

City of Rome
Department of Public Works
Rome, New York 13440

To: All Bidders **Date Issued:** August 10, 2022

Subject: City of Rome Railroad Street Interceptor Upgrades Project
RFB-2022-023

ADDENDUM NO. 1

This addendum consisting of **66 pages** shall be part of the Contract Documents as provided in the Agreement for the above-referenced project.

Acknowledge the receipt of this addendum by inserting its number (No. 1) and date (August 10, 2022) on the Bid Forms. Failure to do so may subject the bidder to disqualification.

List of Attachments:

1. Pre-Bid Meeting Notes
2. Pre-bid Conference Sign-in Sheet
3. Revised Specification 00301
4. Revised Specification 01025
5. Revised Specification 11219

CLARIFICATIONS

1. The costs for Flow Diversion requires for construction of the base bid items is included in Bid Item 2. Flow diversion required for the completion of the add-alternate bid items is included in those bid items.

CHANGES TO SPECIFICATIONS

Section 00301 Bid Form

Replace entire specification with specification attached to this document.

Section 01025 Measurement and Payment

Replace entire specification with specification attached to this document.



Section 11219 Submersible Solids Handling Pumps

Replace entire specification with specification attached to this document.

QUESTIONS AND ANSWERS

Q1: Due to the complexity of this project, the number of lump sum bid items, the amount of incidental work to unit price bid items, and the number of specialty subcontractors to line-up for quote pricing on this project, would the Owner please consider a three (3) week postponement of the current bid date?

A1: The Owner agrees to extend the current bid date 2 weeks to September 8, 2022. Based on this new bid date, written questions are due to Engineer August 29, 2022.

Q2: Please provide the engineer's estimate for the value of the project.

A2: The Engineer's Estimate is \$10-12 M

Q3: Where is the 5" of temporary paving required on the project?

A3: Trench restoration in Section 02510- Asphalt Paving is divided into Initial Paving and Final Paving. All trenches in paved areas (with exception below) shall be restored to grade with initial pavement. Final pavement (see three details on CD-1) shall be completed no less than 90 days after backfill of the trench or satisfactory testing of the sewer. Specification Section 02575 Restoration of Surfaces provides the Contractor the option of restoring trenches with temporary pavement in lieu of the initial pavement. Most likely areas for this to be utilized are trench restoration within roadways to receive curb to curb full depth final pavement.

Areas where trench is to be backfilled with flowable fill do not need placement of initial pavement. These areas are called out on the drawings Sta. 0+10 to Sta. 0+45 and Sta 1+00 to Sta. 6+00. Once flowable fill is set, the trenches can be restored with final pavement.

Q4: Manhole Lining System. Can you add bid items that will help us to bid the work more cost effectively? Bid items to set up to seal leaks, pressure grout by the gallon, manhole lining by the diameter of the manhole and vertical foot.

A4: See updated Bid Form and Measurement and Payment specifications.

Q5: Note #13 on G-2 regarding Zone of Influence. This indicates sheeting left in place? Will you accept trench boxes designed to take the load and drive boxes at the pits?

A5: Note 13 reads "Do not remove vertical support members installed within the zone of influence of new or existing structure or below the mid-diameter of any soil supported pipe." Yes, this note refers to sheeting left in place if excavation support is required within the zone of influence. See definitions of Zone of Influence in Section 02200- Earthwork - Part 1.05E.



The contractor is responsible for design of the excavation support systems in accordance with Section 02311 – Excavation Support and Protection. However, per Section 02311. Part 3.05 B, trench boxes are not allowed for excavations that extend within the zone of influence of existing structures or utilities.

Q6: If we encounter concrete foundations that must be removed, will we be paid for rock removal?

A6: Yes, concrete foundations are covered under Bid item 13A. See Section 1025 Measurement and Payment – Part 3.02B(1) a.

Q7: Can you forward any DOT or Railroad permits that may be required?

A7: The Contractor is required to obtain a road opening permit from NYSDOT for the forcemain installations across Erie Blvd and Black River Blvd North. The City of Rome will be the co-permittee. The City has obtained the railroad permit for construction within the right-of-way. The permit will be provided with the next Addendum.

Q8: Regarding Detail D on CD-2. Do we install filter fabric up halfway on the new pipe for the entire length of the project?

A8: Filter fabric shall be installed on the bottom of all trenches. Wrapping up the sides of the trench is not required.

Q9: Please provide details for railroad protective liability application.

A9: As part of the railroad permit application, the City also obtained railroad protective liability insurance. Specific details can be shared when the contract is awarded. For bidding purposes, assume that the work includes construction parallel to and under railroad tracks. No blasting is allowed; tracks carry freight trains only (no passenger). Trains per day generally varies from 0-3. Other than during the actual pipe crossing installations, the contractor should not be crossing the track at grade with equipment.

Contractors costs for obtaining railroad protective liability insurance should be included in Bid Item 1 – Mobilization.

Q10: What is the width of the railroad right-of-way?

A10: The right of way varies along the path of the railroad. Property lines are indicated on the drawings and demark the right-of-way of the railroad.

Q11: Under measurements & payment for Item 23, it says the contractor shall indicate the type of pipe (CCFRP or PVC) included in their bid. Can you clarify that we have a choice of using either SDR35 PVC or CCFRP for items 23 a-d? Does the type of pipe affect the basis of award.



A11: The contractor does have the option to furnish either PVC (meeting requirements of 02621) or CCFRP pipe (meeting requirements of 02624) for the gravity sewer portions of the project (Item 23 a-d). After the base bid items on the bid form, there is a location to indicate which type of pipe is included in the bid. This indicate is to help with the bid review and does not affect the basis of award.

Q12: Please provide detail for the railroad crossings that are open cut.

A12: See sheet CD-5 for railroad crossing details.

Q13: Is the epoxy coating for the junction structures included in the 26F Item, epoxy lining for new manholes or is it included in the price 7A and 7B Items for Cast In Place Junction Structure?

A13: Epoxy lining of the junction structures is included in the price for each junction structure, Item 7A and 7B.

Q14: Are we installing slide gates for Junction Structure #2?

A14: No. Slide gates are not proposed at Junction Structure #2.

Q15: Project Bid Form, page 00301-10, Item 26d – Precast Square Catchbasin, has a listed “Estimate Quantity” of 10 VF, yet the column entitled “Payment Item Description, Unit Price In Words” depicts the measurement as per each. Additionally, the other structures associated with item 26 (i.e. 26A through 26C) all have a measurement per each. Could the Owner please clarify the unit of measurement for item 26d?

A15: The precast square catchbasins are measured in vertical feet. The description on the Bid Form has been updated.

Q16: Project plan sheets C-1 and C-2, approximate stations 1+50 to 6+00, depict the proposed sewer forcemain crossing to the north of the existing “1 Sty. Steel Bldg.” This crossing appears to be through an existing parking lot, yet, project plan sheet C-28, Paving Plan I, does not depict any pavement reconstruction along those stations. Could the Owner please clarify the pipe trench restoration requirements between stations 1+50 and 6+00 and where that restoration is to be measured and paid?

A16: The paving plans on sheets C-28 and C-29 indicate the areas where the road should be restored with full depth pavement or milled and paved across the entire width of the roadway. Pipe trenches outside the shaded areas on C-28 and C-29 shall be restored in accordance with Detail E on CD-1. Trench restoration is included in the pipe bid item. Specific to the stations indicated above, this work is part of Item 22.

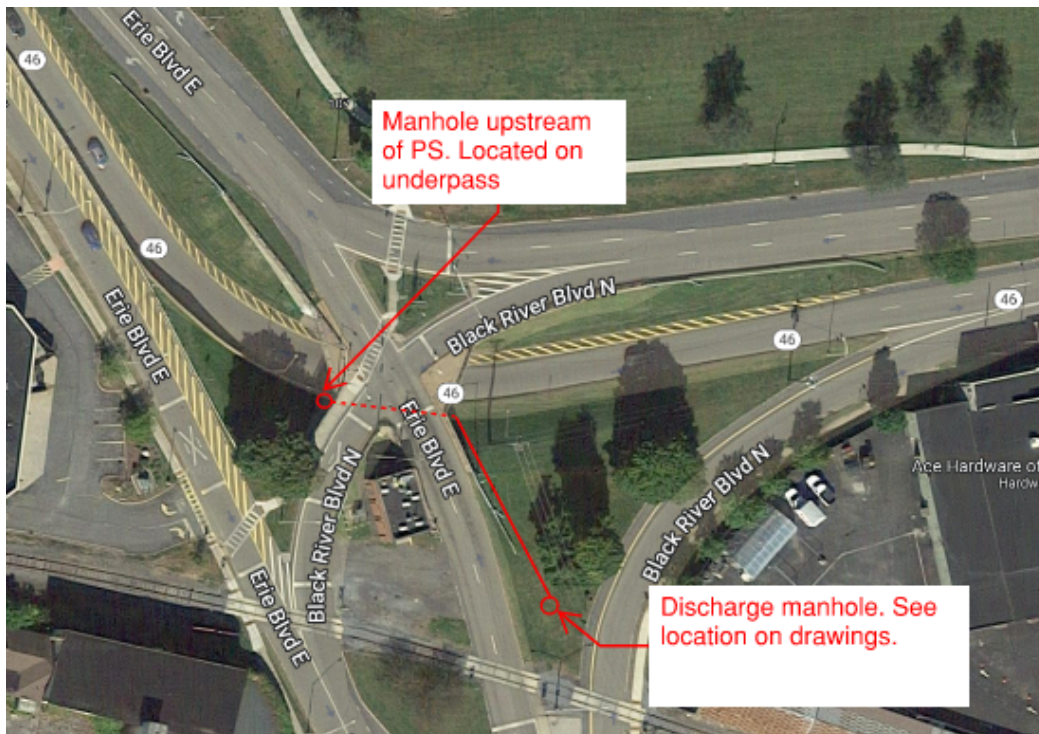


Q17: Specification section 01480, Tightness Testing of Liquid Retaining Structures, page 01480-2, subsection 3.01.B states: "Perform tightness tests prior to water proofing and dampproofing ...". The listed structures in this specification section receive monolithic concrete structure lining systems, specification 02768, for corrosion protection. As the epoxy lining is for corrosion protection, not waterproofing/dampproofing, is the tightness tests to be performed before or after the installation of the epoxy lining?

A17: Tightness testing shall be completed prior to the epoxy coating.

Q18: Please provide details for bypass pumping at the HLPS. The plans show the discharge manhole for the bypass, but what is the upstream point?

