicable; and where such Extra Work is not covered by the Specifications and Contract Documents it shall be performed in accordance with the intent thereof.

25. FAULTY WORK AND DEFECTIVE WORK

Any faulty work or defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause, shall be corrected or removed within ten (10) days after written order is given by the Owner and in accordance with instructions therein; and the work shall be re-executed in satisfactory manner and form by the Contractor. The fact that the Engineer may have previously overlooked such faulty or defective work shall not constitute acceptance of any part of it.

26. USE OF COMPLETED PORTIONS OF THE WORK

The Owner shall have the right to take possession of and use any completed or partially completed portion of the work, not withstanding that the time for completing the entire work or such portions of the work may not have expired; but such taking possession and use shall not be deemed to be acceptance of any work not completed in accordance with the Plans, Specifications, and Contract Documents. If such prior use should increase the cost of or delay the completion of uncompleted work, or should cause refinishing of completed work subjected to such prior use, the Contractor shall be entitled to extra compensation or extension of time, or both, as agreed upon by the Owner.

27. CUTTING AND PATCHING OF WORK

The Contractor shall perform all necessary cutting and patching as required to connect new work to existing work and as required in new work to properly receive the work of the various trades involved in the entire work; and the Contractor shall restore all such cut and patched work, and shall refinish all surfaces affected by such work, to conditions approved by the Engineer. Cutting of the existing work, or any work, in such a manner as would endanger the work, adjacent property, the workmen, or the public, shall not be done.

28. CLEANING UP THE WORK

The Contractor shall remove from the property of the Owner, and from all public and private property, all temporary structures, rubbish, waste materials resulting from his operations or caused to be in such locations by actions of his employees, and surplus materials. The Contractor shall remove all of his equipment, tools, and supplies from the property of the Owner. The entire work shall be clean and finished as specified. The site shall be clean, true to finished contours given, and improved as specified. The entire work shall be ready for permanent occupancy and/or use before acceptance of the work can become fact. After the completion of the work, should the Contractor fail to remove his equipment, tools and supplies from the property of the Owner, the Owner shall have the right to remove them at the expense of the Contractor.

29. CHARACTER OF WORKMEN

The Contractor shall at all times be responsible for the conduct and discipline of his employees and/or any Subcontractor or persons employed by any Subcontractors. All workmen must have sufficient knowledge, skill, and experience to efficiently reliably, safely, and properly

perform the work assigned to them. Any foreman or workman employed by the Contractor or Subcontractor who does not perform his work in manner as described hereinabove, who appears to be incompetent, or who acts in a disorderly or intemperate manner, shall, at the written request of the Owner, be immediately discharged and shall not be again employed on any portion of the work without the approval of the Owner.

31. MATERIALS AND EQUIPMENT

The materials and equipment incorporated and/or installed in the work shall meet the requirements of the Contract Documents. all materials and equipment shall be subject to review by the Engineer, and no materials and equipment shall be ordered until information relating to such materials and equipment has been reviewed by the Engineer. The Contractor shall be responsible for furnishing and installing all material and equipment required for the complete work.

In order to establish standards of quality the Engineer has in the detailed Specifications, or on the Plans, referred to certain product by name or by name and catalog number. This procedure is not t o be construed as eliminating from competition other products of equal or better quality as manufactured by other companies. Any material or article, which according to the judgment of the Engineer, will fully meet the design criteria, is equal in function and durability, and is suitable for use in arrangement as shown on the Plans, will be acceptable. The Contractor shall furnish the complete list of proposed desired substitutions prior to signing of the Contract together with such engineering and catalog data as the Engineer may require. All such proposals shall be submitted in writing by the Contractor and not by individual trades (subcontractors) or materials suppliers. The Engineer will review the proposed substitutions and make his recommendations within a reasonable item. The Contractor shall abide by the Engineer's decision when proposed substitute materials or equipment are not recommended for installation, and shall in such case, furnish the specified material or item of equipment.

It shall be the responsibility of the Contractor to insure that materials and equipment to be furnished will fit the space available. The Contractor shall make field measurements necessary to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment as will contribute to efficient arrangements and results in final installation conforming to the true intent and meaning of the Contract Documents. Where, because of the particular equipment furnished and installed, arrangements of connections different from those shown are required, it shall be the responsibility of the Contractor to install the equipment in manner as to insure proper and satisfactory operation, to arrange the connections in a neat and efficient manner, and to make all changes in the work required by such arrangements, all in harmony with the intent of the Contract Documents.

All materials, manufactured articles, and equipment shall be applied, installed, connected, erected, used, conditioned for use, cleaned and used in accordance with instruction s of the particular manufacturer.

All manufactured and fabricated items shall fully comply with applicable standards of the Occupational Safety and Health Administration.

Materials and equipment, which are not equal to samples reviewed by the Engineer, do not conform to the requirements of the Contract Documents or applicable standards, or are in any way unsatisfactory or unsuited to the purpose for which they are intended, shall neither be furnished nor installed.

32. SAMPLES OF MATERIALS

All samples called for in the Specifications or required by the Engineer shall be furnished by the Contractor and submitted to the Engineer for his review. Samples shall be furnished well in advance of the anticipated time of fabrication or use of materials represented, and the Engineer shall be allowed reasonable time for consideration of samples submitted.

When required, samples shall be accompanied by laboratory test report and/or certified compliance statements indicating that the materials represented conform to the requirements of the Specifications. Sampling and testing of materials shall be performed in accordance with standard methods referred to in the Specifications.

All samples submitted by the contractor shall be accompanied by a covering letter indicating that such samples are recommended by the contractor.

33. TEST REPORTS AND CERTIFICATES

Laboratory test reports on materials proposed to be used in the work shall be furnished by the Contractor in accordance with the provisions of Article 32.

Certified statements of compliance, where required by the Specifications, shall be furnished by the Contractor.

Certified mill test reports, where required by the Specifications, shall be furnished by the Contractor.

34. SHOP DRAWINGS

The Contractor shall provide shop drawings, setting schedules, piping installation details, and such other drawings as may be necessary for the prosecution of the work in the shop and in the field, all as required by the Drawings, the Specifications, or the Engineer's instructions. The drawings shall be submitted in accordance with an orderly schedule based upon time required for fabrication or manufacture and delivery, and upon time at which materials, fabricated items, or manufactured items will be required to be incorporated in the work.

Deviations from the Drawings and Specifications shall be called to the attention of the Engineer at the time such shop drawings or other drawings are first submitted to the Engineer for his consideration. The Engineer's review of any drawings shall not release the Contractor for responsibility for such deviations, or any subsequent deviations not noted by the Contractor or the Engineer.

Shop drawings and other drawings submitted for review by the Engineer shall bear the Contractor's certification that he has reviewed, checked, and approved such drawings, that they are in harmony with the requirements of the project and with the provisions of the Contract Documents, and that he has verified all field measurements, construction criteria, materials, catalog numbers, and similar data. The Contractor shall also certify that the work represented by the shop drawings is recommended by the Contractor and that the Contractor's Guaranty will fully apply.

The finished assemblies represented by the shop drawings and other such drawings shall fully conform to the standards of the Occupational Safety and Health Administration, wherever applicable.

36. EQUIPMENT DATA

The contractor shall submit, for review by the Engineer, complete catalog data for every manufactured item of equipment and all components to be used in the work, including: specific performance data, material description, rating, capacity, working pressure, material gage or thickness, brand name, catalog number, general type, and other pertinent data. Submittals shall be compiled by the Contractor and reviewed by the Engineer before equipment is ordered. Where details of items of equipment are affected by details of items of other equipment, submittals for such associated items of equipment shall be compiled by the contractor and reviewed by the Engineer before any such associated items of equipment are ordered.

Catalog data for equipment reviewed by the Engineer shall not supersede the Contract Documents. The review by the Engineer shall not relieve the Contractor from responsibility for deviations fro Drawings or Specifications, unless the Contractor has in writing called the attention of the Engineer to such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in the items submitted. The Contractor shall check the work described by the catalog data against the requirements set forth in the Contract Documents in order to determine the existence of any errors or deviations.

Equipment data submitted for review by the Engineer shall be accompanied by a covering letter from the Contractor indicting that he has reviewed, checked, and approved the data submitted; that equipment represented by the submittal is in harmony with the requirements of the project and with the provisions of the Contract Documents, and that he has verified catalog numbers, and similar data. The Contractor shall also certify that the work represented by the manufacturer's drawings and equipment data is recommended by the Contractor and that the Contractor's Guaranty will fully apply for the length of the manufacture's warranty.

36. STORAGE OF MATERIALS AND/OR EQUIPMENT

Materials and/or equipment to be incorporated in the work shall properly be housed or otherwise protected from corrosion and damage so as to insure the preservation of their finish, quality, and fitness for the work. Where considered necessary to secure proper protection, the materials shall be placed on racks, platforms, or hard clean surfaces not subject to surface drainage. Factory finished items shall be stored above ground, covered, individually sealed, or housed indoors as required. The Contractor shall be aware of the potential difficulties involved in the storage of equipment fitted with bearing, which may suffer damage for a long period of idleness, and shall take such precautionary measures as required to preserve the life expectancy of the bearings.

Stored materials and equipment shall be located and arranged so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written consent of the owner or lessee of said property. When the Contractor desires to accept delivery of material or equipment which cannot be accommodated or housed on the site of the work he may, but only with the permission of the Owner, store such material and/or equipment in an insured warehouse. Any agreement for rental of such storage space by the Contractor shall contain a provision that the material and/or equipment thus stored shall not be subject a lien for

payment of storage. The Owner shall be protected against loss of or damage to such stored equipment by the terms and endorsements of the Contractor's insurance policies.

37. CONTRACT DRAWINGS

The Contract Drawings, titled:
SANITARY SEWER LIFT STATION TO SERVE SUNRISE SUBDIVISON are on file in the office of the Owner.

The aforesaid Drawings, together with the Proposal, Advertisement for Bids, Bidder's Bond, Instructions to Bidders General Conditions, Supplemental General Conditions (where required), Contract Agreement, Performance Bond, Labor and Material Bond, Specifications, and any Addenda, constitute the Contract Documents. The Drawings shall be used in connection with the Specifications and other Contract Documents, and shall constitute a part of the Contract as if set out herein in full.

The Owner reserves the right to amend or revise the drawings, and to furnish such other detail drawings as, in the opinion of the Engineers, may be necessary for the proper prosecution of the work. All such additional drawings shall have equal force and effect as the original drawings.

Any seeming conflict between the Drawings, Specifications and other Contract Documents, shall be submitted to the Engineer, and the Engineer's decision shall be final.

Drawings and Specifications are intended to be cooperative and where work is called for in one but not in the other, it shall be performed as though it were specified and/or indicated in both.

The figured dimensions and/or elevations shown on the Drawings shall be used by the Contractor for the layout of the work. Where the work of the Contractor is affected by finish dimensions, such dimensions shall be determined by the Contractor at the site of the work, and he shall assume the responsibility therefore.

38. SURVEYS, BASE LINES, BENCH MARKS, CONTROL POINTS

The Owner has made, or caused to be made, the preliminary surveys and topographic surveys necessary for the design of the work and the preparation of the drawings. Such survey information is shown on the drawings.

Where the work consists of construction of units, facilities, or components on a project site, the Engineer will establish base lines necessary for the location of the principal components of the work, will set control points on or reference points for the base lines, and will set a suitable number of bench marks adjacent to the work. The Contractor shall carefully preserve bench marks, reference points, and control points; and, in the case of destruction of or damage to such bench marks, reference points, or control points by the Contractor, or as a result of the Contractor's negligence, the Contractor shall be charged with the expense and damage resulting there from, and shall be responsible for any mistakes that may be caused by the loss or disturbance of such bench marks, reference points, or control points.

Based upon the base lines, bench marks, reference points, and control points thus provided, and on the information shown on the Drawings, the Contractor shall develop and make all detailed surveys necessary for construction, including; slope stakes; batter boards; grade hubs; stakes for locations of pipe lines, cables, conduits, poles, piles, etc.; and working points, lines and elevations.

Where the work consists of construction of water mains, sewers, or similar work, the Engineer will establish control points and reference points necessary for the location of the work, and will set a suitable number of bench marks along the route of the work. The Contractor shall carefully preserve bench marks, control points, and reference points; and, in the case of destruction of or damage to such bench marks, control points and reference points by the Contractor, or as a result of the Contractor's negligence, the Contractor shall be charged with the expense and damage resulting there from, and shall be responsible for any mistakes that may be caused by the loss or disturbance of such bench marks, reference points, or control points.

Based upon the bench marks, control points, and reference points thus provided, and on the information shown on the drawings, the Contractor shall develop and make all detailed surveys necessary for construction, including: slope stakes; batter boards; grade hubs; stakes for location of underground obstructions; and working points, lines and elevations.

39. LANDS AND RIGHTS-OF-WAY

The Owner will provide the lands shown on the Drawings, or described in the Specifications upon which the work under the Contract is to be performed, and which are to be used for access to the work. Any delay in furnishing these lands by the Owner that would prevent the Contractor from beginning the work or continuing the prosecution of the work, may be deemed to be proper cause for adjustment of the Time of completion of the work or for adjustment of the Contract Amount.

Any land and access thereto not specifically shown to be furnished by the Owner that may be required for temporary construction facilities or for storage of materials shall be provided by the Contractor with no liability to the Owner. The Contractor shall confine his equipment, apparatus and storage to such additional areas as he may provide at his own expense.