A18: Responsibility for the design and operation of the bypass system falls to the contractor. However, during the field walk we discussed bypass operations used previously at the HLPS. This operation included pumping from the manhole upstream of the PS to the first manhole downstream, with piping run underneath the Erie Blvd. ramp. This setup eliminated road crossing for the bypass pipe, but necessitated construction of a pump platform near the upstream manhole. Additional details on this set up (designed by a previous contractor) are not available. See depiction below approximating the layout. The HLPS wet well is also an option for the starting point of the bypass.



Pre-Bid Meeting MINUTES

City of Rome Railroad Street Interceptor Sewer Upgrade Project – RFB 2022-023

Date: July 27, 2022 **Time:** 10:00 AM

Location/Call in Details: Rome City Hall Common Council Chambers

Project Name: City of Rome Railroad Street Interceptor Sewer Upgrades Project

Project Number: 21984/114484

Item:

1. Introductions/Sign-in
 - a. Butch Conover - City of Rome Commissioner of Public Works
 - b. Joe Guiliano – City of Rome, Engineering
 - c. Phil Impicciatore – City of Rome Maintenance Supervisor
 - d. Nancy Vigneault and Darcy Rosenthal – CDM Smith, Project Managers

All attendees asked to sign in. The sign-in sheet will be provided with the Addendum.

2. Project Summary

Project is intended to provide additional capacity for flow from the High Level Pump Station to the WPCF. Sanitary flow from approximately 80% of the entire Rome service area is conveyed through the High Level Pump Station. Currently, the HLPS lifts wastewater up to a manhole outside the station and from there a gravity sewer conveys flow to the treatment plant. The existing sewer includes a siphon under the Mohawk River, and an aerial crossing of an unnamed stream.

Overview of components of the new interceptor below:

- a. Forcemain

New 30” forcemain from HLSP pump station, under the Mohawk River, discharging to a discharge structure on Railroad Street.

- b. Gravity Sewer

After discharge structure, the interceptor changes over to a gravity sewer all the way to the WPCF. Portions of the existing gravity sewer to be abandoned along this path as called out on the drawings.

- c. Open Cut/ Directional Drill / Jack and Bore

The majority of the interceptor shall be installed via open cut. This includes two railroad crossings. Directional drilling shall be used to install the forcemain under the Mohawk River. And a Jack and Bore installation is required for the gravity sewer crossing of a raised railroad bed.

d. Pump Station pump replacement (add alternate)

Two add alternates are included for potential work in the HLPS. One alternate is simply to furnish the pumps as specified. The second alternate is to furnish and install the pumps.

e. Junction structures with gates

There are two junction structures to be constructed over the existing interceptor and new interceptor. One near the end of Railroad Street and one at the WPCF.

f. Existing and new manhole lining

New manholes and existing manholes where noted on the drawings shall be lined.

g. Utility relocation, new storm sewers

There are handful of water mains and storm sewers that cross the interceptor that will need to be relocated as part of the interceptor installation. Additionally, a new storm sewer to be installed on Railroad Street. The discharge end of a forcemain from a small pump station will also need to be relocated to discharge to one of the new junction structures.

3. Specific Items to note:

a. Groundwater vs. hydraulic grade line (HGL) delineations

The plan and profile sheets include notes for the design hydraulic grade line in the interceptor; this HGL delineation is noted with white triangles inside each new manhole. See Sheet G-2, Note 10 for the conditions this HGL represents. It was designed for a future condition and is not necessarily representative of the actual HGL today.

Also on the plan and profile sheets are the boring log results. Adjacent to each boring log is a demarcation of the groundwater as encountered at the time of the boring. This is noted with a black triangle.

b. Existing Utilities – Geophysical/GPR requirements

The project includes geophysical/GPR survey to identify existing utilities in the Ace Hardware property and raised railroad bed crossing, as identified on the drawings.

c. Abandoned Interceptor

There is an abandoned interceptor (no active flow) located within the project area; portions of it are in close alignment with the new interceptor and will need to be removed as part of the new interceptor installation. The project does not include chasing and removing the abandoned interceptor outside of where required to install the new interceptor.

d. Coordination with Railroad Street Bridge Contractor

The City has a project scheduled to kick-off in 2023 to replace the decking on the Railroad Street Bridge over the Mohawk River. The contractor is advised that work on the bridge (which will include closing the bridge to traffic) is expected to start in June 2023. The contractor shall coordinate work in this area with the bridge contractor such that both projects have the access needed to complete the work.

e. Archeological Investigations

Archeological oversight is required for excavations at three areas along the interceptor route. See notes on the drawings.

4. Health and Safety

Contractor is responsible for completing construction in accordance with OSHA standards.

5. Maintenance of Operations

- a. High Level Pump Station – Maintain flow from HLPS with bypass pumping plan to be designed by contractor.
- b. Wastewater treatment operations, septage haulers, other traffic – need to keep plant roads clear and coordinate with operations staff

6. Schedule

- a. Substantial completion by July 31, 2024
- b. Final completion by October 31, 2024

7. EFC Funding - Grants and SRF loans – refer to Section 00810 and 00815, Mandatory State Revolving Fund Terms and Conditions

- a. M/WBE utilization plan - 20% Goal
- b. American Iron and Steel
- c. Davis Bacon & NYS Prevailing Wage Rates

8. Site tour of WPCF and High Level Pump Station following meeting. For an additional site visit, please contact Phil Impicciatore at (315) 339-7775

9. Questions due by Monday August 15, 2022. Addendum will be issued by Friday August 19, 2022. Send all questions to Darcy Rosenthal at rosenthalda@cdmsmith.com or fax (518) 782-4517.
10. Bids due Thursday August 25, 2022 at 11 AM local time.

Name	Company	Address	Phone	E-mail
Gary Lieb	F.P. Kane		607-343-4671	
Frank Kane	F.P. Kane Const	Vestal, NY	607-754636	Paul@FPKane.com David@grantstreet.com
David Compagnoni	Grant Street	Coitland, NY	607-253-1690	GrantStreet.com
Bill Stok	Grant Street	Cortland, NY	607-253-1690	DavidCompagnoni@Hotmail.com
Brian Kelleher	Goodwin Pumps	Batavia, NY	315-263-1763	brian.kelleher@nyfen.com
Bodo Kohn	Villager ci	Fairport NY	585-2237697	bkohn@villagerci.com
Danny Clark	Villager	Fairport	585-857-4870	dclark@villagerci.com
Mike Speshok	KCE	Wilton, NY	518-792-5884	kce.estimating@DARCO.com
Steve Vink	Brierley Associates	East Syracuse, NY	315-434-8885	svin@brierleyassociates.com
Ryan Stiles	Rain for Rent (Pumping)	Avon, NY	585-737-6612	rstyle5@rainforrent.com
Ross Beatin	Rain for Rent	Monroeville, NJ	207-3235	rb141@rainforrent.com
Eric Eaton	Rain for Rent	Petersburg, VA	240-444-2565	eraton@rainforrent.com
Steve Carruth	MCI	Adams, NY	315-832-2847	sgarruth@marcellusconstruction.com
Sam J. Barnett	MCI	Adams, NY	315-232-2847	jgarrett@marcellusconstruction.com
Steve J. Jablonski	Jablonski Earthworks Inc.	Dolgeville, NY	(315) 868-7341	Steve@JablonskiEarthworks.com
Keith Sinis	Jablonski Earthworks Inc.	Dolgeville, NY	518-522-8998	KEITH@JABLONSKI_EARTHWORKS.COM
Greg Turner	Schultz Const	Ballston Spa, NY	518-885-0060	gturner@wmschultz.com
Joseph Guiliano	CITY OF ROME		315-339-7627	jguiliano@romecity.gov
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Tony NASH	CITY OF ROME		315-339-7773	tnash@romecity.gov

BID FORM
TO

City of Rome, New York
Railroad Street Interceptor Sewer Upgrades Project
RFB-2022-023
Contract 1G – General

The undersigned declares that the only persons or parties interested in this Bid as principals are as stated; that the Bid is made without any collusion with other persons, firms, or corporations; that all the Contract Documents as prepared by CDM Smith, 308 Maltbie Street, Suite 101, Syracuse, New York 13204 and dated July 2022 have been carefully examined; that the undersigned is fully informed in regard to all conditions pertaining to the Work and the place where it is to be done, and from them the undersigned makes this Bid. These prices shall cover all expenses incurred in performing the Work required under the Contract Documents, of which this Bid Form is a part.

If a Notice of Award accompanied by at least six unsigned copies of the Agreement and all other applicable Contract Documents is delivered to the undersigned within 45 days, after the actual date of the opening of the Bids, the undersigned will within 15 days after the date of receipt of such notification, execute and return all copies of the Agreement and all other applicable Contract Documents to OWNER. The premiums for all Bonds required shall be paid by CONTRACTOR and shall be included in the Contract Price. The undersigned Bidder further agrees that the Bid Security accompanying this Bid shall become the property of OWNER if the Bidder fails to execute the Agreement as stated above.

The undersigned hereby agrees to substantially complete the Work by July 31, 2024 and to fully complete the Work by October 31, 2024 and in accordance with the terms as stated in the Agreement. The undersigned further agrees to pay OWNER, as liquidated damages, \$2,000 per day for each calendar day beyond both the Substantial Completion and the Final Completion Date or extension thereof that the Work remains incomplete, in accordance with the terms of the Agreement.