The Contractor shall not enter upon private property for any purpose without obtaining permission; and the Contractor shall be responsible for the preservation of all public property, trees, monuments, structures and improvements, along and adjacent to the street and/or right-of-way, and shall use every precaution necessary to prevent damage or injury thereto. The Contractor shall use suitable precautions to prevent damage to pipes, conduits, other underground structures, and utilities. The Contractor shall carefully protect from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location; shall not remove such monuments and property marks until directed; and shall replace them in original location when required.

40. ACCESS TO THE WORK

The Engineer and his representatives shall have free access to the work and shall be given full opportunity to inspect the working progress and to examine such records of the Contractor as may have bearing on the proper inspection and observation of the work. The Contractor

shall provide at the site of the work such space as would be reasonably adequate to serve a s a field office for representatives of the Engineer and as storage area for their equipment and supplies.

Representatives of the Margaret, AL

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shall also have free access to the work whenever it is in preparation or progress; and the Contractor shall provide proper facilities for such access and inspection by the representative of the above named authorities and/or agencies.

41. OBSERVATION OF THE WORK

The Engineer shall decide questions which may arise as to the quality and acceptability of materials and/or equipment furnished, the quality and acceptability of work performed, the note of progress of the work, interpretations of the Drawings and Specifications, and all questions as to the acceptable fulfillment of the Agreement on the part of the Contractor. The contractor shall abide by these decisions. The duties and responsibilities of the Engineer as set forth herein shall not be extended except through written consent of the Engineer and the Owner.

All materials and each part or detail of the work shall be subject at all times to observation by the Engineer and the Owner, and the Contractor shall be held strictly to the intent of the Contract Documents in regard to quality of materials, equipment and workmanship, and also in regard to the diligent execution of the Contract. Observation may be made at the site or at the source of material supply, whether mill, plant, or shop. The Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make his observations and construction review.

The Engineer's decision as to the acceptability or adequacy of the work shall be final and binding upon the Contractor. The contractor agrees to abide by the Engineer's decision relative to the performance of the work.

All claims of the Owner or the Contractor shall be presented to the Engineer for his decisions, which shall be final except in cases where time and/or financial consideration are involved, and such cases shall be subject to arbitration if not solved by mutual agreement between the Owner and the Contractor.

42. SUSPENSION OF WORK

The Owner shall have the right to suspend the work, wholly or in part, for such periods of time as he may deem necessary, when the prosecution of the work during unsuitable weather or under other condition s adversely affecting the work is considered to be unfavorable toward the satisfaction of the provisions of the contract, or when time is required to allow for supplying of materials meeting the requirements of the Contract Documents. The Contractor shall not claim damages, extra cost or additional monetary compensation by reason of such suspense of work, but shall be entitled to an adjustment in the Time of Completion of the Contract to compensate for the time during which work was suspended.

43. BREAKDOWN OF CONTRACT AMOUNT

Where unit prices form the basis for payment under the Contract, such unit prices as set forth in the Proposal, when applied to the corresponding quantities of work performed during a given estimate period, shall represent the value of work performed during that estimate period. The periodic partial payments to the Contractor for performance of work under the Contract, where unit prices form the basis for payment, shall be computed as described hereinabove. It shall be understood, however, that the estimated quantities of work shown to be paid for on unit price basis are given for the purposes of determining the approximate value of the work and comparing bids, that the Owner reserves the right to increase or decrease the estimated quantities of work as may be deemed reasonably necessary or desirable by the Owner to complete the work contemplated under this Contract, and that such increase or decrease in the estimated quantities of work shall in no way, neither vitiate this Contract nor give cause for claims or liability for damages.

Where lump sum prices form the basis for payment under the Contract, the Contractor shall, within ten (10) days of receipt of Notice to Proceed, submit a complete breakdown of the contract amount showing the value assigned to each part of the work, the total of the assigned values of all parts or components being equal to the total Contract Price. The division of the work into parts or components according to trades and/or sections of the Specifications shall be subject to the approval of the Engineer. Upon approval by the Engineer of the breakdown of the Contract Amount, such breakdown shall be used as the basis for estimating partial payments for work performed under the Contract. The costs shown in the breakdown shall not, however, be considered as fixing a basis for additions to or deductions from the Contract Price, nor shall they be considered as fixing a basis for computing the cost of Extra Work.

44. PERIODIC OR PARTIAL PAYMENTS

At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect his interest herein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing the approved payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within then (10) days of presentation to him of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate less the retain age. The retain age shall be an amount equal to 10% of said estimate until 50% of the work has been completed. At 50% completion further partial payments shall be made in full to the contractor and no additional amounts may be retained unless the engineer certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the contractor. At 50% completion or any time thereafter when the progress of the work is not satisfactory, additional amounts may be retained but in no event shall the total retain age be more than 10% of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the Contractor.

When the work has been substantially completed except for work which cannot be completed because of weather conditions, lack of materials or other reasons for non completion, owner may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the work to be completed. (Revised 2-15-78, PN 609)

Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

The Contractor agrees that he will indemnify and save the Owner and Engineer harmless from all claims arising out of the lawful demands of subcontractors, laborers, workmen, mechanics, and suppliers of machinery, parts, equipment, power tools, fuel, materials and other construction items, incurred in the performance of work under this Contract. The Contractor shall, at the Owners request, furnish satisfactory evidence that all obligations of the nature hereinabove described have been paid, discharged, or waived. If the Contractor should fail to do so, then the Owner may, after having served written notice on the Contractor, wither directly pay those unpaid bills of which the Owner has received written notice, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is presented that all such liabilities have been fully discharged, whereupon payment to the Contractor shall be resumed in accordance with the terms of this Contract, but, in no event, shall the provisions of this sentence be construed to impress upon the Owner any obligations to either the Contractor or his Surety. In paying any unpaid bills of the Contractor the Owner shall be deemed to be the temporary agent of the Contractor for this specified purpose; and any payment so made by the Owner shall be considered as a payment made under the Contract by the Owner to the Contractor, and the Owner shall not be liable to the Contractor for any such payments made in good faith.

45. PAYMENT FOR MATERIALS STORED

Materials and/or equipment stored shall meet the requirements of Article 36 of theses General Conditions.

No materials or supplies for the work shall be purchased by the Contractor or by any Subcontractor subject to any Chattel mortgage, or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials, equipment, and supplies used by him in the work, and that such title is free from all liens, claims or encumbrance.

Payment for materials stored will be conditioned upon evidence submitted to establish the Contractor's title to materials and/or equipment stored, such as paid invoices, receipts of payment, satisfied purchase agreements, etc. When value of materials sorted is allowed to be included in the Contractor's periodic estimates, the materials and/or equipment represented by such value shall become the property of the Owner, and the Contractor shall be responsible for safe guarding and using such materials and/or equipment in accordance with the provisions of the Contract Documents.

46. PAYMENT FOR EXTRA WORK

Extra work shall be undertaken and prosecuted in accordance with the provisions of Article 24 of these General Conditions.

Payment for Extra Work may be made by use of any one of the following methods:

a. Unit prices or combinations of unit prices which formed the basis of the original Contract.

b. A lump sum based upon the Contractor's estimate and accepted by the Owner.

c. Actual cost of performing the work plus fifteen percent (15%) of actual cost to cover supervision, overhead, bond and profit. The Contractor shall submit to the Owner itemized cost sheets showing actual cost of performance of the work. Actual costs are defined as follows:

(1) Labor cost, including time of foremen while engaged directly on the extra work.

(2) Labor insurance and Workmen's Benefits.

(3) Social Security, old age, and unemployment contributions.

(4) Ownership or rental costs of construction plant and/or equipment used in the actual prosecution of the extra work. Such costs shall not exceed the Associated General Contractors of America standard rental rates or rental rates prevailing in the area of the work. Charges for equipment already allocated to the project shall be based upon standard or prevailing monthly rental rates. Rental rates or use rates shall not be charged for equipment having a value of $50.00 or less, since equipment and tools of the lesser values stated are considered to be 'small tools", and as such, are considered to be part of overhead.

(5) Costs of materials and/or equipment entering permanently into the work.

(6) Costs of power and consumable supplies for the operation of power equipment where such costs are not included in rental rates or use charges.

47. ACCEPTANCE AND FINAL PAYMENT

When the Contractor shall have completed all of the work in accordance with the terms of the Contract Documents, he shall certify to the Owner that he has completed all of the work in full accordance with the provisions of the Contract Documents. The Contractor shall also prepare and submit to the Owner a Final Request for Payment in amount which shall be the Contract Amount plus all approved additions, less all approved deductions and less previous payments made.

The Contractor shall give notice of the completion of the work by advertisement in a newspaper of general circulation in the area in which the work has been performed and said

notice shall appear once each week for a period of four (4) consecutive weeks. Proof of publication of said notice shall be furnished by the Contractor to the Owner by affidavit of the publisher of the newspaper, to which affidavit shall be attached a copy of the Notice.

When the Owner and the Engineer have completed a review of the work and of the request for final payment, and have determined that al of the work has been fully and satisfactorily completed in accordance with the provisions of the Contract Documents, final payment of the amount determined to be due under the Contract will be made to the Contractor, provided that:

a. Any deficiencies in the work noted during the review shall have been satisfactorily corrected; and

b. The Contractor shall have submitted satisfactory evidence that all payrolls, all amounts due for labor and materials, and all other indebtedness connected with the work shall have been fully paid and satisfied, and that there are no outstanding claims or demands against the contractor in any manner connected with the work.

Acceptance of the work by the Owner will release the Contractor except as to the conditions of the Performance Bond and the Labor and Material Payment Bond, any legal rights of the Owner, required guaranties.

Acceptance of final payment by the Contractor shall be, and shall operate as, a release to the Owner of all claims and all liability to the Contractor for all things done or furnished in connection with the work, and for every act and neglect of the Owner and others relating to or arising out of the work.

48. TESTING OF COMPLETED WORK

After completion of work and before acceptance of the work by the Owner, the Contractor shall perform all tests as required by the Specifications. The cost of all labor, tools, materials and equipment necessary for making the required tests shall be borne by the Contractor. Any work found to be defective, faulty, or otherwise unsatisfactory shall be corrected by the Contractor without additional compensation.

49. INCIDENTALS ABSORBED

All work and material covered by these Specifications, or the drawings illustrating the same, or any work, or material that may be reasonable from the information given upon plans or in the Specifications and that is necessary to complete the work, or any tools, or appliances, or structures that may be constructed by the Contractor for carrying out the work shall be furnished by the Contractor and the cost of all this material and work shall be included in and absorbed by the prices and amounts mentioned in the Contractor's Proposal.

50. ASSIGNMENT OF CONTRACT

The Contractor shall not assign his Contract, nor any part thereof, nor any moneys due, or to become due hereunder, without prior written approval of the Owner. In case the Contractor with the consent of the Owner, assigns any or all of any money due or t become due under this contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to prior valid claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of work under this Contract.

51. ORAL AGREEMENT

No oral order, objections, claim, or notice given by any party to the others shall affect or modify any of the terms or obligations continued in any of the Contract Documents, and none of the Contract Documents shall be held to be waived or modified by reason of any act whatsoever, other than by a definitely agreed upon waiver or modification thereof in writing, and no evidence of any other waiver or modification shall be introduced in any proceeding.

52. 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 local office of the contractor or by personal service upon the representative of the Contractor in local charge of the work or by depositing in United States mail in a sealed envelope with sufficient postage prepaid, or delivered with charges prepaid to any telegraph company for transmission to the Contractor, addressed to such Contractor at the address stated by the Contractor in the Proposal, or at the local address used by the Contractor during the process of the work (or at such other address as the Contractor may from time to time designate to the Owner in writing). Any notice to or demand upon the Owner shall be sufficiently given if delivered to the Owner or deposited in the United States mail in a sealed, postage prepaid envelope, or delivered with charges prepaid to said Owner or to authorized representatives of the Owner, or to such address as the Owner may subsequently specify in writing to the contractor for such purposes.

53. TERMINATION FOR BREACH

In the event that any of the provisions of this contract are violated by the Contractor, or by any of his subcontractors the Owner may serve written notice upon the Contractor and Surety of its intention to terminate such Contract, such notices to be signed by the Owner and to contain the reason for such intentions to terminate the Contract. Unless within ten days after serving of such notice upon the Contractor such violation shall cease and arrangements satisfactory to the Owner for the correction of such default be made the Owner may finally terminate the Contract by giving the Contractor notice of such termination for the reasons stated in the initial notice. In the event of any such final termination, the Owner shall immediately serve notice thereof upon the Surety and the Surety shall have the right to take over and complete the performance of the contract, providing, however, that if the Surety does not in good faith commence performance there of within thirty (30) days from the date of the mailing of such notice to such surety, the Owner may take over the work and prosecute the same to completion by the Contract or otherwise for the account of and at the expense of the Contractor, and the contractor and his Surety shall be liable to the Owner for any excess cost occasioned thereby, and in such event the Owner may take possession of and utilize in completing the work such materials,

appliances, equipment, and plant as may be on the site of the work and necessary or useful therefore. The Contract may be terminated for convenience upon written notice by the Owner and the Contractor shall be paid for all items completed in accordance with the contract or as determined by the Engineer.