The undersigned acknowledges receipt of addenda numbered:

In accordance with the above understanding, the undersigned proposes to perform the Work, furnish all materials and complete the Work in its entirety in the manner and under the conditions required at the prices listed below:

Base Bid

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
1	1 Lump Sum	Mobilization, for _____ _____ Dollars _____ Cents/L.S.*	\$	\$
2	1 Lump Sum	Flow Diversion/Control, for _____ _____ Dollars _____ Cents/L.S.	\$	\$
3	1 Lump Sum	Traffic Control, for _____ _____ Dollars _____ Cents/L.S.	\$	\$
4	1 Lump Sum	Geotechnical Monitoring, for _____ _____ Dollars _____ Cents/L.S.	\$	\$
5	1 Lump Sum	Miscellaneous Work and Cleanup, for _____ _____ Dollars _____ Cents/L.S.	\$	\$
6	1 Lump Sum	Erosion and Sediment Control, for _____ _____ Dollars _____ Cents/L.S.	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
7a	1 Lump Sum	Cast in Place Concrete Railroad St. Junction Structure #1, for _____ _____ _____ Dollars _____ Cents/L.S.	\$	\$
7b	1 Lump Sum	Cast in Place Concrete WPCF Junction Structure #2, for _____ _____ _____ Dollars _____ Cents/L.S.	\$	\$
8	1 Lump Sum	Concrete Headwalls and Abovegrade Pipe at Stream Crossing, for _____ _____ _____ Dollars _____ Cents/L.S.		
9	1 Lump Sum	Site Work, Fill and Grading, for _____ _____ _____ Dollars _____ Cents/L.S.		
10	1 Lump Sum	Trenchless Pipe Installation – 30-inch HDPE by Horizontal Directional Drilling, for _____ _____ _____ Dollars _____ Cents/L.S.	\$	\$
11	1 Lump Sum	Trenchless Pipe Installation – 36-Inch CCFRP/PVC Under Railroad by Pipe Jacking, for _____ _____ _____ Dollars _____ Cents/L.S.	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
12	20 Cubic Yards	Excavation Below Normal Subgrade and Refill, for _____ _____ _____ Dollars _____ Cents/CY	\$	\$
13a	20 Cubic Yards	Boulder Removal, for _____ _____ _____ Dollars _____ Cents/CY	\$	\$
13b	50 Cubic Yards	Rock/Concrete Removal, for _____ _____ _____ Dollars _____ Cents/CY	\$	\$
14a	140 Cubic Yards	Test Pits, for _____ _____ _____ Dollars _____ Cents/C.Y.	\$	\$
14b	1,000 Linear Feet	Geophysical Survey, for _____ _____ _____ Dollars _____ Cents/L.F.		
15a	20 Cubic Yards	Miscellaneous Granular Materials – Crushed Stone, for _____ _____ _____ Dollars _____ Cents/C.Y.	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
15b	20 Cubic Yards	Miscellaneous Granular Materials – Screened Gravel, for _____ _____ _____ Dollars _____ Cents/C.Y.	\$	\$
15c	20 Cubic Yards	Miscellaneous Granular Materials – Rip Rap, for _____ _____ _____ Dollars _____ Cents/C.Y.	\$	\$
16a	20 Cubic Yards	Miscellaneous Concrete – 4,000 psi, for _____ _____ _____ Dollars _____ Cents/C.Y.	\$	\$
16b	20 Cubic Yards	Miscellaneous Concrete/Controlled Density Fill – 300 psi, for _____ _____ _____ Dollars _____ Cents/C.Y.	\$	\$
17a	30 Linear Feet	PVC Storm Drain Pipe – 12-Inch-Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
17b	1,050 Linear Feet	PVC Storm Drain Pipe – 18-Inch-Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
17c	45 Linear Feet	PVC Storm Drain Pipe – 24-Inch-Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
18	45 Linear Feet	Ductile Iron Storm Drain Pipe – 18-Inch-Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
19	35 Linear Feet	Steel Sanitary Sewer Force Main Pipe –10-Inch- Diameter, for _____ _____ _____ Dollars _____ Cents/L.F.	\$	\$
20a	15 Linear Feet	Ductile Iron Sanitary Sewer Force Main Pipe –18-Inch- Diameter, for _____ _____ _____ Dollars _____ Cents/L.F.	\$	\$
20b	1 Each	Ductile Iron Fitting, 30-inch x 18-inch Reducer, for _____ _____ _____ Dollars _____ Cents/EA	\$	\$
20c	1 Each	Ductile Iron Fitting, 18-inch 45-deg bend, for _____ _____ _____ Dollars _____ Cents/EA	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
21a	249 Linear Feet	HDPE Sanitary Sewer Force Main Pipe –30-Inch- Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
21b	20 Linear Feet	HDPE Sanitary Sewer Force Main Pipe –18-Inch- Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
21c	4 Each	HDPE Fitting, 30-inch Diameter, 45-Deg Bend, for _____ _____ _____ Dollars _____ Cents/Each.	\$	\$
22	545 Linear Feet	HDPE Sanitary Sewer Force Main Pipe with Controlled density backfill –30-Inch- Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
23a	20 Linear Feet	CCFRP/PVC Sanitary Sewer Pipe – 24-Inch- Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
23b	7,200 Linear Feet	CCFRP/PVC Sanitary Sewer Pipe – 36-Inch- Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
23c	2,320 Linear Feet	CCFRP/PVC Sanitary Sewer Pipe – 42-Inch- Diameter in Paved Areas, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
23d	140 Linear Feet	CCFRP/PVC Sanitary Sewer Pipe – 42-Inch- Diameter in Non-Paved Areas, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
24a	55 Linear Feet	Sanitary Sewer with Steel Casing Under Railroad - 48-inch Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
24b	130 Linear Feet	Sanitary Sewer with Steel Casing Under Railroad - 60-inch Diameter, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
25a	1 Each	Precast Concrete Special Manholes - Combination Air Valve Manhole, for _____ _____ _____ Dollars _____ Cents/Each	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
25b	2 Each	Precast Concrete Special Manholes - Air Release Valve Manhole, for _____ _____ _____ Dollars _____ Cents/Each	\$	\$
25c	1 Each	Precast Concrete Special Manholes – Forcemain Discharge Manhole, for _____ _____ _____ Dollars _____ Cents/Each	\$	\$
25d	1 Each	Special Manholes - Flushing Manhole, for _____ _____ _____ Dollars _____ Cents/Each	\$	\$
26a	2 Each	Precast Concrete Manholes – 48-Inch-Diameter, for _____ _____ _____ Dollars _____ Cents/Each	\$	\$
26b	30 Each	Precast Concrete Manholes – 60-Inch-Diameter, for _____ _____ _____ Dollars _____ Cents/Each	\$	\$
26c	3 Each	Precast Concrete Manholes – 72-Inch-Diameter, for _____ _____ _____ Dollars _____ Cents/Each	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
26d	10 VF	Precast Square Catchbasin, for _____ _____ _____ Dollars _____ Cents/VF	\$	\$
26e	130 VF	Epoxy Lining of Existing Manholes, 72-inch diameter, for _____ _____ _____ Dollars _____ Cents/VF	\$	\$
26f	32 VF	Epoxy Lining of Existing Manholes, 84-inch diameter for _____ _____ _____ Dollars _____ Cents/VF	\$	\$
26g	8 VF	Epoxy Lining of Existing Manholes, 96-inch diameter for _____ _____ _____ Dollars _____ Cents/VF	\$	\$
26h	22 VF	Epoxy Lining of Existing Manholes, 10'x8' Rectangular for _____ _____ _____ Dollars _____ Cents/VF	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
26i	24 Each	Epoxy Lining of New Manholes, for _____ _____ _____ Dollars _____ Cents/Each	\$	\$
26j	100 GAL	Active Leak Sealing Grout , for _____ _____ _____ Dollars _____ Cents/Gallon	\$	\$
26k	22 Each	Drilling and Setup for Grouting , for _____ _____ _____ Dollars _____ Cents/Each	\$	\$
27a	100 Linear Feet	Replace or Relocate Existing Water Mains – 8-Inch-Diameter DIP, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
27b	100 Linear Feet	Replace or Relocate Existing Water Mains – 10-Inch-Diameter DIP, for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
28	4,000 Square Feet	Concrete Sidewalk Restoration , for _____ _____ _____ Dollars _____ Cents/ S.F.	\$	\$
29a	1,100 Linear Feet	Granite Curbing , for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
29b	200 Linear Feet	Concrete Curbing , for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
30	1,400 Linear Feet	Concrete gutters , for _____ _____ _____ Dollars _____ Cents/ L.F.	\$	\$
31	4,300 Square Yards	Cold Milling , for _____ _____ _____ Dollars _____ Cents/ S.Y.	\$	\$
32a	6,000 Square Yards	Final Pavement, Bituminous Asphalt Pavements with Aggregate Subbase , for _____ _____ _____ Dollars _____ Cents/ S.Y.	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
32b	2,000 Square Yards	Final Pavement, Bituminous Asphalt Pavements with RAP Subbase, for <hr/> <hr/> _____ Dollars _____ Cents/ S.Y.	\$	\$
33	3 Each	Remove, Protect and Reinstall Light Poles, for <hr/> <hr/> _____ Dollars _____ Cents/ Each	\$	\$
34a	50 Linear Feet	Remove, Protect and Reinstall Existing Ornamental Fence, for <hr/> <hr/> _____ Dollars _____ Cents/ Linear Feet	\$	\$
34b	50 Linear Feet	Remove, Protect and Reinstall Existing Chain Link Fence, for <hr/> <hr/> _____ Dollars _____ Cents/ L.F.	\$	\$
35	16 Each	Abandon Existing Manholes, for <hr/> <hr/> _____ Dollars _____ Cents/ Each	\$	\$
36	5,300 Linear Feet	Abandon Existing Sewers, for <hr/> <hr/> _____ Dollars _____ Cents/ L.F.	\$	\$

Item No.	Estimated Quantity	Payment Item Description Unit Price in Words	Unit Price in Figures	Extended Total in Figures
37a	20 Days	Compensation for Archaeological Investigations- Excavations for _____ _____ Dollars _____ Cents/Day	\$	\$
37b	5 Days	Compensation for Archaeological Investigations – Downtime, for _____ _____ Dollars _____ Cents/Day	\$	\$
38	1 Lump Sum (Fixed Allowance)	Miscellaneous Existing Utility Modifications Allowance, for _____ <u>One-hundred Thousand</u> Dollars _____ <u>No</u> Cents/L.S. (Allowance)	\$ 100,000.00	\$ 100,000.00
39	1 Lump Sum (Fixed Allowance)	Removal/Handling/Disposal of Impacted Material and/or Groundwater Allowance, for _____ <u>One-hundred Thousand</u> Dollars _____ <u>No</u> Cents/L.S. (Allowance)	\$ 100,000.00	\$ 100,000.00
40	1 Lump Sum (Fixed Allowance)	Railroad Fees Allowance, for _____ <u>One Hundred Thousand</u> Dollars _____ <u>No</u> Cents/L.S. (Allowance)	\$ 100,000.00	\$ 100,000.00
41	1 Lump Sum (Fixed Allowance)	Invasive Species Control Allowance, for _____ <u>Twenty Thousand</u> Dollars _____ <u>No</u> Cents/L.S. (Allowance)	\$ 20,000.00	\$ 20,000.00
42	1 Lump Sum (Fixed Allowance)	Contingency Allowance, for _____ <u>One Hundred Thousand</u> Dollars _____ <u>No</u> Cents/L.S. (Allowance)	\$ 100,000.00	\$ 100,000.00
TOTAL BID			\$ _____ (Price in Figures)	

TOTAL CONTRACT 1G BASE BID PRICE IN WORDS (including above Allowances)

\$ _____

Indicate which sewer pipe material will be used – CCFRP or PVC

Add Alternates

Item No.	Estimated Quantity	Brief Description of Work	Amount in Figures
A1	Allowance	Add Alternate 1 (Pump Replacement) – Amount to be added to the Base Bid for providing replacement pumps at the High Level Pump Station as described under <i>Section 01010 Summary of Work</i> , except as included under the Base Bid items and other Add Alternates described herein.	\$250,000
A2	Allowance	Add Alternate 2 (Pump Installation) Amount to be added to the Base Bid for constructing improvement associated with installing 4 pumps in the High Level Pump Station to replace existing pumps including modifications to suction and discharge piping	\$300,000
Total			\$550,000

TOTAL CONTRACT 1G ADD ALTERNATE 1 PRICE IN WORDS (including above Allowance)

\$ _____

The undersigned agrees that extra work, if any, will be performed in accordance with Article 10 of the Conditions of the Contract and will be paid for in accordance with Article 11 of the Conditions of the Contract.

Amounts shall be shown in both words and figures, where indicated. In case of discrepancy, the amount shown in words will govern.

The above prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance and incidentals required to complete the Work.

The names and residences of all persons and parties interested in the foregoing Bid as principals are as follows:

(Give first and last names in full. In the case of a corporation, see Article 8.3 of the Instructions to Bidders, in the case of a limited liability company [LLC], see Article 8.4 of the Instructions to Bidders, in the case of a partnership, see Article 8.5 of the Instructions to Bidders.)

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.

The undersigned hereby certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this section, the word "person" shall mean any natural person, joint venture, partnership, corporation, or other business or legal entity.

Social Security Number
or Federal Identification
Number

Signature of Individual or
Corporate Name

By: _____
Corporate Officer
(if applicable)

Notice of acceptance should be mailed, faxed, or delivered to the following:

(Name)

By: _____
(Title)

(Business Address)

(City and State)

Date _____

Note: If the Bidder is a corporation, indicate State of incorporation under signature, and affix corporate seal; if a partnership, give full names and residential addresses, if different from business address.

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SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes specification for the measurement and payment of the various elements of the Work; with provisions applicable to lump sum prices, unit prices, and allowances, if applicable.
- B. In the case of conflict between this Section and the measurement methods specified in the individual technical Sections, the measurement methods in the technical specifications shall govern.
- C. The Contractor shall receive no payment for any portion of the work until it is installed. The only exception to this is payment for stored materials on site if the Contract provides for the payment of stored materials. Partial payment may be requested for items partially installed.

1.02 RELATED WORK

- A. Bid Forms is included in Section 00301.
- B. Applications for Payment are included in Section 01029.
- C. Schedule of Values is included in Section 01370.
- D. Summary of Work is included in Section 01010.

1.03 LUMP SUM ITEMS

- A. Lump Sum measurement will be for the entire item, unit of work, structure, or combination thereof, as specified and as indicated in the Bid Form. Measurement and payment for all bid items indicated as Lump Sums shall include the cost of all labor, materials and equipment necessary to furnish, install, clean, test, and place each bid item into operation; including permitting, general conditions, overhead and profit.
- B. Progress payments will be based on the Schedule of Values prepared by the Contractor and approved by the Engineer and Owner before acceptance of the first Application for Payment.
- C. In order for the Contractor to request progress payments against Lump Sum items, Contractor shall provide a disaggregation or breakdown in sufficient measurable detail that is acceptable to the Engineer.
- D. Measurement
 - 1. Measurement shall be based on the estimated percent complete of each item of the Schedule of Values, as determined by the Engineer.

E. Payment

1. Payment will be made at the lump sum price proportional to the completion percentages approved by the Engineer.

1.04 UNIT PRICE ITEMS

- A. Quantity and measurement estimates stated in the Bid Form are estimates for bidding purposes only. Actual payments shall be based on actual quantities installed, in-place, as measured and/or verified by the Engineer.
- B. Unless otherwise provided in the General Conditions, the bid unit prices shall be in effect throughout the contract duration, regardless of variances between the estimated quantities and the actual installed quantities.
- C. The Contractor shall make no claim, nor receive any compensation, for anticipated profits, loss of profit, damages, or any extra payment due to any difference between the amounts of work actually completed, or materials or equipment furnished, and the estimated quantities
- D. Unless otherwise approved by the Owner, any unit quantities exceeded may not be invoiced until the estimated quantity is increased by contract change order.
- E. Contractor shall assist Engineer by providing necessary equipment, workers, and survey personnel as required to measure quantities.
- F. Measured quantities shall be rounded to the nearest whole integer, unless the value of the unit price exceeds \$100, in which case measured quantities shall be rounded to the nearest half unit.
- G. Measurement
 1. Measurement for progress payment shall be made by, or approved by, the Engineer based on the estimated effective quantity installed. The effective quantity installed represents the actual units or quantities installed, adjusted for incomplete elements or components.
 2. Unless otherwise provided for in the Bid Form unit price items are all-inclusive of all related work, direct and indirect, to provide a complete and functional item. For example, underground pipe installation would include trenching, shoring, dewatering, bedding, installation, backfill, testing, flushing, disinfection, and commissioning; including all labor, materials and equipment necessary to furnish, install, clean, test, and place into operation; including permitting, general conditions, overhead and profit.
 3. The final measurement shall be based on actual quantities, jointly measured by Contractor and Engineer, complete, fully, tested and placed into service.
- H. Payment
 1. Progress payments shall be in accordance with the contract documents based on estimated effective quantities installed, paid at the bid unit price.

2. The final payment shall be based on actual quantities, fully installed, tested and placed into service, paid at the bid unit price.

1.05 ALLOWANCES

- A. Allowances, if any, specified in the Contract Documents and indicated in the Bid Form are considered provisional amounts to be used only if needed. Allowances are exclusive of work indicated in the Contract Documents for which payment is included under other items in the Bid Form. No work may be performed under an allowance without prior written approval of the Owner.
- B. Any unused balance of the allowances shall revert to the Owner upon completion of the project. Prior to final payment, the original amount provided for allowances shall be adjusted to actual costs by deductive Change Order, adjusting the contract price, accordingly.
- C. The Contractor shall make no claim, nor receive any compensation, for anticipated profits, loss of profit, damages, or any extra payment due to any unexpended portion of the allowances.
- D. The Contractor is to include time for allowance work in the construction schedule. No adjustment of Contract Time shall be allowed for any work performed under allowance items.
- E. Allowance items shall be included in the Schedule of Values.
- F. Unless otherwise indicated in the specific measurement and payment provisions under allowance items, the measurable and allowable costs for work performed under an Allowance item shall be limited to the actual, demonstrable, and direct costs associated with that Allowance item. Shipping and sales taxes are allowable costs.
 1. No mark-up for overhead or profit shall be included for payment under an Allowance account item. Overhead and profit shall be included in the contract base bid or allocated across other bid items.
 2. Work authorized by the Owner under an allowance may be performed as a lump sum (negotiated before the fact), unit prices (when applicable), or time and material. For work performed under time and material, Contractor shall submit detailed verification (break-down) of all costs, subject to the approval of the Engineer or Owner.

1.06 PAYMENT

- A. Payment for each lump sum and unit price stated in the itemized bid shall constitute full compensation for all required labor, products, tools, equipment, material, plant, transportation, services and incidentals; erection, application or installation of an item of the Work required to complete all work specified under that particular item including cleanup, and all costs for doing related work as set forth in these Specifications and /or on the Contract Drawings or implied in carrying out their intent.
- B. The price bid for each lump sum and unit price item stated in the itemized bid shall be deemed to include overhead and profit.

- C. Relevant specification section references are provided to facilitate pricing. However, Contractor shall, using his own judgment, determine which sections are relevant to each pay item prior to submitting a comprehensive price that covers all Work identified in the Contract Documents.
- D. Requests for payment shall be in accordance with the General Conditions.
- E. Payment will be made to the limits as specified in the Contract Documents. If the constructed limits are less than the specified limit, payment will be made at the prices given in the Schedule of Prices to the actual limits of construction as shown on the As-built Drawings. Payment for quantities that exceed the specified contract limits will only be made with the approval of the Engineer and shall be at the unit rates given in the Schedule of Prices. Payment for quantities that exceed the contract quantities will be made through an approved Change Order in accordance with the General Conditions of the Contract.
- F. The Contractor shall receive no payment for any portion of the work until it is installed. The only exception to this is payment for stored materials on site if the Contract provides for the payment of materials adequately stored and protected until installation. Partial payment may be requested for items partially installed.
- G. Materials will be paid for as specified in the General Conditions. All such requests must have material quantities verified by the Engineer prior to payment.
 - 1. Qualification for partial payment for materials delivered shall be in accordance with the General Conditions.

1.07 VARIATIONS IN ESTIMATED QUANTITIES

- A. The quantities given in the Contract Documents are approximate only and are given as a basis for the uniform comparison of bids, and Owner does not expressly or by implication warrant that the actual amount of work will correspond therewith.
- B. The Contractor must provide, for Unit Price Work, a proposed contract price determined on the basis of estimated quantities required for each item. The estimated quantities of items are not guaranteed and are solely for the purpose of comparing bids. Each such unit price will be deemed to include an amount for overhead, profit and indirect costs for each separately defined item.
- C. An increase or decrease in the quantity for any unit price item shall not be regarded as sufficient grounds for an increase or decrease in the price of the items except as provided in the General Conditions.
- D. If the actual Work requires more or fewer quantities than those indicated in the Bid Form, provide the required quantities at the unit sum/prices given in the Schedule of Prices and in accordance with the General Conditions of the Contract.

1.08 DEFECT ASSESSMENT

- A. Replace defective Work, or portions of defective Work, not conforming to specified requirements.

- B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct a remedy in accordance with the requirements of Article 13 of the General Conditions.

1.09 AUTHORITY

- A. Measurement methods delineated in the individual specification sections are intended to complement the criteria of this section. In the case of conflict between this Section and the measurement methods specified in the individual technical Sections, the measurement methods in the technical specifications shall govern.
- B. The Contractor shall take all measurements and compute quantities. The Engineer will verify measurements and quantities.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 LUMP SUM ITEMS

A. MOBILIZATION (Item 1)

- 1. Measurement
 - a. Measurement for payment of mobilization costs shall be on a lump sum basis but the cost shall not exceed 5 percent of the bid.
- 2. Payment
 - a. Payment of the lump sum price bid in the Bid Form for Item 1 shall be full compensation for all costs associated with initiating the Contract, exclusive of the cost of materials. Payment shall include, but is not limited to, mobilization, demobilization, insurance, bonds, shop drawings, health & safety plan, environmental protection requirements, site preparation, furnishing of temporary facilities, project meetings, project closeout, utility locations, acquisition of permits, control of work, clearing of horticulture, erosion controls, project signs, scheduling, and preparation and submittal of contract required work plans, and in general the costs associated with establishing the work on site to assure that it is proceeding in a continuous manner.