54. ADDITIONAL OR SUBSTITUTE BONDS

If, at any time after the execution of the Contract Agreement and the Surety Bonds attached thereto, the Owner should, for justifiable cause, deem the Surety or Sureties then upon the Performance and/or Payment Bonds, the Contractor shall within five (5) days after notice form the Owner to do so, furnish an acceptable bond (or bonds) in such form as may be satisfactory to the Owner and with such Surety or Sureties as may be satisfactory to the Owner. The premiums on such bond (or bonds) shall be paid by the Contractor. In such event no further payments to the Contractor shall be deemed to be due until such new and/or additional security for the performance of the work and/or for the payment for labor and materials shall have been furnished in form and amount satisfactory to the Owner.

SUPPLEMENTARY CONDITIONS

1. INSURANCE

a. Special Hazards or Perils the Public Liability and Property Damage Insurance Coverage of the contractor's operations shall provide adequate protection against death, bodily injury, or property damage resulting from blasting operations.

b. General

The provisions of Article 5. of the General Conditions shall be fully implemented by the Contractor. Name insured shall include the Owner and the Engineer "Owner and Engineer" shall also mean each of their officers, agents and employees. The Contractor shall furnish to the Owner "Owners and Contractor' Protective Liability Insurance Coverage for Operations of Designated Contractor. Coverage shall not be less than the following:

Bodily Injury $1,000,000 ea. occurrence, $2,000,000 aggregate
Property Damage $1,000,000ea. occurrence, $2,000,000 aggregate
Personal Injury $1,000,000 ea. occurrence, $2,000,000 aggregate
Excess Liability Umbrella $2,000,000ea. occurrence, $2,000,000 aggregate

The Named Insured shall be the Owner, and by endorsement attached to the Policy the Named Insured shall also be the Engineer. The "Owner" and "Engineer" shall also mean each of their officers, agents and employees. As an alternate to the above insurance the Contractor may name the "Owner" and the "Engineer" as additional insured on his General Liability, Automobile liability and excess liability policies to at least the minimum limits listed on page GC-6 of these Specifications.

Equipment – Sanitary Sewer

SCOPE: Furnish and install (2) submersible chopper pump(s). Each pump shall be capable of delivering the following performance points; 98.5 U.S. GPM at 97.1 TDH; with a shut off head of 105 TDH (minimum) and 30.5% minimum efficiency at 98.5 U.S.GPM. The pump motor shall be 10 HP (maximum), 1 Phase, 60 Hertz, 230 Volts. The pump (s) shall be manufactured by a company regularly engaged in the manufacture and assembly of submersible units for a minimum of five (5) years. The pump (s) shall be KSB KRT F 80-217/72XEG-S or approved Equal.

PUMP DESIGN: Each pump shall be capable of handling raw, unscreened domestic sewage consisting of water, fibrous materials, and solids at heavy consistencies. The pump shall be able to chop/ macerate solids without clogging with chopped solid size not less than 1 inch, and the chopping mechanism shall be an integral part of the pump. The pump(s) shall be capable of handling liquids with temperatures up to 104 degrees F continuous, 160 degrees F intermittent. Bearings shall be oil-lubricated and designed for 50,000 hours operating at minimum flow. Product shall be furnished with oil filled Inverter Duty Motors per NEMA MG-1, Part 31 with stator winding of the open type with Class H spike resistant magnet wire.

PUMP CONSTRUCTION: The volute, seal plate, adapter, motor housing and motor housing cap shall be constructed of high quality, ASTM A-48 Class 30 cast iron. Impeller shall be furnished in ASTM A-536 ductile iron with a keyed, tapered shaft bore. Pump(s) shall be coated with two coats of Axalta™ amido amine modified polymer satin gloss epoxy with a total 10 mil minimum thickness in the manufacturer's standard color. All exposed hardware shall be 300 series stainless steel including the lifting bail. Discharge connection shall be a standard 125 pound 4" flange, slotted to accommodate 4" ANSI or 100mm ISO flanges. The suction side of the volute shall contain 16 points of attachment for accessories and additional configurations including attachment of a 4" ANSI or 100mm ISO flange.

The pump shaft shall be 416 stainless steel with a tapered impeller fit to reduce rotor imbalance and minimize stress risers associated with stepped shafts. All gaskets shall be of the angular gland compression O-ring type eliminating critical slip fits and the possibility of damage during service associated with sliding O-ring sealing arrangements. The impeller shall be a mono vane design with pump out vanes.

The chopping mechanism shall consist of a stationary striker plate and a rotating slicing blade. Both blades shall only be constructed of high quality, ASTM A276 440C stainless steel, heat treated to 53-60 HRC. The slicing blade shall be press-fitted on to the impeller and secured to the impeller by four stainless steel pins. The striker plate shall be fixed to the volute in eight locations. The striker plate shall be adjustable to maintain a clearance of 0.001" to 0.008" between the striker plate and slicing blade. The bladed impeller assembly shall be dynamically balanced to ISO G6.3 specifications. The striker plate shall be sealed internally against the volute with an O-ring.

The chopping mechanism shall consist of dual wear ring system. The slicing blade shall operate as a wear ring for the impeller along the outer diameter of the impeller assembly. The matching volute shall be provided with an external replaceable bronze wear ring at the inlet.

The tandem mechanical shaft seals shall be of the single spring design operating in an intermediate oil-filled seal cavity. Pump-out vanes on back side of the impeller shroud shall be large enough to efficiently expel solids away from the seal area. The materials of construction shall be silicon carbide vs. silicon carbide for the pump-end seal and carbon vs. ceramic for the motor-end seal, lapped and polished to a tolerance of one light band, 300 series stainless steel hardware, and Buna-N elastomeric parts. The pump-end seal shall be pinned in place to prevent rotation of the stationary seat and shall seal to the pump housing via an O-ring to maximize heat transfer. Cup mounted seats shall not be considered equal. The seal shall be commercially available and not a pump manufacturer's proprietary design. A moisture sensor detection system consisting of two probes shall be integrated within the oil-filled seal chamber which is isolated from the motor chamber. Units sensing moisture within the motor chamber are not acceptable. Moisture sensing devices utilizing one probe and grounding through the pump case or utilizing a float device are not acceptable. The leads for the moisture detector and temperature sensors shall be contained within the power cable, except that for 1/0 cables, the sensor leads will be in a separate cable.

The pump motor shall be sized to be non-overloading throughout the entire system operating range. The rotor and stator assembly shall be of the standard frame design and the stator pressed into the motor housing for mechanical stability. The motor shall be constructed with the windings operating in a sealed environment containing clean dielectric oil. Manufacturer to supply submergence requirements for continuous operation.

Motors shall be dielectric oil filled for optimal thermal management and maximum bearing life. Air-filled motors with grease-filled bearings shall not be acceptable. The motor windings shall be of Class H, spike-resistant insulation. The motor shall meet the NEMA Design B standard and be Inverter Duty Rated per NEMA MG1, part 31.

The pump shaft shall be of 416 stainless steel, keyed and tapered for the matching impeller. The lower bearing shall be of the double row ball type, locked in position to accept radial and axial thrust loads, and the upper bearing of the single ball type for radial loads. Bearings shall operate in an oil bath environment for superior lubrication, cooling and life.

THREE PHASE: Three thermal sensors (one per phase) shall be embedded in the end coil of the stator windings, wired in series and used to monitor stator temperatures. This shall be used in conjunction with an external motor overload protection device and wired to the control panel through the single power cable.

The pump shall be equipped with (50/75/100) ft. of a CSA-qualified submersible quick connect power cable constructed in accordance with type W guidelines and shall include the moisture and temperature sensor leads. For 21 Frame pumps, the cable entry system shall consist of a voltage-selectable expanding rubber plug held in place by a cast stainless steel plate indicating voltage and max amps. For 28 Frame pumps, cord connection shall be a pump mounted plug and a rigid cord socket contained by a cast iron housing bolted to the motor with epoxy-potted cable connections and sealed by compressed O-rings.

PUMP TEST: The pump manufacturer shall perform the following inspections and tests in accordance with Hydraulic Institute Type B standards before shipment from the factory:

1. A check of the motor voltage and frequency shall be made as shown on the name plate.
2. A motor and cable insulation test for moisture content or insulation defects shall be made per CSA criteria.
3. A 20-minute conditioning mechanical run-in shall be performed.
4. The pump shall be run to determine that the unit meets five predetermined hydraulic performance points.
5. A performance curve from the production line test showing head versus flow shall be included in the Installation and Operation Manual shipped with each pump.
6. A written report shall be available showing the aforementioned tests have been performed in accordance with the specifications.

START-UP: The pump(s) shall be tested at start-up by a qualified representative of the manufacturer. A start-up report as provided by the manufacturer shall be completed before final acceptance of the pump(s).

DOCUMENTATION: The manufacturer, if requested, will supply a minimum of 2 sets of standard submittal data; Standard submittal data consist of:

1. Pump catalog data;
2. Pump performance curve;
3. Break Away Fitting (BAF) data;
4. Access cover data;
5. Typical installation drawing;
6. Control panel data
7. Panel wiring schematic;
8. Accessory data;

9. Installation & Operation Manuals with Parts List.

Duplex VFD Pump Control Panel

Control panels will be provided for each pump station, designed to automatically operate pumps in response to excursions in liquid level as specified for the station. The control panel is UL 508A certified and listed, completely assembled, wired, tested and properly labeled prior to shipment. The control panel is supplied by the pump manufacturer or distributor to insure compatibility between pumps and controls.

The pump control will be housed in a NEMA 4X stainless steel enclosure with 3pt pad lockable latch and aluminum inner door. The inner door will be 12 gauge with a .75 inch 90 degree break on all 4 sides. Wiring will have not less than 600 volt insulation with a 75 degree Celsius rating. The enclosure will be adequate size to provide proper spacing of the equipment and have a properly sized cooling system if needed.

The panel will provide the capability of converting single phase supply power to 3 phase power using VFD drives.

The panel will consist of the following components:
Voltage 230V 1 phase input power with 230V 3 Phase pump power.
Hand-Off-Automatic switch for each pump.
Overload and short circuit protection for each pump.
Finger safe control power fuse and holder.
120 volt control voltage.
Red high level alarm light.
Supply power distribution block.
Circuit breaker for each pump.
Generator receptacle.
Generator and Main breaker with interlock mechanism.
Field wiring connection points will be supplied using terminal strips.
Pump control will use 4 floats.
Pump starting will be using VFD Drives for phase conversion.
Pump seal leak detection and motor thermal monitor relay by pump manufacturer.
Pump seal fail amber warning pilot light.
High level contact output on terminal strip for external monitoring.
Duplex cross wired alternator with selector switch.
Green pump running pilot lights.
Pilot lights will be LED for long life.
Breakers, pilot lights and switches will be oil tight mounted on inner door.
Terminal strip will be marked with thermal setting ink for durability.
All Mounting screws will be stainless machine with backplate holes drilled and tapped.

*** *Panel Shall be coordinated and compatible with existing Dexter Fortson Telemetry as located at the Site. Sample Specifications for the telemetry are included.*

Technical Specifications – Sanitary Sewer

Part 1 - MEASUREMENT AND PAYMENT

1.1 SECTION INCLUDES

A. Measurement for payment on a unit price basis shall be as described below. Payment for each unit installed shall be made according to the unit price bid, as listed in the Price Form. Only those items appearing in the Unit Price Form will be considered for payment on a unit price basis.

B. Even though an item of work is included in the technical specifications, if it is not both covered herein and specifically itemized in the Unit Price Form, payment for it shall not be separately made. Such work shall be considered a necessary part of or incidental to its related work.

C. "Total Cost" on the Bid Form shall be calculated by multiplying "Approximate Quantity" by "Unit Price" on the Unit Price Form and adding all items together. In the event of a mathematical error on the bid form, this procedure shall be used to determine the actual price bid.

1.2 SCHEDULE OF PAY ITEMS

A. **Bidding Requirements and Contract Forms**

1. Bidding Requirements and Contract Forms are not pay items. They shall be considered an integral part of the construction, and unit prices bid for items with which Bidding Requirements and Contract Forms are connected shall be full compensation for these items and for all labor, materials, and equipment required to complete these items in accordance with the drawings and specifications.

B. **General Requirements**

1. General Requirements are not pay items. They shall be considered an integral part of the construction, and unit prices bid for items with which General Requirements are connected shall be full compensation for these items and for all labor, materials, and equipment required to complete these items in accordance with the drawings and specifications.

C. **Erosion Control**

1. Erosion Control is not a pay item. It shall be considered an integral part of the construction, and unit prices bid for items with which Erosion Control are connected shall be full compensation for these items and for all labor, materials, and equipment required to complete these items in accordance with Federal, Local, and State laws and requirements.

D. Unclassified Excavation for Utilities

1. Unclassified excavation for utilities is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices bid for utilities with which unclassified excavation is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.
2. Rock excavation for utilities is NOT a pay item. It shall be considered and designated a necessary part of the construction, and unit prices bid for utilities with which rock excavation is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.

E. Site Clearing

1. Site Clearing for utilities is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices bid for utilities with which Site clearing is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.

F. Dewatering

1. Dewatering for utilities is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices bid for utilities with which dewatering is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.

G. Excavation support and protection

1. Excavation support and protection is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices bid for work with which excavation support and

protection is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.

H. Earthwork

1. Earthwork is not a pay item. It shall be considered and designated a necessary part of the construction, and unit prices bid for work with which earthwork is connected shall be full compensation for this item and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.

I. Sanitary Sewerage

1. The quantities of pipe for which payment will be allowed shall be expressed in linear feet for each size and type of pipe in terms of the horizontal lengths of pipe installed in place at various depths as measured along the centerline with no deductions for manholes or fittings. Such payment shall be full compensation for the furnishing and installing of pipe at design grade, jointing materials (including connections to existing manholes), excavation, shoring, backfill and all other work necessary for and incidental to completion of the work.

2. The quantities of ductile iron fittings for which payment will be allowed shall be expressed per pound of fittings installed. Such payment shall be full compensation for the furnishing and installing of fittings, stone, materials, labor, testing, etc. including and all other work necessary for and incidental to completion of the work.

3. The quantities of precast concrete manholes for which payment will be allowed shall be expressed in Lump Sum feet for each size of manhole. Overall manhole depth shall be measured from finished grade ring elevation to invert of outlet pipe and shall include manhole steps, rubber boot, external sealing sleeve, excavation, backfill, stone bedding, and all other items of work necessary and incidental to completion of the work. (including ring and cover)

4. The Lump Sum price for the Sanitary Sewer Lift Station for which payment will be made shall be the installation of the pumps, building, pre-cast wet well, access hatch, concrete, piping, fittings, pipe supports, controls, power, fencing, landscaping and all other associated appurtenances. Payment shall be at the Lump Sum price in the Bid Form and shall include all items necessary for and incidental to the completion of the work.

5. The quantities of steel casing for which payment will be allowed shall be expressed in linear feet for each size of steel casing pipe in terms of the horizontal lengths of casing installed as measured along the centerline. Such payment shall be full compensation for the furnishing and installing of casing, casing spacers, end caps, etc., stone, jointing materials, concrete, labor, testing, etc. including and all other work necessary for and incidental to completion of the work over the given distance of casing specified for each area.

6. The Lump Sum price for Connection to Existing Sanitary Sewer System for which payment will be made shall be the connections made to the sanitary sewer force main and gravity line. Payment shall be at the Lump Sum price for each listed in the Bid Form and shall include all items necessary for and incidental to the completion of the work.

7. The quantities of gravel for the access drive for which payment will be allowed shall be expressed in square yards over which gravel is placed. Such payment shall constitute full compensation for the performance of all work items necessary for and incidental to completion of the work and for the furnishing of all labor, tools, equipment, and incidentals necessary and appurtenant to the completion of these items to the complete satisfaction of the governing authority. The maximum width paid on the access drive shall be 12 feet wide along the access path and as shown at the lift station. Approximately 3” thick of #57 stone.

J. Boring and Casing for Sanitary Sewers and Water Lines

1. The linear foot unit price for the HDPE casing pipe shown on the drawings and in the Bid Form shall include the installation and pipe and all work incidental thereto, complete and in place as shown on the drawings

K. **Sewer Flow Control**

1. Sewer Flow Control is not a pay item and shall be considered and designated as incidental to construction.

L. **Lawns and Grasses**

1. Lawns and grasses are not a pay item. They shall be considered and designated a necessary part of the construction, and unit prices bid for items with which lawns and grasses are connected shall be full compensation for these items and for all labor, materials, and equipment required to complete the item in accordance with the drawings and specifications.

M. **Concrete Reinforcement**

1. Concrete Reinforcement is not a pay item and shall be considered and designated as incidental to construction.

N. **Concrete for Utility Lines**

1. Concrete for cradles, anchors, caps or thrust blocking is not a pay item and shall be considered and designated as incidental to construction.

Part 2 - SUBMITTALS

1.3 RELATED DOCUMENTS

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

1.4 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.5 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.6 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with initial construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Engineer's final release or approval.
    g. Scheduled date of fabrication.
    h. Scheduled dates for purchasing.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.7 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will **not** be provided by Engineer for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow **15** days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
3. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Name of subcontractor.
    f. Name of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).

    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return without review] submittals received from sources other than Contractor.

    a. Transmittal Form for Paper Submittals: Use contractor’s standard transmittal form if approved by Engineer.
    b. Transmittal Form for Paper Submittals: Provide locations on form for the following information:

        1) Project name.
        2) Date.

3) Destination (To:).
4) Source (From:).
5) Name and address of Engineer.
6) Name of Contractor.
7) Name of firm or entity that prepared submittal.
8) Names of subcontractor, manufacturer, and supplier.
9) Category and type of submittal.
10) Submittal purpose and description.
11) Specification Section number and title.
12) Specification paragraph number or drawing designation and generic name for each of multiple items.
13) Drawing number and detail references, as appropriate.
14) Indication of full or partial submittal.
15) Transmittal number.
16) Submittal and transmittal distribution record.
17) Remarks.
18) Signature of transmitter.

E. Options: Identify options requiring selection by Engineer.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Action Submittals: Submit one paper copy (and One email copy) of each submittal unless otherwise indicated. Engineer will return one copy. Make copies of returned submittal as needed for distribution.
2. Informational Submittals: Submit four paper copies of each submittal unless otherwise indicated. Engineer will not return copies.
3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

a. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in the following format:

    a. Five paper copies of Product Data unless otherwise indicated. Engineer will return one copy.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 24 by 36 inches.

3. Submit Shop Drawings in the following format:

    a. One email Copy in PDF format. Returns will be completed by email.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of applicable Specification Section.
    e. Specification paragraph number and generic name of each item.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Engineer will retain two Sample sets; remainder will be returned.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:
    a. Three paper copies of product schedule or list unless otherwise indicated. Engineer will return one copy.

F. Coordination Drawing Submittals: Comply with requirements specified in Section 01310 "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Section 01320 "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01290 "Payment Procedures."

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01400 "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01770 "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Section 01782 "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified.

M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01770 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents. Engineer will return submittals that do not bear Contractor’s approval stamp without action.

3.2 ENGINEER'S ACTION

A. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:

1. “Approved”: The work covered by the submittal may proceed, provided it complies with the Contract Documents.

2. "Approved As Noted": The work covered by the submittal may proceed, provided it complies with the Engineer's notations and corrections on the submittal and the Contract Documents.

3. "Revise and Resubmit": Do not proceed with the work covered by the submittal, including purchasing, fabrication, delivery, or other activity for the product submitted. Revise or prepare a new submittal according to Engineer's notations and corrections.

4. "Rejected": Do not proceed with the work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.

B. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Engineer without action.

UNCOVERING AND CORRECTION OF WORK

3.3 RELATED DOCUMENTS

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

3.4 SUMMARY

A. This section specifies the requirements for uncovering and correction of work.

3.5 UNCOVERING OF WORK

A. If the Contract Documents, laws, ordinances, rules, regulations or orders of any Public Authority having jurisdiction require any portion of the Work to be inspected, the Contractor shall give the Engineer timely notice of its readiness so that the Engineer may observe such inspections.

B. If a portion of the Work is covered contrary to the Engineer's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Engineer, be uncovered for the Engineer's observation and be replaced at the Contractor's expense without change in the Contract Time.

C. If a portion of the Work has been covered which the Engineer has not specifically requested to observe prior to its being covered, the Engineer may request to see such Work and it shall be uncovered by the Contractor.
   1. If such Work is in accordance with Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner.
   2. If such Work is not in accordance with Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

3.6 CORRECTION OF WORK

A. The Contractor shall promptly correct the Work rejected by the Engineer or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed.

B.

1. Costs of correcting such rejected Work, including additional testing, inspections, and compensation for the Engineer's services and expenses made necessary thereby, shall be at the Contractor's expense.

C. The quality of materials and workmanship used in restoring this work shall be in full compliance with the requirements of the Contract Documents.

CUTTING AND PATCHING

3.7 RELATED DOCUMENTS

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

3.8 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:
1. Division 1 Section "Selective Demolition" for demolition of selected portions of the alterations.
2. Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

3.9 DEFINITIONS

A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

3.10 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 4 - PRODUCTS

4.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 5 - EXECUTION

5.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
   1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
   2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

5.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

5.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete or Asphalt: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
   5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
   1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
   2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
   3. Exterior Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

EROSION AND SEDIMENT CONTROL

PART 6 -

6.1 SECTION INCLUDES

6.2 The work shall include erosion and sediment control on all cut and fill operations, excavation, backfill, or other construction activities within the limits of the construction site, within any temporary or permanent easements, and within any borrow site used during the period of construction. The protection of these sites shall continue throughout the construction period. During dry weather, sprinkle the sites with water or use other means as necessary to provide dust control.

6.3 QUALITY ASSURANCE

6.4 All erosion and sediment control work shall comply with applicable requirements of governing authorities having jurisdiction. The specifications and drawings are not represented as being comprehensive, but rather convey the intent to provide complete slope protection and erosion control for both the Owner's and adjacent property.

6.5 Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas, which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attention.

6.6 All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time, and the length of time of exposure.

6.7 Surface water runoff originating upgrade of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.

6.8 When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving stream, provide measures to control both

the velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream.

6.9 All land-disturbing activities shall be planned and conducted so as to minimize off-site sedimentation discharge and damage.

6.10 The Contractor is responsible for cleaning out and disposing of all sediment once the storage capacity of the sediment facility is reduced by one-half.

6.11 Frequent inspections of erosion and sediment control measures by the Contractor are required. Repair or replacement shall be made promptly.

PART 7 - PRODUCTS

7.1 MATERIALS

7.2 Temporarily stabilize areas from which topsoil has been removed and topsoil stockpiles by seeding fast growing annuals such as cereal, rye, annual ryegrass, Sudan grass, and millet that provide quick protection. These annual grasses shall be seed certified by the State Department of Agriculture and shall be worked into the soil when the site is prepared for final seeding of more permanent species. To promote temporary vegetation establishment, use commercial lime and fertilizer on exposed areas subject to severe erosion.

7.3 Strawbales: Bales shall be either wire bound or string tied with bindings orientated around sides rather than over and under.

7.4 Crushed stone for stabilized construction entrance shall conform to ASTM Designation C-33, size No. 2 (1-1/2" to 2-1/2").

7.5 Silt fence shall be "Envirofence" preassembled silt fence by Mirafi, Inc., or its equivalent.

7.6 Sandbags anchored with steel rods or brush obtained from clearing operations may also be used to control sediment loss.

PART 8 - EXECUTION

8.1 PROTECTION

8.2 Conduct construction so as to provide the site with maximum protection from erosion at all times.

8.3 Conduct excavation activities to provide erosion and sediment control as follows:

1. Do not start clearing and excavation until a firm construction schedule is submitted to and approved by the Engineer. Continuously coordinate the schedule with the clearing and excavation activity.
2. Place the excavated material so as not to block any drainage area. Replace this excavated material in the trench immediately after repairs or installations have been completed and are approved by the Engineer.
3. Retain natural vegetation whenever feasible.
4. Restore and cover exposed areas subject to erosion as quickly as possible by means of seeding and mulching. Use diversion ditches or other methods as appropriate to prevent storm water from running over the exposed area until seeding is established as specified.
5. Take particular care along streams and drainage ditches so that fallen trees, debris, and excavated material will not adversely affect the streamflow. Exercise care to minimize the destruction of streambanks. Wherever the streambanks are affected by construction, reduce the slope of the streambanks to provide a suitable condition for vegetative protection. Minimize land exposure in terms of area and time.
6. Cover exposed excavated areas with mulch or vegetation.
7. Mechanically retard the rate of runoff water.
8. Trap the sediment contained in the runoff water.

9. Divert water from erosive areas.
10. Take care during the hauling of materials, etc., to keep vehicles from creating a severe erosion problem. Proper scheduling of operations and prompt repair of ruts created during this operation is necessary from this source.
11. Control dust by sprinkling or other means as necessary to keep it to a minimum.
12. Stabilize roadways and driveways as soon as feasible.

8.4 Regrade and reseed surfaces eroded or otherwise damaged during any and all construction operations.

8.5 STRAW BALE BARRIERS

8.6 Excavation shall be to the width of the bale and the length of the proposed barrier to a minimum depth of 4 inches.

8.7 Bales shall be placed in a single row, lengthwise on proposed line, with ends of adjacent bales tightly abutting one another. In swales and ditches the barrier shall extend to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale.

8.8 Staking shall be accomplished to securely anchor bales by driving at least two stakes or rebars through each bale and a minimum of 8 inches into the ground.

8.9 The gaps between bales shall be filled by wedging straw.

8.10 The excavated soil shall be backfilled against the barrier. Backfill shall conform to ground level on the downhill side and shall be built up to 4 inches on the uphill side. Loose straw shall then be scattered over the area immediately uphill from a straw barrier.

8.11 STABILIZED CONSTRUCTION ENTRANCE

8.12 Stone size: Use ASTM designation C-33, size No. 2 (1-1/2" to 2-1/2"). Use crushed stone.

8.13 Length: As effective, but not less than 150 feet.

8.14 Thickness: Not less than eight (8) inches.

8.15 Width: The full width of all points of ingress or egress, but not less than 20 feet.

8.16 Washing: When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public right-of-way. When washing is required, it shall be done on an area stabilized with crushed stone, which drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch, or watercourse through use of sand bags, gravel, boards or other approved methods.