B. FLOW DIVERSION (Item 2)

- 1. Measurement
 - a. Measurement for payment of flow diversion costs shall be on a lump sum basis.
- 2. Payment
 - a. Payment of the lump sum price bid in the Bid Form for Item 2 shall be full compensation for all costs associated with maintaining sewer flows including flow diversion and bypass pumping, and design and operation of temporary pumping in accordance with specification 11500. This item includes all flow diversions required

for work on existing sewer structures, including pipe tie-ins, manhole cleaning and repair, and application of epoxy lining.

C. TRAFFIC CONTROL (Item 3)

1. Measurement and Payment

- a. Payment for traffic control (Item 3) will be made at the lump sum price bid in the Bid Form. This price shall be full payment for furnishing, installing, maintaining, and removing all traffic control devices, equipment, and measures necessary for implementing the traffic control plan required per the Contract Documents

D. GEOTECHNICAL MONITORING (Item 4)

1. Measurement

- a. Measurement shall be the shall be on a lump sum basis.

2. Payment

- a. Payment for Geotechnical Monitoring (Item 4) will be made at the lump sum price bid in the Bid Form. This price shall be full payment for surveying and installation of the project geotechnical instrumentation, measurement of geotechnical instrumentation, performing calculations, and maintaining field notes, documentation, and removal of instrumentation.

E. MISCELLANEOUS WORK AND CLEANUP (Item 5)

1. Measurement and Payment

- a. Payment for miscellaneous work and cleanup (Item 5) will be made at the lump sum price bid in the Bid Form. This price shall include costs incurred by the Contractor for usage of public water supply, restoration of paved and unpaved surfaces, certified survey and as-built drawings, coordination with utility companies, environmental professional to monitor soil excavation for contamination, and shall be full compensation for all labor, materials, equipment and incidentals required to do all the work specified in Section 01110, 01046, and 02901 including work not specifically included under other Bid Items but which are obviously necessary for the proper completion of the Contract.

F. EROSION AND SEDIMENT CONTROL (Item 6)

1. Measurement and Payment

- a. Payment for furnishing and installing erosion and sediment controls along the length of the project as identified on the plans and specifications, performing regular maintenance and repairs/additional controls as directed by the Engineer, developing of a Stormwater Pollution Prevention Plan and submitting a Notice of Intent for coverage under the General Permit, providing Qualified Contractor to sign off on the project Stormwater Pollution Prevention Plan, and all else incidental thereto for which separate payment is not provided.

G. CONCRETE STRUCTURES (Items 7a and 7b)

1. Measurement and payment

- a. Payment for concrete structures (Items 7a and 7b) will be made at the lump sum price bid in the bid form, which price and payment shall be full compensation for all excavation, backfilling, excavation support; dewatering operations, all forms, reinforcing, and concrete and masonry materials required to construct the structures, frames and covers, pipe connections, pipe stubs and couplings/concrete for connection to existing sewers and slide gates where applicable; furnishing and installing screened gravel subbase, filter fabric, temporary pavement, and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.

H. CONCRETE HEADWALLS AND ABOVEGRADE PIPE (Item 8)

1. Measurement and Payment

- a. Payment for furnishing and installing concrete headwalls for stream crossing complete in place will be made for the quantity as above determined at the unit price bid for Item 8, which price and payment shall be full compensation for all clearing, excavation (except rock and boulder excavation), backfilling, excavation support, dewatering operations, all forms, reinforcing, and concrete materials required to construct the headwalls, filter fabric, screened gravel subbase, and grade restoration around headwall, riprap placement, furnishing and installing above grade ductile iron pipe with insulation between headwalls and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.

I. SITE WORK, FILL AND GRADING (Item 9)

1. Measurement:

- a. Site work, filling and grading (Item 9) shall be measured for payment at a lump sum bid in the bid form for all site work, fill and grading.

2. Payment:

- a. Payment at the lump sum price shall be full compensation for all labor, materials, equipment, granular fill, loam and seed to fill and grade the area from Sta 49+50 to 123+00, within the sewer corridor to the grades shown on the Drawings. Backfilling of the trench to the grades shown is included in Item 23b. This Item is for added fill and grading to proposed grades shown outside of the sewer trench not included in Item 23b.

J. TRENCHLESS PIPE INSTALLATION – 30-INCH HDPE BY HORIZONTAL DIRECTIONAL DRILLING (HDD) (Item 10)

1. Measurement:

- a. Trenchless Pipe Installation – 30-inch HDPE by Horizontal directional drilling (HDD) (Item 10) shall be measured for payment at a lump sum bid in the bid form for the complete installation of the 30-inch HDPE.

2. Payment:

Payment at the lump sum price shall be full compensation for all labor, materials, equipment, fusible HDPE pipe, fusing machines and skilled operators, connection, tracer wire, saw cuts, excavation, excavated surplus material and slurry transport and disposal, backfill, test pits as required by the Contractor, testing, backfill, temporary

paving and restoration of entry and exit points, and all work required for or incidental to the satisfactory completion of this item.

K. TRENCHLESS PIPE INSTALLATION – 36-Inch CCFRP/PVC UNDER RAILROAD BY PIPE JACKING (Item 11)

1. Measurement:
 - a. Base Bid Item No. 11 Trenchless Pipe Installation – 36-Inch CCFRP/PVC Under Railroad by Pipe Jacking shall be measured for payment at a lump sum item in the bid form for the complete installation of the 36-Inch CCFRP/PVC.
2. Payment
 - a. Payment at the lump sum price shall be full compensation for furnishing all labor, materials, equipment and incidentals including the following:
 - 1) Mobilization and demobilization of tunneling equipment, setup of tunnel staging areas, temporary ventilation, lighting, and communication systems, and storage and protection of delivered piping;
 - 2) Design and construction of the tunnel shafts, including all excavation, excavation support, maintenance for construction purposes, geotechnical monitoring, and dewatering and drainage of the shafts and tunnel;
 - 3) Excavation and installation of steel casing pipe, including controlling and monitoring line and grade of casing pipe alignment, and mucking;
 - 4) Transportation and disposal of excavated materials and slurries from shafts and tunnel;
 - 5) Installation of steel carrier pipe and fittings from Station 113+93 to Station 115+49, including pipe support casing spacers, cathodic protection bonding, non-destructive examination of welds, and deflection testing;
 - 6) Grouting of annular space between casing pipe and native soil, construction of a bulkhead at each end of the tunnel, grouting of annular space between casing pipe and native soil, grouting of annular space between carrier pipe and casing pipe and grout testing;
 - 7) Backfilling, compaction, and compaction testing of shafts;
 - 8) Loaming and seeding of disturbed area for shafts.
 - 9) All else incidental thereto for which separate payment is not provided under other Items in the Bid Form.

3.02 UNIT PRICE ITEMS – GENERAL CONTRACT

A. EXCAVATION BELOW NORMAL SUBGRADE AND REFILL (Item 12)

1. Measurement
 - a. Measurement of earth excavation and refill below normal trench subgrade, for the removal of unsuitable subgrade or as otherwise directed by the Engineer, will be measured from the bottom of pipe or structure bedding specified in the details to the actual bottom of excavation. For payment purposes, the allowable trench width shall be in accordance with the standard trench detail or structure detail. No payment will be made for over excavation.
 - b. If the trench bottom is excavated below normal grade requiring refill through error by the Contractor or if the trench bottom is otherwise disturbed by the Contractor through

improper drainage or other similar disturbances, such removal and replacement of material will not be measured for payment.

2. Payment

- a. Payment for earth excavation and refill below normal trench subgrade will be made for the quantity as above determined at the price per cubic yard entered for the respective item on the Bid Form. Price and payment shall be full compensation for excavation and disposal of all materials below normal grade, furnishing, placing and compacting screened gravel and all other work incidental thereto for which separate payment is not provided under other items in the Bid Form.

B. ROCK/CONCRETE AND BOULDER EXCAVATION (Items 13a and 13b)

1. Measurement

- a. When rock is encountered, the material shall be uncovered, and the Engineer notified. The Owner's Representative will then take cross sections of the rock/concrete surface. If the Contractor fails to uncover the ledge, notify the Owner's Representative and allow ample time for cross sectioning the undisturbed material, the Contractor shall have no right-of-claim to any classification other than that allowed by the Owner's Representative. Removal of old concrete foundations, if any, shall be classified as rock.
- b. Measurement of rock excavation in pipe trenches will extend to the width as shown below. The limits are as follows:

<u>Depth from Ground Surface to Invert of Pipe</u>	<u>Pay Width (Nominal Pipe Diameter (D))</u>	
	<u>0 to 24-in</u>	<u>over 24-in</u>
0 to 12-ft	5-ft-0-in	D + 3-ft-0-in
12-ft to 20-ft	7-ft-0-in	D + 5-ft-0-in

- 1) Payment depth for rock which is encountered in a trench shall be no less than three feet when removal can be accomplished only by drilling and blasting (if allowed) or by use of jack (air or hydraulic) hammers.
- 2) Payment for rock removed, using the same or equal equipment as utilized for normal trench excavation, shall be limited to the actual depth removed within the limits established by the contract documents.
- c. Measurement for depth shall be from the top of the rock formation to the normal depth of the pipe as shown on the Drawings.
- d. The pay limit for rock and boulder removal for manholes shall commence one foot outside the widest dimension of the structure or shall be the maximum connecting trench width, whichever is greater. No allowance will be made for overbreakage.

- e. Boulders and concrete structures exceeding 1 cu yd in volume when encountered in excavation will be measured for payment. Removal of boulders of whatever size will not be paid for when encountered in borrow areas.
- f. The quantity of rock and boulder excavation to be paid for shall be the number of cubic yards of rock or boulders measured in place within the limits herein specified.

2. Payment

- a. Payment for rock/concrete and boulder excavation will be made for the quantities as determined above at the unit price bid for Items 13a and 13b in the Bid Form, which price and payment will be full compensation for permitting, blasting (if permitted), removal and disposal of rock and boulder; backfilling any over excavated volumes; and all work incidental thereto, for which payment is not provided under other items.

C. SUBSURFACE EXPLORATION (Item 14a and 14b)

1. Measurement

- a. Test pits (Item 14a) will be measured in cubic yards in accordance with the following established volume rates:

<u>Test Pit Depth</u>	<u>Cu. yds per vertical ft</u>
0 to 8 ft	2
8 to 12 ft	1.5

- b. Geophysical surveying (Item 14b) will be measure on a linear foot basis along the centerline of the proposed sewer.

2. Payment

- a. Payment for test pits will be made for the quantities as determined herein at the price per cubic yard bid for Item 14a in the Bid Form. This price shall be full compensation for excavation (including hand excavation), backfill, compaction, restoring trench surface to grade, temporary pavement and all incidental work required to complete the test pits for which separate payment is not provided under other items in the Bid Form.
- b. Payment for test pits will be made for the quantities as determined herein at the price per cubic yard bid for Item 14b in the Bid Form. This price shall be full compensation for completing a geophysical survey (ground penetrating radar) to locate utilities within 10 feet of proposed sewer centerline.