8.17 Maintenance: The entrance shall be maintained in a condition, which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. It is recommended that a layer of medium grade filter fabric be placed on the ground prior to placing stone. This would help prevent infiltration of fines into the stone. All sediment spilled, dropped, washed or tracked onto public rights-of-way shall be removed immediately.

8.18 SILT FENCING

8.19 Excavate a 6-inch by 6-inch trench along the lower perimeter of the site, when using premanufactured silt fencing.

8.20 Install the silt fence in accordance with the manufacturer's recommendations and the details shown on the plans.

8.21 Pile brush in a row along the perimeter of the land disturbing activities. Windrow brush along contour as close as possible. Brush may require compaction. Construction equipment may be used to accomplish this.

8.22 INLET PROTECTION

8.23 Excavation around the drop inlet shall be performed to accommodate the width of the bale and to a minimum depth of 4 inches.

8.24 Placement of bales shall be lengthwise in a single row surrounding the drop inlet. Adjacent bales shall be pressed together and loose straw then wedged between them to prevent water entering between bales.

8.25 Staking shall be accomplished to securely anchor bales by driving at least two stakes or rebars through each bale and a minimum of 8 inches into the soil.

8.26 Backfill shall consist of the excavated soil and be compacted against the straw barrier.

8.27 DUST CONTROL

8.28 Dust generated from the contractor's performance of the work, either inside or outside the right-of-way shall be controlled by the contractor by applying either water or calcium chloride.

8.29 Water and calcium chloride shall be provided in the amounts and locations in accordance with general local practice.

8.30 The Contractor shall acquire an NPDES permit for this project, if such permit is required. The above list is a guideline. All necessary erosion control is the responsibility of the contractor. The Contractor shall be bound by all requirements of the NPDES Permit and shall be responsible for any fines or penalties which may be assessed as a result of failure to comply.

UNCLASSIFIED EXCAVATION FOR UTILITIES

PART 9 - GENERAL

9.1 SECTION INCLUDES

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

9.2 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

9.3 JOB CONDITIONS

A. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

B. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

C. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.
   1. Provide minimum of 48-hour notice to Engineer, and receive written notice to proceed before interrupting any utility.

D. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

E. Use of Explosives: Do not bring explosives onto site or use in work.

F. Preserve from damage surveying monuments, property pins, and similar items. If disturbed or damaged by construction operations, pay the cost of restoration by a registered surveyor.

G. Costs for locating, maintaining, and protecting existing facilities shall be merged in the unit price of the pipeline.

H. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

9.4 PROTECTION

A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.

B. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.

C. Notify Engineer of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.

D. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

E. Grade excavation top perimeter to prevent surface water run-off into excavation.

F. Protect excavation bottoms against freezing when atmospheric temperature is less than 35^{o}F.

G. Protect trees, shrubbery, fences, poles, and all other property and surface structures during construction operations unless their removal for purposes of construction is authorized by Engineer. Fences, poles, or other man made surface improvements which are moved or disturbed shall be restored to the original conditions after construction is completed. Trees, shrubbery, or other vegetation which are approved for removal in order to facilitate construction operations shall be removed completely, including stumps and main roots. Responsibility for damage or claims for damage caused by construction operations to shrubbery or other landscape improvements which were not authorized for removal by Engineer shall be assumed by Contractor.

9.5 SAFETY

A. Barricades, Guards, and Safety Provisions: Place and maintain barricades, fences, construction signs, torches, flashing lights, lanterns, guards, and flagmen as required during the progress of the construction work and until it is safe for traffic to use the roads and streets. Material piles, equipment, and pipe which may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. The rules and regulations of OSHA and appropriate authorities respecting safety provisions shall be observed.

B. Structure Protection: Provide temporary support, protection, and maintenance of underground and surface structures, drains, sewers, and other obstructions encountered during the progress of the work. Structures which may have been disturbed shall be restored upon completion of the work.

9.6 DEVIATIONS OCCASIONED BY STRUCTURES OR UTILITIES

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

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

9.7 DUST CONTROL

A. When ordered by Engineer, furnish and distribute over traveled road surfaces which have not been fully restored an application of regular flake calcium chloride having a minimum calcium chloride content of 77 percent, or a brine solution consisting of 1.5 pound of calcium chloride and one pound of sodium chloride per 100 gallons of water applied by a pressure distributor. Rate of application shall be 3 pounds/square yard for the flake calcium chloride, and 0.48 gallon/square yard for brine solution.

B. Whenever dust control is necessary, it shall be considered an integral part of the work, and no separate payment shall be made for it.

9.8 MAINTENANCE OF TRAFFIC AND CLOSING OF STREETS

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

PART 10 - PRODUCTS

10.1 SOIL MATERIALS

A. Satisfactory soil materials are defined as those complying with ASTM D2487 unified soil classification system groups GW, GP, GM, SM, SW and SP.

B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 unified soil classification system groups GC, SC, ML, MH, CL, CH, OL, OH and PT.

C. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1-1/2" sieve and not more than 5% passing a No. 4 sieve.

D. Backfill and Fill Materials: Satisfactory soil materials of clay, rock or gravel not larger than 2" in any dimension, free of debris, waste, frozen materials, vegetable and other deleterious matter.

PART 11 - EXECUTION

11.1 PREPARATION OF THE SITE

A. Before starting construction, remove from the work site all vegetable growth (except as hereinafter excluded), debris, and/or other objectionable matter as well as any buildings and/or other structures that

the drawings and/or the Engineer specifically indicate are to be removed. Dispose of this refuse material in a manner acceptable to the Engineer.

B. In certain areas it may be desirable for existing trees, shrubs, or other vegetation on the site to be preserved for the permanent landscape. Such vegetation may be shown on the drawings, specifically listed in the specifications, marked on the site, or identified by the Engineer. In no case damage or remove such growth without written permission from the Owner.

C. If the area to be excavated is occupied by trees, brush, or other vegetable growth, clear such growth and grub the excavated area, and remove all large roots to a depth of not less than 2' below the bottom of the proposed construction. Dispose of the growth removed in a manner satisfactory to the Engineer. Fill all holes or cavities created during this work that extend below the subgrade elevation with suitable material, and compact to the same density as the surrounding material.

D. Trees, cultivated shrubs, etc., that are situated within public rights-of-way and/or construction easements through private property but not directly within the excavation area shall remain undisturbed unless it is necessary to remove them so that the work can be performed safely and unless their removal is specifically ordered by the Engineer. Take special precautions to protect and preserve such growth throughout all stages of the construction.

E. Preparation of the site shall be considered an integral part of the excavation and one for which no separate payment shall be allowed.

11.2 EXCAVATION

A. Excavation is Unclassified, and includes excavation to subgrade elevations regardless of character of materials and obstructions encountered. It shall be understood that any reference to rock, earth, or any other material on the drawings is not to be taken as an indication of classified excavation or the quantity of either rock, earth, or any other material involved.

B. The bidder shall draw his own conclusions as to the conditions to be encountered.

11.3 UNSUITABLE MATERIALS

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

11.4 ROCKS AND BOULDERS

A. Any material that is encountered within the limits of the required excavation that cannot be removed by traditional excavation methods, including rock, boulders, masonry, hard pan, chert, shale, street and sidewalk pavements, and/or similar materials, shall be considered as unclassified excavation, and no separate payment will be made therefor.

B. Should rock be encountered in the excavation, remove it by hammering, chipping or otherwise. Blasting will not be allowed.

C. Excavate rock to a minimum horizontal distance of 12” outside the pipe in each direction and to a depth of not less than 12” below the bottom of the pipe if rock extends to such depth. Then backfill the space below the pipe with ALDOT No. 67 crushed stone, tamp to the proper grade, and make ready for construction.

11.5 DISPOSAL OF MATERIALS

A. Whenever practicable, all materials removed by excavation that are suitable for backfilling pipe trenches or for other purposes shown on the drawings or directed by the Engineer shall be used for these purposes.

Any materials not so used shall be considered waste materials and disposed of by the Contractor as specified below.

B. Waste materials may be deposited in spoil areas at locations approved by the Engineer. Waste materials shall be properly disposed of off-site if no spoil area is approved by the Engineer. Provide a copy of executed property owner agreements to Engineer. Do not leave in unsightly piles but instead spread in uniform layers, neatly level, and shape to drain. Seed as specified in Section 02920, Lawns and Grasses.

C. Once any part of the work is completed, properly dispose of all surplus or unused materials (including waste materials) left within the construction limits of that work. Leave the surface of the work in a neat and workmanlike condition, as described below.

D. The disposal of waste materials shall be considered an integral part of the excavation work and one for which no separate payment shall be allowed.

11.6 EXCAVATION FOR MANHOLES AND STRUCTURES

A. Excavation for manholes, inlets, and other incidental structures shall not be greater in horizontal area than that required to allow a 2' clearance between the outer surface of the structure and the walls of the adjacent excavation or of the sheeting used to protect it. The bottom of the excavation shall be true to the required shape and elevation shown on the drawings. No earth backfilling will be permitted under manholes, inlets, headwalls, or similar structures. Should the Contractor excavate below the elevations shown or specified, he shall at his own expense, fill the void with either concrete or granular material approved by the Engineer.

11.7 SHEETING, SHORING AND BRACING

A. Take special care to avoid damage wherever excavation is being done. Sufficiently sheet, shore, and brace the sides of all excavations to prevent slides, cave-ins, settlement, or movement of the banks and to maintain the specified trench widths. Use solid sheets in wet, saturated, or flowing ground. All sheeting, shoring, and bracing shall have enough strength and rigidity to withstand the pressures exerted, to keep the walls of the excavation properly in place, and to protect all persons and property from injury or damage. Separate payment will not be made for sheeting, shoring, and bracing, which are considered an incidental part of the excavation work.

B. Wherever employees may be exposed to moving ground or cave-ins, shore and lay back exposed earth excavation surfaces more than 5' high to a stable slope, or else provide some equivalent means of protection. Effectively protect trenches less than 5' deep when examination of the ground indicates hazardous ground movement may be expected. Guard the walls and faces of all excavations in which employees are exposed to danger from moving ground by a shoring system, sloping of the ground, or some equivalent protection.

C. Comply with all OSHA standards in determining where and in what manner sheeting, shoring, and bracing are to be done. The sheeting, shoring, and bracing system shall be designed by a professional engineer licensed in the State of Alabama and shall be subject to approval by the Engineer. However, such approval does not relieve the Contractor of the sole responsibility for the safety of all employees, the effectiveness of the system, and any damages or injuries resulting from the lack or inadequacy of sheeting, shoring, and bracing.

D. Where excavations are made adjacent to existing buildings or structures or in paved streets or alleys, take particular care to sheet, shore, and brace the sides of the excavation so as to prevent any undermining of or settlement beneath such structures or pavement. Underpin adjacent structures wherever necessary, with the approval of the Engineer.

E. Do not leave sheeting, shoring, or bracing materials in place unless this is called for by the drawings, ordered by the Engineer, or deemed necessary or advisable for the safety or protection of the new or existing work or features. Remove these materials in such a manner that the new structure or any existing structures or property, whether public or private, will not be endangered or damaged and that cave-ins and slides are avoided.

F. Fill and compact all holes and voids left in the work by the removal of sheeting, shoring, or bracing as specified herein.

G. The Contractor may use a trench box, which is a prefabricated movable trench shield composed of steel plates welded to a heavy steel frame. The trench box shall be designed to provide protection equal to or greater than that of an appropriate shoring system.

H. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

I. Do not allow water to accumulate in excavations. Remove water to prevent softening of subgrade foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

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

11.8 BORROW EXCAVATION

A. Whenever the backfill of excavated areas or the placement of embankments requires more material than is available from authorized excavations, or whenever the backfill material from such excavations is unsuitable, then obtain additional material from other sources. This may require the opening of borrow pits at points accessible to the work. In such cases, make suitable arrangements with the property owner and pay all incidental costs, including any royalties, for the use of the borrowed material. Before a borrow pit is opened, the quality and suitability of its material shall be approved by the Engineer.

B. Excavate borrow pits in such a way that the remaining surfaces and slopes are reasonably smooth and that adequate drainage is provided over the entire area. Construct drainage ditches wherever necessary to provide outlets for water to the nearest natural channel, thus preventing the formation of pools in the pit area. Leave the sides of borrow pit cuts at a maximum slope of 2:1 unless otherwise directed by the Engineer.

C. Properly clear and grub borrow pits, and remove all objectionable matter from the borrow pit material before placing it in the backfill.

D. The taking of materials from borrow pits for use in the construction of backfill, fills, or embankments shall be considered an incidental part of the work; no separate payment shall be made for this.

11.9 BACKFILLING

A. Conduct backfilling around manholes, inlets, outfalls, and/or structures in the same manner as specified for water lines, gravity sewers and/or force mains except that even greater care is necessary to prevent damage to the utility structure.

B. Perform backfilling so as not to disturb or injure any pipe and/or structure against which the backfill is being placed. If any pipe or structure is damaged and/or displaced during backfilling, open up the backfill and make whatever repairs are necessary.

11.10 MAINTENANCE

A. Seed and maintain in good condition all excavated areas, trenches, fills, embankments, and channels until final acceptance by the Owner.

B. Maintain trench backfill at the approximate level of the original ground surface by periodically adding backfill material wherever necessary and whenever directed to do so by the Engineer. Continue such maintenance until final acceptance of the project, or until the Engineer issues a written release.

11.11 SLOPES

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

DEWATERING

PART 12 - GENERAL

12.1 SUMMARY

A. This Section includes construction dewatering.

12.2 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations and permit construction to proceed on dry, stable subgrades.

12.3 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.

PART 13 - PRODUCTS (Not Used)

PART 14 - EXECUTION

14.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
   1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
   2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

14.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
   1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
   1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.

E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

F. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.
   1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

SANITARY SEWER

PART 15 - GENERAL

15.1 SUMMARY

A. This Section includes sanitary sewerage piping and appurtenances.

15.2 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.

B. Force-Main Pressure Ratings: At least equal to system operating pressure, but not less than 200 psig.

15.3 SUBMITTALS

A. Product Data: For the following:
   1. Pipe and fitting materials.
   2. Manhole materials.
   3. Manhole steps.
   4. Manhole castings.
   5. Concrete mix designs.
   6. Coal tar epoxy.

B. Shop Drawings: Include plans, elevations, details, and attachments for the following:
   1. Precast concrete manholes, including frames and covers.
   2. Cast-in-place concrete manholes and other structures, including frames and covers.

C. Field test reports.

15.4 PROJECT CONDITIONS

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.

PART 16 - PRODUCTS

16.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
   2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

16.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Paragraph for applications of pipe and fitting materials.

16.3 PIPES AND FITTINGS

A. Use materials specified below, as indicated on the Drawings.

B. Ductile-Iron Sewer Pipe: ASTM A 746, for push-on joints, size 4” to 64”, double thickness cement-lined, pressure class 200 minimum.
   1. Standard-Pattern, Ductile-Iron Fittings: AWWA C110, ductile or gray iron, for push-on joints, cement-lined.
   2. Compact-Pattern, Ductile-Iron Fittings: AWWA C153, for push-on joints, cement-lined.
   3. Gaskets: AWWA C111, rubber.
   4. Identification: All ductile iron sewer pipe shall have a green stripe painted on the top of the pipe. Field painting of the identification stripe is acceptable.

C. PVC Sewer Pipe and Fittings: According to the following:
   1. PVC Sewer Pipe and Fittings, 21” and Smaller:
      a. ASTM D3034, SDR-26, minimum stiffness 115 psi @ 5% deflection
      b. Smooth wall
      c. 14’ maximum joint length
      d. Gasketed joints utilizing ASTM F 477, elastomeric seals and meeting AMTM D3212
      e. Fittings manufactured specifically for use with heavy wall sewer pipe

D. PE, AWWA Pipe: AWWA C906, DR No. 11; with PE compound number required to give pressure rating not less than 200 psig.

   1. PE, AWWA Fittings: AWWA C906, socket- or butt-fusion type, with DR number matching pipe and PE compound number required to give pressure rating not less than 200 psig.

E. Vitrified Clay Pipe is not allowed.

F. Reinforced Concrete Sewer Pipe is not allowed.

16.4 MANHOLES

A. Normal-Traffic Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
   1. Diameter: 48 inches minimum, unless otherwise indicated.
   2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
   3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having base section with monolithic floor.
   4. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
   5. Top Section: Concentric-cone type, unless eccentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
   6. Gaskets: ASTM C 443, rubber.
   7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch diameter frame and cover.

8. Steps: Polypropylene plastic with 3/8" steel reinforcing rod encapsulated. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12- to 16-inch intervals. Omit steps for manholes less than 36 inches deep.
9. Pipe Openings: Pre-cast at the proper alignment and elevation, or cored in the field. Saw-cut or chipped openings will not be allowed.
10. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section. Installed in pre-cast openings, as manufactured by Kor-N-Seal Co., or equivalent.
11. Drop Manholes: Provide drop manholes (Memphis Tees) where indicated and at all instances where the vertical drop through the manhole exceeds 2'-0".
12. Inverts: Inverts shall be precast by the manufacturer or poured with solid concrete in the field. Brick and mortar inverts are not allowed.

B. Manhole Frames and Covers:
1. ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service, with machined bearing surfaces.
2. 305 pounds total weight, minimum.
3. 22" clear opening, minimum.
4. Include risers and adjusting rings as required for each installation.
5. Covers: Solid (no holes), indented top design with lettering "SANITARY SEWER" cast into cover, 23 ½" diameter.
6. Manufacturer: East Jordan Iron Works Model V-1480-1 or equivalent.

16.5 EXTERNAL MANHOLE SEALING SLEEVE

A. Description: All manhole joints and the connection between the grade rings to the frame and cover shall be wrapped in an external rubber sleeve to prevent inflow and infiltration.

B. Rubber sleeve shall be a single continuous 60 mil minimum EPDM seal, with width as required to seal the actual number of grade rings installed, but in no case less than 12".

C. Each seal shall have a minimum 2" x ¼" mastic strip on the top and bottom edge. Mastic shall be non-hardening butyl rubber sealant.

D. Manufacturers:
1. Infi-Shield by Sealing Systems, Inc.
2. Or approved equivalent.

16.6 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.
5. Admixtures: Xypex

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water-cementitious materials ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

C. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water-cementitious materials ratio. Include channels and benches in manholes.
1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
   a. Invert Slope: 1 percent through manhole.
2. Benches: Concrete, sloped to drain into channel.
   a. Slope: 8 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water-cementitious materials ratio.
   1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
   2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

16.7 CLEANOUTS

A. Ductile Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:
   1. Light Duty: In earth or grass foot-traffic areas.
   2. Medium Duty: In paved foot-traffic areas.
   3. Heavy Duty: In vehicle-traffic service areas.
   4. Extra-Heavy Duty: In roads.
   5. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 746, Ductile iron pipe and fittings.

PART 17 - EXECUTION

17.1 INSTALLATION

A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

B. Identification: Materials and their installation are specified in Division 2 Section "Earthwork." Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.
   1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

C. Gravity Flow Piping Applications: Include watertight joints. Use the following as shown on the Drawings:
   1. Ductile-iron sewer pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints.
   2. PVC sewer pipe and fittings, gaskets, and gasketed joints.

D. Force-Main Piping: Use the following:
   1. Ductile-iron sewer pipe; standard- or compact-pattern, ductile-iron fittings; gaskets; and gasketed joints.
   2. PVC pipe shall be acceptable for force mains.

E. Sleeve-Type Pipe Couplings: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.

F. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account.
   1. Install piping as indicated, to extent practical.
   2. Furnish all stakes, templates, patterns, platforms, materials, equipment, and labor as required to lay out the work.
   3. Engineer will provide horizontal and vertical control at the beginning of the project. Contractor is responsible for establishing lines and grades from this control. Cost of re-establishing control points disturbed by Contractor shall be at Contractors' expense.

G. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

H. Use manholes for changes in direction on gravity sewer. Do not use fittings.

I. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

J. Install gravity-flow piping and connect to existing sewers and services, of sizes and in locations indicated. Terminate piping as indicated.
   1. Install piping pitched down in direction of flow, at minimum slope of 1.0 percent, unless otherwise indicated.
   2. Install piping with 36-inch minimum cover.

K. Install force-main piping between and connect to sewage pump station outlet and termination point indicated.
   1. Install piping with restrained joints at horizontal and vertical changes in direction. Use cast-in-place concrete braces for additional thrust restraint.
   2. Install piping with 36-inch minimum cover.

L. Install ductile-iron, force-main piping according to AWWA C600.

M. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.

N. Pipe Joint Construction and Installation: Join and install pipe and fittings according to installations indicated.
   1. Refer to Division 2 Section "Utility Materials" for basic piping joint construction and installation.
   2. Ductile-Iron Sewer Pipe with Ductile-Iron Fittings: According to AWWA C600.
   3. PVC Sewer Pipe and Fittings: As follows:
      a. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
      b. Install according to ASTM D 2321.
   4. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

O. Manhole Installation: Install complete with appurtenances and accessories indicated.
   1. Form continuous concrete channels and benches between inlets and outlet.
   2. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere, unless otherwise indicated.
   3. Install precast concrete manhole sections with gaskets according to ASTM C 891.

P. External Manhole Sealing Sleeve
   1. Install sealing sleeve at all manhole joints and the frame and cover connection to the grade rings.
   2. Install sealing sleeve after manhole and all grade rings are set.
   3. Detailed installation instructions shall be according to the manufacturer’s recommendations.

Q. Concrete Placement: Place cast-in-place concrete according to ACI 318 and ACI 350R.

R. Cleanouts:
   1. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use ductile iron pipe fittings in sewer pipes at branches for cleanouts and for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
   2. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding grade.
   3. Set cleanout frames and covers in pavement with tops flush with pavement surface, and sloped to match grades.

S. Service Tees and Service Lines:
   1. Install service tees at exact locations as shown on the Drawings or directed by the Engineer.
   2. Plug all services tees where a service line is not indicated to be installed.
   3. Where service lines are indicated to be installed, terminate service lines at the right of way line with a plugged bell end.
   4. Install service lines at a minimum slope of 1%.
   5. Install service lines with a minimum of 24” of cover.
   6. Mark the location of all service tees or service lines installed. Maintain these markings until final acceptance of the Project. Provide service tee and service line records to the Engineer indicating the following:
      a. Distance from each tee to the centerline of the first manhole downstream of the tee.
      b. Direction which each service line runs, and length of service line.

c. Distance from the end of each service line to the centerline of the first manhole downstream of the service, measured parallel to the main sewer line.
d. Do not backfill over any tee until the above information has been recorded by the Contractor and the Engineer.

T. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.

U. Installation of Sanitary Piping Crossing a Water Line:
1. Normal Conditions: Lay sanitary piping crossing water lines to provide a separation of at least 18 inches between the top of the sanitary piping and the bottom of the water line whenever possible.
2. Unusual Conditions: When local conditions prevent a vertical separation described above, use the following construction:
a. Sanitary piping passing over or under water lines shall be constructed of AWWA-approved water pipe, pressure tested in place without leakage prior to backfilling.
b. Sanitary piping passing over water lines shall, in addition, be protected by providing:
1) A vertical separation of at least 18 inches between the bottom of the sanitary piping and the top of water line.
2) Adequate support for the sanitary piping to prevent excessive deflection of the joints and the settling on and breaking of water line.
3) That the length (minimum 18 feet) of the sanitary piping be centered at the point of the crossing so that joints shall be equidistant and as far as possible from the water line.

V. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

W. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

X. Clear interior of piping and structures of dirt and superfluous material as work progresses.
1. Place plug in end of incomplete piping at end of day and when work stops.
2. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

17.2 CLOSING ABANDONED SANITARY SEWERAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use procedure below:
1. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood or masonry plugs.

B. Abandoned Structures: Excavate around structure as required and use one procedure below:
1. Remove structure and close open ends of remaining piping.
2. Remove top of structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
3. Backfill to grade according to Division 2 Section "Earthwork."

17.3 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
1. Defects requiring correction include the following:
a. Alignment: Less than full diameter of inside of pipe is visible between structures.
b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
c. Crushed, broken, cracked, or otherwise damaged piping.
d. Infiltration: Water leakage into piping.
e. Exfiltration: Water leakage from or around piping.

2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
3. Re-inspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to authorities having jurisdiction.
3. Schedule tests and inspections with at least 24 hours' advance notice to Engineer.
4. Submit separate reports for each test.
5. Perform tests as follows:
   a. Sanitary Sewerage: Perform air test according to UNI-B-6.
   b. Manholes: Perform vacuum test according to ASTM C1244.
6. Leaks and loss in test pressure constitute defects that must be repaired.
7. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

CLOSEOUT PROCEDURES

PART 18 - GENERAL

18.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

18.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

18.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

18.4 CLOSEOUT SUBMITTALS

A. Test Reports: (Bacteriological and Pressure) From authorities having jurisdiction.

18.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

18.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer. Label with manufacturer's name and model number where applicable.

C. Procedures Prior to Substantial Completion:

Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Complete startup and testing of systems and equipment.
3. Perform preventive maintenance on equipment used prior to Substantial Completion.
4. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
5. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
6. Complete final cleaning requirements, including touchup painting.
7. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

18.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 01290 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

18.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:
    a. Three paper copies. Engineer will return two copies.

18.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 19 - PRODUCTS

19.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 20 - EXECUTION

20.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Remove snow and ice to provide safe access to building.
    f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    h. Sweep concrete floors broom clean in unoccupied spaces.
    i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    k. Remove labels that are not permanent.
    l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

    p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
    q. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: "Temporary Facilities and Controls."

20.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

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SECTION 13000

RADIO TELEMETRY MONITOR AND CONTROL SYSTEM

PART 1 GENERAL SPECIFICATION

1.01 SYSTEM DESCRIPTION

A. New fully integrated Radio Telemetry Monitor and Control SCADA System Units will be designed, furnished, and installed by Dexter Fortson Associates, Inc. which provides the owner with automated feedback control, alarms as they occur, information and reports specific to the owner's needs as herein specified. Generally, the system shall consist of the existing system control computer (SCC) with appropriate peripherals, base radio modem (BRM) and remote site terminal units (RTUs) linked via a wide area common radio network. Concurrent operations of distributed intelligence shall occur at system, area, site, and unit level of the local area network via interrupt driven, multi-tasking functionality at all levels. Configuration of the system enables one to many devices, discrete input/output translation, process control, store and forward repeating, and links to local area network (LAN) units at any level. The system message traffic shall be managed to provide maximum functionality and minimize redundant operations and data. Critical variables such as slew rates, damping, and dead bands shall be implemented at the site level and be accessible only by the system engineer. The system furnished shall have the capability of downloading and restarting programs via telephone modem including the downloading of programs via the radio network to site RTUs.