D. MISCELLANEOUS GRANULAR MATERIALS (Items 15a, 15b and 15c)

1. Measurement

- a. Materials included in Items 15 will be paid only when directed in writing by Engineer. Crushed stone, screened gravel and riprap are generally included in other pay items for concrete structures (Item 7), concrete headwall and abovegrade pipe (Item 8),

trenchless pipe installation (Items 10 and 11), pipe and structures (Items 17 to 27), and paving (Item 32).

- b. Crushed Stone (Item 15a), when its use is approved and when furnished, placed and compacted for pavement subbase and for miscellaneous uses will be measured in cubic yards at actual in-place dimensions as determined by the Engineer. When used for pavement subbase the widths for payment shall not exceed those defined for initial trench pavement. No allowance will be made for loss from consolidation of material. Truck measurement will not be permitted. Material excavated from trench which is used as pavement subbase will not be measured for payment.
 - c. Screened gravel (Item 15b) used in conjunction with utility crossings and at other locations when its use is ordered by the Engineer will be measured in cubic yards at actual in-place dimensions as determined by the Engineer. When used in trenches the payment limits shall not exceed the trench widths defined for rock.
 - d. Riprap (Item 15c), when its use is required and approved and when furnished and placed for slope stabilization and restoration, will be measured in cubic yards at the actual in-place dimensions as directed by the Engineer. When used in trenches the payment limits shall not exceed the trench widths defined for rock.
2. Payment
- a. Payment for furnishing and placing crushed stone, screened gravel and riprap will be made for the quantity determined above at the respective price bid for Items 15a thru 15c in the Bid Form. This price and payment shall be full compensation for furnishing, hauling, placing, compacting and all else incidental thereto for which separate payment is not provided under other items.
 - b. Payment for gravel borrow refill material to replace unsuitable backfill material will be included under Item 12.
 - c. Payment for screened gravel used in pipe bedding will be included with the respective pipe items.
 - d. Payment for screened gravel used in subbase for manholes and structures will be included with the respective structure bid items.
 - e. Payment for granular materials to refill rock and boulder excavation will be included under Items 13a and 13b, respectively.

E. MISCELLANEOUS CONCRETE (Items 16a and 16b)

1. Measurement
 - a. Measurement for payment for concrete furnished and installed shall be the actual number of cubic yards placed or as determined by the Engineer.
 - b. Concrete placed for miscellaneous purposes where approved by the Engineer will be measured in cubic yards.

- c. Item 16a is for 4,000 psi concrete. Item 16b is for lean concrete/controlled density backfill.
2. Payment
 - a. Payment for miscellaneous concrete and controlled density backfill will be made for the quantity as above-determined at the unit price bid in the Bid Form for Items 16a and 16b and shall be full compensation for furnishing and placing the concrete including form work, reinforcing and other materials for encasing pipe connections to manholes, and other miscellaneous concrete work as directed by the Engineer.
 - b. Payment for concrete for gutters, curbs, structures, and manhole benches is not included in this item.
- F. PVC STORM DRAIN PIPE (ITEM 17a THRU 17c)
1. Measurement
 - a. Drain pipe of the type and size specified on the Bid Form (Items 17a thru 17c) will be measured in place on a linear foot basis. Measurement for payment does not signify that the storm sewer line is accepted.
 - b. Measurement of drain pipe for length will be along the horizontal centerline of the pipe with no deduction for fittings and will be to the center of manholes.
 2. Payment
 - a. Payment for furnishing and installing drain pipe will be made for the respective quantities as determined above at the unit price bid under Items 17a thru 17c in the Bid Form. This price and payment shall be full compensation for cutting and removing existing pavement, clearing and grubbing easements, trench excavation (except rock and boulder excavation), photoionization detector (PID) air monitoring in and along the excavation, backfilling and compaction, loaming and seeding, impervious dams, restoring the trench surface to grade (including geotextile, tack coats as required, sub-base, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed), furnishing screened gravel bedding and encasement, furnishing, laying, jointing, cleaning and testing the pipe, and all incidental work, including driving and removing sheeting and bracing and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.
 - b. Payment will be made for pipe only when it is installed in the ground and no so-called proportional payment shall be made for pipe on the site but not yet installed.
 - c. Pavement for final restoration of trench surface is included in Item 32.
- G. DUCTILE IRON STORM DRAIN PIPE (Item 18)
1. Measurement
 - a. Ductile iron pipe of the type and size specified on the Bid Form (Item 18) will be measured in place on a linear foot basis. Measurement for payment does not signify that the sewer line is accepted.

- b. Measurement of ductile iron pipe for length will be along the horizontal centerline of the pipe with no deduction for fittings and will be to the center of manholes.
- 2. Payment
 - a. Payment for furnishing and installing ductile iron pipe will be made for the respective quantities as determined above at the unit price bid under Items 18 in the Bid Form. This price and payment shall be full compensation for cutting and removing existing pavement, clearing and grubbing easements, trench excavation (except rock and boulder excavation), photoionization detector (PID) air monitoring in and along the excavation, backfilling and compaction, loaming and seeding, impervious dams, restoring the trench surface to grade (including geotextile, tack coats as required, subbase, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed), furnishing and installing screened gravel bedding, furnishing, laying, jointing, cleaning and testing the pipe, and all incidental work, including driving and removing sheeting and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.

H. STEEL SANITARY SEWER FORCE MAIN (Item 19)

- 1. Measurement
 - a. Steel sanitary sewer forcemain of the size specified on the Bid Form (Item 19) will be measured in place on a linear foot basis. Measurement for payment does not signify that the sewer line is accepted.
 - b. Measurement of sewer pipe for length will be along the horizontal centerline of the pipe with no deduction for fittings and will be to the center of manholes.
- 2. Payment
 - a. Payment for furnishing and installing steel sanitary sewer pipe will be made for the respective quantities as determined above at the unit price bid under Item 19 in the Bid Form. This price and payment shall be full compensation for cutting and removing existing pavement, clearing and grubbing easements, trench excavation (except rock and boulder excavation), photoionization detector (PID) air monitoring in and along the excavation, backfilling and compaction, loaming and seeding, impervious dams, restoring the trench surface to grade (including geotextile, tack coats as required, subbase, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed), furnishing screened gravel bedding and encasement, furnishing, laying, jointing, cleaning and testing the pipe and fittings, and all incidental work, including driving and removing sheeting and bracing and connecting to existing steel force main, and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.
 - b. Payment will be made for pipe only when it is installed in the ground and no so-called proportional payment shall be made for pipe on the site but not yet installed.

I. DUCTILE IRON SANITARY SEWER FORCEMAIN (Items 20a to 20c)

1. Measurement
 - a. Ductile iron pipe of the type and size specified on the Bid Form (Item 20a) for connection at the existing High Level Pump Station will be measured in place on a linear foot basis. Measurement for payment does not signify that the sewer line is accepted.
 - b. Measurement of ductile iron pipe for length will be along the horizontal centerline of the pipe with no deduction for fittings and will be to the center of manholes.
 - c. Ductile iron fittings (Item 20b and 20c) will be measured for payment as the number of each at sizes actually installed in the completed project and accepted by the Engineer.
2. Payment
 - a. Payment for furnishing and installing ductile iron pipe will be made for the respective quantities as determined above at the unit price bid under Item 20a in the Bid Form. This price and payment shall be full compensation for cutting and removing existing pavement, clearing and grubbing easements, trench excavation (except rock and boulder excavation), photoionization detector (PID) air monitoring in and along the excavation; backfilling and compaction, loaming and seeding, impervious dams, restoring the trench surface to grade (including geotextile, run of crush, tack coats as required, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed), furnishing and installing screened gravel bedding, furnishing, laying, jointing, cleaning and testing the pipe, and all incidental work, including driving and removing sheeting and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.
 - b. Payment for ductile iron fittings will be made for the quantity as above determined at the contract price per each bid item (Item 20b and 20c) in the Bid Form. Such price and payment shall be full compensation for furnishing new ductile iron fittings including all labor, equipment, and materials for excavation (excluding rock excavation) including furnishing, installing and removing sheeting, where required; removing and disposing of excess and unacceptable excavation material; dewatering and drainage; transporting and installing the fitting, furnishing and installing sufficient restraint for the fitting; bedding; backfilling; compaction; cleaning and testing of the fittings; and all work required for or incidental to the satisfactory completion of the Items for which separate payment is not provided under other items in the Bid Form

J. HDPE SANITARY SEWER FORCEMAIN (Items 21a to 21c)

1. Measurement
 - a. Sanitary pipe of the type and size specified on the Bid Form (Item 21a and 21b) will be measured in place on a linear foot basis. Measurement for payment does not signify that the sewer line is accepted.
 - b. Measurement of sanitary pipe for length will be along the horizontal centerline of the pipe with no deduction for fittings and will be to the center of manholes.

- c. HDPE fittings (Item 21c) will be measured for payment as the number of each at sizes actually installed in the completed project and accepted by the Engineer.
 2. Payment
 - a. Payment for furnishing and installing sanitary pipe will be made for the respective quantities as determined above at the unit price bid under Items 21a and 21b in the Bid Form. This price and payment shall be full compensation for cutting and removing existing pavement, clearing and grubbing easements, trench excavation (except rock and boulder excavation), photoionization detector (PID) air monitoring in and along the excavation; backfilling and compaction, loaming and seeding, impervious dams, restoring the trench surface to grade (including geotextile, , tack coats as required, subbase, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed), furnishing screened gravel bedding and encasement, furnishing, laying, jointing, cleaning and testing the pipe, and all incidental work, including driving and removing sheeting and bracing and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.
 - b. Payment for HDPE fittings will be made for the quantity as above determined at the contract price per each bid item (Item 21c) in the Bid Form. Such price and payment shall be full compensation for furnishing new ductile iron fittings including all labor, equipment, and materials for excavation (excluding rock excavation) including furnishing, installing and removing sheeting, where required; removing and disposing of excess and unacceptable excavation material; dewatering and drainage; transporting and installing the fitting, furnishing and installing sufficient restraint for the fitting; bedding; backfilling; compaction; cleaning and testing of the fittings; and all work required for or incidental to the satisfactory completion of the Items for which separate payment is not provided under other items in the Bid Form
 - c. Payment will be made for pipe only when it is installed in the ground and no so-called proportional payment shall be made for pipe on the site but not yet installed.
 - d. Pavement for final paving is included in Item 32.
 - e. HDPE sanitary sewer forcemain installed via horizontal directional drilling is included in Item 10.
 - f. HDPE sanitary sewer forcemain installed inside casing pipe is included in Item 24.
- K. HDPE SANITARY SEWER FORCEMAIN BACKFILLED WITH CONTROLLED DENSITY FILL (Item 22)
 1. Measurement
 - a. Sanitary pipe of the type and size specified on the Bid Form (Item 22) will be measured in place on a linear foot basis. Measurement for payment does not signify that the sewer line is accepted.
 - b. Measurement of sanitary pipe for length will be along the horizontal centerline of the pipe with no deduction for fittings and will be to the center of manholes.