B. The system supplier shall be the system integrator and have complete responsibility for the telemetry system, software interface, software configuration and functionality, hardware integration, field installation, commissioning, instrumentation calibration, wiring and related control functions.

    1. The system supplier shall provide warranty, training, and field services as needed.

C. The system supplier shall be responsible for obtaining all required radio licenses and the preparation of the studies, both propagation and/or topographic, to determine the optimum radio transmission communications path.

D. If the Radio Telemetry Monitor and Control System does not meet the minimum performance standards specified herein as judged by the engineer and the owner, the System Contractor shall be required to replace the telemetry system with a system as specified herein and do so promptly and at no cost to the owner. The Radio Telemetry Monitor and Control System Supplier & System Integrator shall

be by Dexter Fortson Associates, Inc. of Bessemer, Alabama.

E. The system supplier shall be an Underwriters Laboratory (UL) 508A approved shop. List the certificate approval number .

F. The communications protocol shall be non-proprietary with store-and-forward capability. The protocol shall be readily available for evaluation by interested parties.

G. The following significant items are to be furnished and installed complete in every detail:

    1. Remote Terminal Units (RTUs) with radio equipment and antennas.
    2. Interface sensors and relays not furnished by owner.

H. The system shall have the capability of performing the following functions:

    1. Monitor and control system parameters such as tank or reservoir levels.
    2. Monitor and control system equipment such as pumps and valves.
    3. Monitor pressure, differential pressure, temperature, metering, and peripheral sensors both analog and digital.
    4. Process digital values, ON/OFF, and High/Low.
    5. Process analog values and set points – High-High, High-Low, Low-High, Low-Low.
    6. Process metering, count, rate, corrected/uncorrected as appropriate.
    7. Provide an operator interface with system.
    8. Provide records of appropriate system transactions.

I. The system provided shall allow full redundancy with the ability to switch to manual operation as the system existed before automation.

J. The communications strategy used by the Telemetry System shall contain error checking, positive identification of all transmissions, and report by exception. The operator-controlled System Control Computer (SCC) shall have adjustable polling times from 5 seconds to 24 hours, independently by site and incremented from the last confirmed message. The system shall incorporate reporting of changes and alarms as they occur, time stamped data logging, and alarm logging.

K. All telemetry devices shall auto start on energizing and resolve the system, area, site, and unit control algorithms on an interrupt driven multitasking basis at all levels.

1.02 LICENSING

A. An application must be submitted to the Federal Communications Commission

(FCC) in the name of the system owner and a radio frequency license issued to the owner for the operation of VHF or UHF radio data frequency as appropriate.

B. Each site must be surveyed to establish the function, latitude, longitude, and elevation. The resultant radio frequency license prescribes the compliance requirements for the radio frequency assigned with regard to the following criteria:

    1. Radio power output rated in watts.
    2. Effective radiated power.
    3. Allowable height of the antenna above ground level.

C. State and/or local licenses must be obtained where required.

1.03 QUALITY ASSURANCE

A. The system supplier of the telemetry system must present to the owner a listing of systems that are currently in operation and are composed of the same base station hardware, software, and remote location equipment being offered for the contract. The system supplier must demonstrate to the satisfaction of the owner that the similar existing systems meet the functionality, technical correctness, durability, flexibility, and the aesthetic expectations of the owner.

B. The system supplier must accomplish an on-site radio path survey to assure sufficient field strength for reliable radio communications.

C. The system supplier shall have the capability of accomplishing radio path surveys and complying with FCC radio tuning requirements using an IFR-1200 instrument or equal.

D. Interface protection schemes will be an integral part of the system including but not limited to the following measures:

    1. All hardwired interconnected panels and devices within a facility will be grounded with a minimum of one #6 bare copper conductor attached with copper, bronze, or stainless-steel high quality
    2. connectors.
    3. All antenna masts will be provided with a separate copper clad ground rod not less than eight feet in length and bonded to the existing grounding system.
    4. All structures provided, such as antenna masts and antennas, will be positioned not less than eight feet from bare high voltage
    5. conductors.
    6. Pressure transducer access to water systems will be installed by the owner and the owner will provide suitable freeze protection for all

devices, unless otherwise specified.

7. Coaxial lightning arresters (600Vdc ±20% to 1200Vdc ±20%) shall be provided for all radio installations.
8. All RTUs shall be equipped with Line, Input and Output interface boards that provide surge protection through suitable MOV's, dry contacts and/or optical isolation devices.

1.04 POWER REQUIREMENT

A. The owner or others shall provide 120 volts, 15-amp AC electric power to all sites except where solar power is specifically indicated.

B. Electronic systems shall operate on 12 to 24 volts DC.

C. Remote Terminal Units (RTUs) shall be supplied with a twelve (12) to twenty-four (24) hour battery backup power. And in no case shall the battery be rated less than ten (10) ampere-hours.

1.05 TRAINING

A. A training program for the owner's personnel shall be included. The approach to system training shall be designed to accomplish two basic objectives.

B. A minimum of eight hours training shall be provided on the "Telemetry System Operation and Maintenance" and shall be scheduled with the owner or owner's representative.

1.06 SYSTEM SUPPORT

A. Unlimited telephone support shall be provided for a period of one year at no additional cost to the owner.

B. Replacement parts shall be shipped within 24 hours of request.

C. A telephone modem and remote access software shall be an integral part of the system supplied to enhance software support.

1.07 SYSTEM MAINTENANCE

A. The system supplier shall maintain on-call qualified field service electricians and electronic technicians to assist with system maintenance.

B. In the event emergency repairs are required, the system supplier shall have a system trained and qualified technician on the owner's premises within a maximum of 24 hours.

C. After a three-month period of operation, the owner will provide first level maintenance such as changing fuses, board swapping, checking batteries, and checking voltages, in accordance with the operations and maintenance manual provided by the system supplier.

1.08 WARRANTY

A. A one (1) year warranty shall be provided for the system. This warranty shall cover all materials, labor and system operation. After a three-month period of operation and training, subsequent field service will be provided only in excess of first echelon maintenance, which is to be performed by the owner.

B. The owner should maintain appropriate insurance to cover damage to system components due to vandalism, misuse, the environment, or acts of others.

1.09 SUBMITTALS

A. The system supplier shall provide the following submittal information to the owner.

1. References of similar completed projects with the owner's name and current telephone number.
2. FCC application for radio frequency license.
3. Overview drawing.
4. System diagram.
5. Significant item cut sheets.
6. Interconnect diagrams.
7. Spare parts list.
8. Detail of the communications protocol.
9. Installation, operations, and maintenance manuals.
10. Warranty document.
11. Schedule of events.

PART 2 DETAIL SPECIFICATION

2.01 REMOTE TERMINAL UNIT (RTU)

A. Area controllers (RTUs) serve to manage a group of remote sites in a total telemetry system and replicate a portion of the system control algorithm that

resides in the system control computer (SCC). The area control algorithm and the assignment of the related remote sites allow the area controller to function independently of the system control computer (i.e. stand-alone mode and to continue functioning in the event of system controller or SCC failure).

B. All RTUs shall incorporate programming modifications or additions via the local Wide Area Network (WAN) without the need of on-site programming by a technician or locally connected programming equipment.

C. All RTUs shall have peer-to-peer communication configuration and multi-protocol recognition. Some industry protocols are DNP3, TCP/IP, Data 2179, DFA OpenLink, Modbus® RTU, or Modbus® ASCII.

D. All RTU discrete channels shall be reporting, non-reporting, inverse, or assigned to process control.

E. All RTUs shall be capable of being networked by radio, direct line, telephone, cellular, fiber optics, or internet.

F. The RTU shall incorporate the following equipment as standard.

1. The portion of the system control algorithm that may reside in the A/D- RTU shall reside in EEPROM memory form and shall be non-volatile on power shutdown.
2. The EEPROM memory shall be capable of being modified, expanded, or reconfigured through the use of the wide area radio network (WAN), a telephone modem, or a serial connection to a laptop computer.
3. Two RS232 serial ports expandable to 4 serial ports.

G. All RTUs shall have the following common characteristics:

1. Microprocessor based, interrupt driven and multitasking.
2. Have a unique two (2) part identification address; the address shall be digital utilizing the hexadecimal numbering system and occupy a minimum of two (2) bytes of memory.
3. Capable of route store-and-forward repeating of remote location data and information.
4. Capable of serving as local area or process controller.
5. Capable of executing system control computer (SCC) commands.
6. Capable of monitoring and controlling site functions and status.
7. Capable of processing digital/analog inputs and processing digital/analog outputs.
8. Capable of utilizing Intel data formats.
9. Have multiple on-board counters for totalization.
10. Operate on a 12-volt battery backup.
11. Operate on nominal input power 105-135 volts 60 Hz.

12. Report alarms as they occur in a “report by exception” format.
13. Incorporate over-voltage protection on all inputs/outputs connections, supply power connections, and antenna connections.
14. Capable of being solar powered.
15. Capable of supporting synthesized voice dialer with 24 voice alarm messages.

H. All RTUs shall have the ability to provide the following features:

1. Differential Pressure Calculations
2. Square Root & Absolute Value Functions
3. Flow Rate & Totalization Calculations
4. 32-Bit, signed Math Capability
5. AND, NAND, OR, NOR
6. XOR, XVOR, INVERT
7. Pump Alternator
8. Level Controller
9. High Speed Counters
10. Pump Runtime & Cycle Counters
11. High / Low Alarm Indicators
12. Data Logging (93 hours)
13. Microprocessor Watchdog
14. Multi-tasking Operating System
15. 32kB RAM, 32kB ROM
16. 16-bit, 8 MHz Processor
17. Operator Keypad Access (optional)
18. 8 x 40 LCD Screen (optional)

I. Pump runtimes originating at the RTU are terminated to the digital input channels and are counted to the nearest second. Runtimes originating within the Control PC are to the nearest minute. The RTU shall accommodate runtime calculations to one- second accuracy.

J. The RTU shall be housed in single metallic enclosure that encompasses the electronics, battery, and transceiver and shall consist of the following standard features:

1. The enclosure shall conform to NEMA industry standard Type 4 with 16-gauge steel bodies and 14-gauge steel doors.
2. The finish shall be ANSI 61 gray polyester powder coating inside and out over phosphatized surfaces for outdoor applications. The equipment mounting panels shall be white enamel.
3. Seams shall be continuously welded and ground smooth.
4. The enclosure shall have four (4) external mounting feet.
5. There shall be a rolled lip around three sides of the door and all sides of the enclosure.

6. An oil-resistant door gasket attached with oil resistant adhesive and held in place with steel retaining strips shall be provided.
7. The door shall be attached with a continuous steel hinge and a stainless-steel hinge pin.
8. The enclosure shall have an integral hasp and staple provided for padlocking.
9. The enclosure shall include stainless steel pad lockable handles which include 3-point latching hardware.
10. The enclosure shall be sized appropriately for equipment, environment, installation, and provide for adequate maintenance access.

K. RTU general requirements are established in the interest of function, durability, flexibility, cost effectiveness, and standardization for operations and maintenance.

L. The RTU electrical parameters shall conform to the following minimum standards.

1. The alternating current source shall be rated at 120 volts, 60 hertz and the power consumption shall be rated at sixty (60) watts.
2. The direct current source shall be rated at 12 to 24 volts, and the power consumption shall be rated at 30 watts.
3. Battery power 10 ampere-hour (AH), 12-hour rating for a (5-25 watt radio) or 24 hour for a (2-5watt radio), 30 AH for solar and repeater options.
4. Any solar panels required shall be rated for a minimum of 3 to 6 amp at 20 volts - bright sun.

M. The RTU input parameters shall conform to the following minimum standards.

1. All RTUs shall incorporate a minimum of four (4) analog inputs with the following characteristics, 8 or 10 bit, 4-20ma / 0-5vdc / 1-5vdc.
2. All RTUs shall incorporate a minimum of four (4) digital inputs with the following characteristics, ON/OFF, 12vdc, 24vdc, 120vac, dry contacts, isolated.
3. The RTUs shall incorporate a minimum of two (2) counters with the following characteristics, 16 bit or 32 bit, ON/OFF, isolated.

N. The RTU output parameters shall have the following minimum standards.

1. The RTUs shall incorporate a minimum of one (1) analog output with the following characteristics, 4-20ma, 0-5vdc.
2. The RTUs shall incorporate a minimum of four (4) digital outputs with the following characteristics, On/Off, 120vAC @ 5-amp resistive dry contacts.

O. RTU input/output (I/O) requirements are established as a function of site-specific equipment and sensors to be monitored and/or controlled. The Input/Output (I/O) quantity may vary by site with standardization preferred with the minimum requirement established in the table below.

RTU Input / Output Capability

I/O Diversity	Medium	
I/O Flexibility	Variable	
I/O Channels	29	
Analog Inputs	8	Expandable to 16 Analog Inputs
Digital Inputs	8	Expandable to 64 Digital Inputs
Counter Inputs	4	Expandable to 56 Counter Inputs
Analog Outputs	1	Expandable to 16 Analog Outputs
Digital Outputs	8	Expandable to 64 Digital Outputs

P. All RTUs shall be designed to operate in an ambient temperature environment ranging from -20°C to +60°C and within a relative humidity range from 5 to 95 percent non-condensing.

Q. The RTU shall allow for the following equipment being *optional* and *not* included as standard equipment.

1. The RTU shall optionally include an 8 X 40 LCD screen and 20 push button keypad for operator interface. The screen and keypad shall be mounted to an integral hinged and screw type thumb-latch panel, and
2. allow full access to the RTU components.
3. Optionally, the RTU shall have the capability to be programmable and the program algorithm shall reside in EEPROM memory form and shall be non-volatile on power shutdown.
4. Optionally the EEPROM memory shall be capable of being modified, expanded, or reconfigured through the use of the local wide area radio network (WAN), a telephone modem, or a serial connection to a laptop computer.

R. For local control functions, the RTU shall rely on the system control computer or local Area Controller as required by the owner application.

S. Each RTU shall be capable of being a “store-and-forward” repeater, communicating in a “peer-to-peer” configuration and include the option of route repeating strategy.

2.02 RADIO EQUIPMENT

A. Radio transceivers shall operate in half-duplex mode and meet the needs of the

system. Each RTU shall have a radio transceiver meeting the requirements of the FCC Part 90 and can be tuned, aligned, and repaired at any competent two-way radio service center. All radios are single frequency and capable of be transferred between sites without reprogramming.

B. The RTU shall be capable of using any data radio that is commercially available for use on designated frequencies. The radio shall have a type-acceptance under FCC Part 90 for operation in the appropriate bandwidth (either narrow or wide band). All electrical connections to the radio shall be plug-in for ease of repair.

C. Transceivers that require custom programming or use protocol conversion routers to enable the store-and-forward capability of the RTU shall not be acceptable, and shall disqualify the entire system as an "or equal" for consideration.

D. The communications protocol shall be non-proprietary with store-and-forward capability. The protocol shall be readily available for evaluation by interested parties.

E. Radio antennas shall be Omni or Yagi type antenna with gain as required by the field survey, and shall have the following characteristics:

    1. The antennas shall be rated for 100 miles per hour wind speed.
    2. Antennas shall be connected to radios with RG/8U low loss coaxial cable or appropriately sized helix cable.
    3. Each antenna shall be mounted at a height above ground as determine by the field survey and be in compliance with FCC regulations.
    4. Coaxial connection to the remote unit enclosure shall be by means of a coaxial type bulkhead lightning arrester with a minimum of 600Vdc ±20% and a maximum of 12000Vdc ±20%.
    5. Antenna masts if required will be free standing, galvanized steel or aluminum.

F. Radio modems shall be provided as an interface between transceivers and the system control computer or RTUs. Radio modems shall be consistent with the system design and telemetry strategy including store and forward repeating.

G. Radio repeaters will be furnished selectively to ensure reliability of the telemetry network where factors such as terrain feature or effective radiated power of the system does not provide a reliable communications path.

H. Dual frequency repeaters shall not be used.

PART 3 SYSTEM EXECUTION AND SITE-SPECIFIC DATA

3.01 RTU PLACEMENT AND INPUT/OUTPUT REQUIREMENTS

A. For each site in the telemetry system, list the physical location of each site and the RTU placement at the site, site name and Input/Output structure, alarms and other requirements for each site's RTU. Example:

Remote Site Name: Ivy Creek Pump Station RTU # 1 – locate RTU within the PS building.

Latitude: 12°34'56.78"N
Longitude: 12°34'56.78"W
Elevation: approximately _____ feet

Digital Inputs	***Digital Description***	***Function Explanation***
1	*Pump # 1 Status*	*Run / Stop – Pump run times, cycle counts, fail alarms*
2	*Pump # 2 Status*	*Run / Stop – Pump run times, cycle counts, fail alarms*
3	*Pump # 1 HOA Switch Status*	*Remote Switch Position Status "Not in Auto". Contacts Supplied by Telemetry Contractor.*
4	*Pump # 2 HOA Switch Status*	*Remote Switch Position Status "Not in Auto". Contacts Supplied by Telemetry Contractor.*
5	*Phase Loss*	*Alarm – Auxiliary contacts Phase Loss Relay*
6	*Intrusion Alarm*	*Status / Alarm – Door Switch with Key Switch. Switches supplied by Telemetry Contractor.*
7		*Spare – Future Addition*
8		*Spare – Future Addition*

Digital Outputs	***Digital Description***	***Function Explanation***
1	*Pump # 1 Control*	*Call to Run or Pump Start / Stop*
2	*Pump # 2 Control*	*Call to Run or Pump Start / Stop*
3		*Spare – Future Addition*
4		*Spare – Future Addition*
5		*Spare – Future Addition*
6		*Spare – Future Addition*
7		*Spare – Future Addition*
8		*Spare – Future Addition*

Analog Inputs	*Digital Description*	*Function Explanation*
1	*Suction Pressure*	*Pressure transducer. Supplied by Telemetry Contractor*
2	*Discharge Pressure*	*Pressure transducer. Supplied by Telemetry Contractor*
3	*Flow Rate*	*Flow meter. Supplied by Telemetry Contractor*
4		*Spare – Future Addition*
5		*Spare – Future Addition*
6		*Spare – Future Addition*
7		*Spare – Future Addition*
8		*Spare – Future Addition*

Analog Output	*Digital Description*	*Function Explanation*
1		*Spare – Future Addition*

Counter Input	*Digital Description*	*Function Explanation*
1	*Total Flow Rate*	*Electronic Meter pickup. Supplied by Telemetry Contractor*
2		*Spare – Future Addition*
3		*Spare – Future Addition*
4		*Spare – Future Addition*

B. Continue to lists the RTUs and the Input/Output as above until all site locations are complete.

3.02 SYSTEM SPECIFIC REQUIREMENTS

A. List any specific requirements needed or required. Example:

Reports different and in addition to the individual site reports:

1. List all tank levels at all 5 remote sites in the system on one report for ease of comparison.
2. List all flow rates for the 3 remote sites & total flows for these sites on one report. Flow Rate and Total Flow for a specific site should
3. be next to each other on the report.

END OF SECTION

Alternate Bid - Standby Engine-Generator Package

Engine-Generator

1. Description of Work
    1. This section outlines the quality, type and installation of the Standby Power Generator.
    2. The standby engine-generator set shall be furnished and installed as a complete system of the latest type and design. The engine generator set shall be completely built, factory tested and shipped as units by a manufacturer regularly engaged in the production of such equipment for the past five (5) years. Dealer assembled and/or tested units shall not be considered as equal.
    3. Furnish and install the complete engine generator set including a reinforced concrete isolated mounting pad, fuel system, cooling system, exhaust silencer, piping, duct work, excavation and accessories to complete the installation for operation as required and specified herein. Field-test the entire installation after completion.
2. The following information shall be furnished for County approval on each installation.

1. Evidence of the selling agency's experience and maintenance capabilities.
2. Make and model of engine proposed.
3. Brake horsepower curve of engine.
4. Generator manufacturer, model, and rating.
5. Type of excitation and voltage regulation.
6. Weight and basic dimensions of the engine generator set.

C. The following companies manufacture acceptable Standby Power Generators that may be selected for design conditions. This list is not exclusive, but other companies must comply with the specification and be approved by the County.

1. Caterpillar, Inc. (Power Generation)
2. Cummins, Inc. (Onan)
3. Kohler Co. (Power Systems)
4. Or approved equivalent

D. The Contractor shall also include as a portion of the submittal the following job drawings.

1. Location of the engine generator set, accessories, and pertinent conditions. Plan shall be 3/8" scale minimum.

2. Fuel system diagram approved by an authorized representative of the engine manufacturer.
3. Schematic wiring diagram for automatic start/stop control and for alarm annunciation, including remote annunciators.

Engine-Generator Rating

1. The rating of the package-engine-generator set shall be based on operation of the set when equipped with all necessary operating accessories such as radiator, fan, air cleaners, lubricating oil pump, fuel transfer pump, fuel injection pump, jacket water heater, generator and exciter regulator.
2. The above rating shall be for operation at 1000 feet above sea level and at ambient maximum 125°F (51.7°C) and minimum temperature 0°F (-17.7°C).
3. The engine generator set shall be rated to operate all pumps and equipment at the sewage lift station simultaneously and continuously. The fuel capacity, if other than natural gas, shall be sufficient for 3 days (72 hours) operation.

Engine

A. Where natural gas service is available, the engine and fuel system for standby power shall be natural gas. Propane gas or Diesel fuel systems may be considered on a case-by-case basis. Engine and generator operating speed shall be a maximum of 1800 RPM.

Starting System

1. Starting System: The engine shall be equipped with a 12 volt DC electric starting system of capacity recommended by the manufacturer. Batteries shall be lead-acid (nickel cadmium) having a minimum capacity of cranking the engine for at least 45 seconds at firing speed in the ambient conditions specified under section 3.1641.1, "ENGINE-GENERATOR RATING", paragraph "B", and to start the engine a minimum of four times without recharging. Batteries to be mounted in marine type enclosure within the generator enclosure.
2. A current limiting battery charger shall be furnished to automatically recharge batteries. It shall include overload protection, silicon diode full wave rectifiers, voltage surge suppressors, DC, ammeter, and fused AC input. Amperage output shall be no less than 5 amperes. Connect charger cables to batteries, NOT starters. The battery charger shall have a high- low rate capable of fully charging the starting battery during running conditions. Charger shall be capable of fully recharging the batteries in 24 hours or less. Battery charger to be located in automatic transfer switch enclosure.
3. Provide 120 Volt thermostatically controlled battery heater. Battery heater shall automatically shut off when the battery temperature attains 85° F (29.4°C).
4. Jacket Water Heater Starting Aid: An engine mounted thermostatically controlled immersion type engine coolant heater shall be provided to ensure a minimum coolant temperature 100°F (37.8°C) in a minimum ambient of 32°F (0°C) The heater shall be suitable for operation at 120/240 volts single phase. Provide

manual cut off valves, mounted to engine block for heater isolation. The jacket water heater shall be automatically deactivated while the engine is running.

Engine-Generator Control Panel

A. The engine-generator control panel shall be mounted in a engine mounted enclosure and prewired to terminal strips. The control panel shall function to start and stop the engine automatically or manually, to provide visual indication and automatic shutdown of the engine as required for safety control, and to provide all other functions as required for engine generator control for the specific engine furnished.

B. Safety Control: Audible and visual pre-alarm warning annunciation and dry contacts for future SCADA connections shall be provided to indicate the following conditions:

1. Engine temperature above the manufacturer's recommended safe range.
2. Lubrication oil pressure is below the manufacturer's recommended safe range.
3. Low coolant.
4. Future SCADA remote monitoring of engine running status.

Generator Main Breaker

A. A generator main molded case circuit breaker shall be furnished and sized as required. Main breaker shall be mounted in enclosure on generator.

Generator

1. The AC generator shall be a revolving field type with voltage ratings the same as the station main service. The generator shall conform to NEMA and IEEE Standards.
2. Voltage regulation shall be within plus or minus 2% of rated voltage from no load to rated load. The steady state voltage stability shall remain within a 0.5% band of rated voltage.
3. For any addition of load up to and including 90% of rated load, the voltage dip shall not exceed 20% of rated voltage. The voltage shall recover to and remain within the steady band in not more than 1.5 seconds.
4. The frequency regulation from no load to rated load shall be in accordance with that defined by the engine governor performance. For any addition of load up to 90% of rated load, the frequency shall recover to the steady state frequency band within 5 seconds.

Engine-Generator Housing

A. When required because of exterior installation the engine-generator set shall be furnished complete with weatherproof housing. Side, front and rear panels shall be removable for access. All louvers used shall be designed to prevent the entry of water into the housing while the engine is idle or while running. The housing shall be all

aluminum, tamperproof and painted the color selected. Units to be complete with maintenance light fixture and switch.

B. Sound attenuation housings shall be furnished.

Engine-Generator Mounting

A. The set shall be mounted on a welded base, which shall provide suitable for mounting on any level surface. Generator shall be mounted using recommended compression spring vibration isolators.

Automatic Transfer Switch

1. An automatic transfer switch, which causes the engine to be started upon normal power failure, shall be included. When the electric set reaches rated voltage and speed, the switch shall transfer the load to the generator. Upon restoration of normal power, the switch shall transfer load back to normal supply. The transfer switch shall control the automatic start-stop system.
2. The Automatic Transfer Switch shall be rated as shown on plans with solid neutral, 230 volts. Accessories to be included are a time delay starter, (3 seconds) to ignore momentary outages; adjustable time delay on retransfer to normal, (2 minutes to 25 minutes); 5 minute cool down timer; test switch to simulate an outage and load the generator; pilot contact to close and initiate starting controls on engine; 2 sets of auxiliary contacts for remote alarms: 1 NO (during transfer) and 1 NC (before transfer); exerciser to automatically start and run the generator loaded once per week.

Remote Shutdown

A. A remote engine shutdown switch shall be included. For exterior installations the emergency shutdown switch shall be located a minimum of 15’- 0” away and in line of sight of generator housing. For interior installations the emergency shutdown switch shall be located inside door next to light switch.

Installation of Equipment
A. All equipment shall be properly supported and additional support provided where necessary.

B. Installation shall be according to the manufacturer's written recommendations and shall be done in a neat workmanlike manner. The generator set shall be installed under the supervision of a factory-trained service representative.