2. Payment
 - a. Payment for furnishing and installing sanitary pipe will be made for the respective quantities as determined above at the unit price bid under Item 22 in the Bid Form. This price and payment shall be full compensation for cutting and removing existing pavement, trench excavation (except rock and boulder excavation), photoionization detector (PID) air monitoring in and along the excavation; backfilling with controlled density backfill, , impervious dams, restoring the trench surface to grade (including geotextile, tack coats as required, subbase, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed), furnishing screened gravel bedding and encasement, furnishing, laying, jointing, cleaning and testing the pipe, and all incidental work, including driving and removing sheeting and bracing and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.
 - b. Payment will be made for pipe only when it is installed in the ground and no so-called proportional payment shall be made for pipe on the site but not yet installed.
 - c. Pavement for final restoration of trench surface is included in item 32.

L. CCFRP/PVC SANITARY SEWER (Item 23a to 23d)

1. Measurement
 - a. Sanitary pipe of the type and size specified on the Bid Form (Item 23a to 23d) will be measured in place on a linear foot basis. Measurement for payment does not signify that the sewer line is accepted.
 - b. Measurement of sanitary pipe for length will be along the horizontal centerline of the pipe with no deduction for fittings and will be to the center of manholes.
2. Payment
 - a. Payment for furnishing and installing sanitary pipe will be made for the respective quantities as determined above at the unit price bid under Items 23a to 23c in the Bid Form. This price and payment shall be full compensation for cutting and removing existing pavement, clearing and grubbing easements, trench excavation (except rock and boulder excavation), photoionization detector (PID) air monitoring in and along the excavation, furnish and place granular fill to proposed grades within pipe trench limits as shown on Drawings, backfilling and compaction, loaming and seeding, impervious dams, restoring the trench surface to grade (including geotextile, tack coats as required, subbase, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed), furnishing and installing bedding as required for pipe type, furnishing, laying, jointing, cleaning and testing the pipe, and all incidental work, including driving and removing sheeting and bracing and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.
 - b. Payment will be made for pipe only when it is installed in the ground and no so-called proportional payment shall be made for pipe on the site but not yet installed.
 - c. Contractor shall indicate on Bid Form the type of pipe (CCFRP or PVC) included in the bid.

- d. Pavement for final restoration of trench surface is included in Item 32.
- e. Pipe to be installed inside a casing pipe via jack and bore is included in Item 11.
- f. Pipe to be installed inside a casing pipe via open cut is included in Items 24a and 24b.

M. SANITARY SEWER WITH STEEL CASING (Items 24a to 24b)

- 1. Measurement
 - a. Sanitary sewer with steel casing of the type and size specified on the Bid Form (Item 24a to 24b) will be measured in place on a linear foot basis. Measurement for payment does not signify that the sewer line is accepted.
 - 1) Item 24a is the 48" casing and sewer located between Stations 7+00 and 8+00
 - 2) Item 24b is the 60" casing and sewer located between Stations 41+00 and 41+50
 - b. Measurement of pipe for length will be along the horizontal centerline of the pipe with no deduction for fittings and will be to the end of the steel casing.
- 2. Payment
 - a. Payment for furnishing and installing sanitary sewer in steel casing will be made for the respective quantities as determined above at the unit price bid under Items 24a and 24b in the Bid Form. This price and payment shall be full compensation for cutting and removing existing pavement, clearing and grubbing easements, trench excavation (except rock and boulder excavation), backfilling and compaction, loaming and seeding, supporting, protecting and restoring railroad ties and tracks during excavation, restoring the trench surface to grade (including geotextile, tack coats as required, subbase, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed), furnishing and installing bedding as required for the steel casing, furnishing; joining and installing the steel casing; furnishing, joining, cleaning and testing the sanitary sewer carrier pipe; furnishing and installing bulkheads and grout in annular space between casing pipe and carrier pipe, grout testing, and all incidental work, including driving and removing sheeting and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.

N. PRECAST CONCRETE SPECIAL MANHOLES (ITEM 25a TO 25d)

- 1. Measurement
 - a. Precast concrete special manholes (Items 25a to 25d) will be measured on an individual basis.
- 2. Payment
 - a. Payment for furnishing and installing precast concrete special manholes complete in place will be made for the quantity as above determined at the unit price bid for Item 25a to 25d, which price and payment shall be full compensation for all excavation (except rock and boulder), backfilling, for furnishing and installing precast sections and bases, manhole rungs, frames and covers, corrosion resistant lining, pipe and appurtenances (including tees, fittings, and valves) within the manhole, pipe supports,

mechanical seals, DIP to HDPE transition fittings, screened gravel subbase and filter fabric, all forms, reinforcing, concrete and masonry materials, top slabs, restoring to grade (including geotextile, tack coats as required, subbase, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed or loam and seed if outside of paved area and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.

O. PRECAST CONCRETE SANITARY AND STORM STRUCTURES (ITEMS 26a TO **26k**)

1. Measurement

- a. Precast concrete manholes (Items 26a, 26b, 26c) will be measured based on the number of manholes of the given diameter provided and installed.
- b. Precast square catchbasins (Item 26d) will be measured in vertical feet from the invert of the catchbasin sump to the top of the catchbasin frame.
- c. Epoxy lining of **new** manholes (Items ~~26e and 26f~~ **26i**) will be measured based on the number of manholes to which epoxy lining is applied.
- d. **Epoxy lining of existing manholes (Items 26e to 26h) will be measured in vertical feet from the invert of structure to the rim of the manhole.**
- e. **Grout used to stop active leaks (Item 26j) shall be measured on a per gallon basis.**
- f. **Drilling and setup for grouting (Item 26k) will be measured based on the number of setups (maximum of one per manhole) required to apply the grout.**

2. Payment

- a. Payment for furnishing and installing concrete manholes complete in place will be made for the quantity as above determined at the unit price bid for Items 26a to 26d, which price and payment shall be full compensation for all excavation (except rock and boulder), backfilling, for furnishing and installing precast sections and bases, platforms, manhole rungs, frames and covers or grates, corrosion resistant epoxy lining, screened gravel subbase and filter fabric, all forms, reinforcing, concrete and masonry materials, top slabs for shallow manholes if used, restoring to grade (including geotextile, tack coats as required, subbase, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed or loam and seed if outside of paved area), and all else incidental thereto, including pipe connections and manhole testing, for which separate payment is not provided under other items in the Bid Form.
- b. Final pavement restoration is included in Item 32.
- c. Payment for Items **26e to 26h** is for epoxy lining of existing manholes on the existing interceptor from the new Railroad Street junction structure #1 to the WPCF Junction Structure #2. Payment shall be full compensation for cleaning, repairing and epoxy lining the existing structures.

- d. Payment for Item ~~26i~~ 26f is for epoxy lining of new manholes on the new interceptor from the SMH-10 to SMH-33. Payment shall be full compensation for applying the epoxy lining to the new structures.
- e. **Payment for Item 26j is for furnishing and applying grout as needed to seal active leaks in advance of epoxy lining of existing manholes.**
- f. **Payment for Item 26k is for equipment and labor to setup the grouting operation at each manhole where required. Multiple setups at one manhole will be measured as one setup.**
- g. Flow diversion required for application of the epoxy lining is included in Item 2.

P. REPLACE/RELOCATE DUCTILE IRON WATER PIPE (ITEMS 27a to 27b)

- 1. Measurement
 - a. Ductile iron water pipe of the type and size specified on the Bid Form (Item 27a to 27b) will be measured in place on a linear foot basis. Measurement for payment does not signify that the water line is accepted.
 - b. Measurement of ductile iron water pipe for length will be along the horizontal centerline of the pipe with no deduction for fittings.
- 2. Payment
 - a. Payment for furnishing and installing ductile iron water pipe replacement/relocation will be made for the respective quantities as determined above at the unit price bid under Items 27a to 27b in the Bid Form. This price and payment shall be full compensation for cutting and removing existing pavement, clearing and grubbing easements, trench excavation (except rock and boulder excavation), backfilling and compaction, loaming and seeding, restoring to grade (including geotextile, tack coats as required, subbase, base and binder courses and placement and removal of temporary pavement if final paving is not performed immediately after pipe is placed or loam and seed if outside of paved area), furnishing and installing screened gravel bedding, furnishing, laying, jointing, cleaning, testing and disinfecting the pipe, and all incidental work, including driving and removing sheeting and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.

Q. CONCRETE SIDEWALK RESTORATION (Item 28)

- 1. Measurement
 - a. Concrete sidewalk restoration (Item 28) shall be measured in place as the actual square footage of full concrete sidewalk installed.
- 2. Payment
 - a. Payment for concrete sidewalk restoration shall be made for the quantity measured in place at the unit price bid for Item 28 in the Bid Form and shall be full compensation for all work required for the satisfactory completion of the item, including furnishing

and installing gravel subbase, filter fabric, all forms, reinforcement and ties, concrete with control joints and finish, A.D.A. detectable warning devices and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.

R. CURB (Item 29)

1. Measurement

- a. Granite Curb (Item 29a) shall be measured in linear feet as the actual length of granite curb installed.
- b. Concrete Curb (Item 29b) shall be measured in linear feet as the actual length of concrete curb installed.

2. Payment

- a. Payment for curb shall be made for the quantity measured in place at the unit price bid for Items 29a and 29b in the Bid form and shall be full compensation for all work required for the satisfactory completion of the item, including excavation and supports; furnishing and installing concrete base or backfill, gravel subbase and filter fabric; furnishing and installing curb; dowels for concrete curb connection to concrete sidewalk; and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.

S. CONCRETE GUTTERS (Item 30)

1. Measurement

- a. Concrete gutters (Item 30) shall be measured in linear feet as the actual length of concrete gutter installed.

2. Payment

- a. Payment for concrete gutters shall be made for the quantity measured in place at the unit price bid for Item 30 in the Bid form and shall be full compensation for all work required for the satisfactory completion of the item, including furnishing and installing gravel subbase, filter fabric, all forms, reinforcement and ties, concrete with control joints and finish, and all else incidental thereto, for which separate payment is not provided under other items in the Bid Form.

T. COLD MILLING (Item 31)

1. Measurement

- a. Milling and Paving - milling of existing pavement and placement of new bituminous concrete top course in milled and excavated areas will be measured for payment in square yards as actually placed, but not exceeding widths indicated in the details of the drawings or otherwise specified.

2. Payment

- a. Payment for pavements complete in place, will be made for the quantity determined above at the price entered for the respective item on the Bid Form. Price and payment shall be full compensation for furnishing and placing new pavement, milling existing, cleaning and preparing the surface of the gravel base, furnishing, placing and

maintaining the pavement, including labor, materials, calcium chloride for dust control, tack coats as required, and all else incidental thereto for which payment is not provided under other items in the Bid Form.

- b. No additional payment will be made for leveling course if required.

U. FINAL PAVEMENT (Items 32a and 32b)

1. Measurement

- a. Full Depth New Pavement – placement of new sub-base, base, binder and top course will be measured for payment in square yards as actually placed, but not exceeding widths indicated in the details of the drawings, or otherwise specified.

2. Payment

- a. Payment for Bituminous Asphalt Pavements with Aggregate Subbase (Item 32a) complete in place, will be made for the quantity determined above at the price entered for the respective item on the Bid Form. Price and payment shall be full compensation for demolishing existing pavement and subbase; furnishing, placing and maintaining new pavement and aggregate subbase, including labor, materials, calcium chloride for dust control, tack coats as required, and all else incidental thereto for which payment is not provided under other items in the Bid Form.
- b. Payment for Bituminous Asphalt Pavements with RAP Subbase (Item 32b) complete in place, will be made for the quantity determined above at the price entered for the respective item on the Bid Form. Price and payment shall be full compensation for demolishing existing pavement and subbase; transporting RAP from the Owners yard and placing and compacting RAP subbase; furnishing, placing and maintaining new pavement including labor, materials, calcium chloride for dust control, tack coats as required, and all else incidental thereto for which payment is not provided under other items in the Bid Form.
- c. No additional payment will be made for leveling course if required.

V. REMOVE, PROTECT AND REINSTALL EXISTING APPURTENANCES (Items 33 to 34)

1. Measurement

- a. Remove, protect and reinstall light poles (Item 33) will be measured on an individual basis of actual light poles.
- b. Remove, protect and reinstall fencing (Items 34a and 34b) will be measured on a linear foot basis.

2. Payment

- a. Payment for removing, protecting and reinstalling light poles and fencing will be made for the quantity determined above at the price entered for the respective item on the Bid Form. Price and payment shall be full compensation for all work required for satisfactory completion of the item, including excavation to remove item, storage in protected area, and reinstallation to match existing conditions, and all else incidental thereto for which payment is not provided under other items in the Bid Form.

W. ABANDON EXISTING MANHOLES AND SEWERS (Items 35 to 36)

1. Measurement
 - a. Abandon existing manholes (Item 35) will be measured on an individual basis of the number of manholes abandoned.
 - b. Abandon existing sewers (Item 36) will be measured on a linear foot basis between manholes and/or pipe cap.
2. Payment
 - a. Payment for abandoning manholes will be made for the quantity determined above at the price entered for the respective item in the Bid Form. Price and payment shall be full compensation for the work required to satisfactorily complete the item, including excavation and removal of top section of manhole, installation of concrete plugs in pipes from manhole, backfill and compaction within manhole, backfill and compaction to return to grade, storage and disposal of removed manhole section, and all else incidental thereto for which payment is not provided under other items in the Bid Form.
 - b. Payment for abandoning sewers will be made for the quantity determined above at the price entered for the respective item in the Bid Form. Price and payment shall be full compensation for the work required to satisfactorily complete the item, including installation of pipe cap (when not at a manhole) and filling abandoned sewer with flowable fill, and all else incidental thereto for which payment is not provided under other items in the Bid Form.

X. ARCHAEOLOGICAL INVESTIGATION (Items 37a and 37b)

1. Measurement
 - a. Archaeological investigation excavation (Item 37a) will be measured on the number of days (or fraction thereof) for which contractor is required to perform careful excavation as directed by the Archaeological Monitor and/or Owner's Representative.
 - b. Archaeological downtime (Item 37b) will be measured on the number of days (or fraction thereof) for which contractor is waiting for completion of Archeological Monitor documentation/findings to move forward with additional work in the monitored area.
2. Payment
 - a. Payment for archaeological investigation excavation (Item 37a) will be full compensation for the work required to complete the item, including all labor and equipment required to complete the careful excavation and a report of work completed.
 - b. Payment for archaeological downtime (Item 37b) will be full compensation for the crew (Labor and equipment) that are idle during the archeological documentation/finding period.
 - c. No compensation will be granted for archeological downtime if the Contractor uses all or some of the affected crew for other work unless specifically agreed to by the Owner.

- d. For the purpose of this item one (1) day will equal to ten (10) working hours. The Owner reserves the right to prorate the compensation by dividing the daily rate by ten and multiplying by the number of affected hours in this timeframe.

3.03 ALLOWANCE ITEMS

A. MISCELLANEOUS EXISTING UTILITIES MODIFICATIONS (Item 38)

1. Measurement and Payment
 - a. Payment to the Contractor for this allowance will be reimbursement for work required to relocate or modify existing utilities not identified on the plans for relocation/modification.
 - b. Contractor shall provide Engineer with documentation for proposed work and agree to price with Owner and Engineer prior to performing the work.

B. REMOVAL, HANDLING, AND DISPOSAL OF IMPACTED MATERIAL AND/OR GROUNDWATER (Item 39)

1. Measurement and Payment
 - a. Contingency allowance for use only as directed by the Engineer for cost to manage and dispose of contaminated material and/or groundwater.

C. RAILROAD FEE ALLOWANCE (Item 40)

1. Measurement and Payment
 - a. Payment under this allowance item will be for all fees from the railroad (including costs to coordinate railroad access and flagging) for work within the railroad right-of-way as documented on railroad invoices.

D. INVASIVE SPECIES CONTROL ALLOWANCE (Item 41)

1. Measurement and Payment
 - a. Payment under this allowance item will be for all fees for herbicide treatment of invasive species performed in accordance with Section 02955 as documented in submitted invoices.

E. CONTINGENCY ALLOWANCE (Item 42)

1. Measurement
 - a. The Work for Bid Item 42 shall only be as directed by the Owner's Representative for the Owner's purposes. This allowance is intended to cover unforeseen conditions, such as utility or structural conflicts not identified on the Drawings or additional requirements from the railway. The Allowance amount shall be as indicated on the Bid Form.

2. Payment

- a. Payment for unforeseen conditions as described in the scope of work above, shall be made on a time and materials basis in accordance with the scope of work developed by the Owner's Representative and budget developed by the Contractor and agreed upon by Owner, Owner's Representative, and Contractor. A written directive for performing the work will then be prepared by the Owner's Representative identifying the scope and price for performing the unforeseen work. Upon completion of the work, the Contractor shall provide supporting documentation to justify the costs of performing the work. Additional documentation may be required, as requested by the Owner's Representative. No payment will be made under this item that, in the opinion of the Owner's Representative, have not been sufficiently documented or were not authorized to be performed.
 - b. Payment will be made in accordance with the Contract provisions for Bid Item 42 and shall be full compensation to the Contractor for furnishing all labor, materials, equipment and incidentals required as directed by Owner's Representative.
3. Any unexpended balance shall be returned to the Owner as a credit. If the Allowance is exceeded, the excess will be paid to the Contractor via Change Order.

3.04 ADD ALTERNATES

A. PUMP REPLACEMENT (A1))

1. Measurement and Payment
 - a. Amount to be added to the Base Bid for providing replacement pumps at the High Level Pump Station as described under *Section 01010 Summary of Work*, except as included under the Base Bid items and other Add Alternates described herein. All add alternate work to be authorized in writing prior to undertaking the work
 - b. Payment to be made based on invoiced cost to procure and deliver replacement pumps.

B. PUMP INSTALLATION (A2)

1. Measurement and Payment
 - a. Amount to be added to the based bid for installation of replacement pumps in the High Level Pump Station. All add alternate work to be authorized in writing prior to undertaking the work
 - b. Scope of work required to complete the installation shall be negotiated as part of authorization for undertaking this add alternate.

END OF SECTION

SECTION 11219

SUBMERSIBLE SOLIDS HANDLING PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Submersible solids handling pumps including their respective motors.
- 2. Supervisory services during installation and field testing of each unit and instructing the regular operating personnel in the proper care, operation and maintenance of the equipment.

- B. Related Requirements:

- 1. Section 033000: Concrete Work, except anchor bolts which are as recommended by (pump) Manufacturer furnished by the Contractor.

1.3 COORDINATION

- A. Section 01300 "Submittals"

1.4 ACTION SUBMITTALS

- A. Product Data: Submit literature, which may include drawings, describing the equipment in sufficient detail, including materials of construction, to indicate full conformance with the detail specifications for each pump model proposed.

- 1. The total weight of the equipment including the weight of the single largest item.
- 2. A complete materials table for all equipment establishing compliance with these specifications.
- 3. A list of the Manufacturer's recommended spare parts with the Manufacturer's current price for each item. Include gaskets, seals, etc. on the list. List all bearings by the bearing manufacturer's numbers only.
- 4. A complete total bill of materials of all equipment.

- B. Shop Drawings:

- 1. Certified dimensional drawings showing all important details of pump construction and auxiliary apparatus.
- 2. Submittal shall demonstrate that hatch clear opening is sufficient for the pump supplied.

3. Pump support design details showing anchor bolt locations and sizing information.
 4. Complete wiring diagrams and schematics of all power and control systems showing wiring requirements between all system components, motors, sensors, control panels and related systems.
 5. Complete motor data, including, but not limited to:
 - a. Type of enclosure design
 - b. Rated horsepower
 - c. Rated voltage
 - d. FLA
 - e. Starting current
 - f. LRA
 - g. LR KVA
 - h. NEMA starting code letter and insulation code letter
 - i. RPM
 - j. Input power in kW at nameplate rating
 - k. Starting calculations
 - l. Cable size
 - m. Efficiency at 50%, 75% & 100% load, and power factor at 50%, 75% & 100% load
 - n. Winding temperature rise
 - o. Speed torque curves
 - p. Recommended trip and alarm settings for temperature protective devices
 - q. Power and control cable size and materials of construction, details of cable sealing method, description and type of motor thermal protection, description of insulation system and service factor.
 - r. Submit a certified statement from the motor manufacturer that the motors are capable of continuous operation on the power supply from the variable frequency drives to be furnished without affecting their design life for bearings or windings. This requirement does not replace nor relieve submittal requirements under Division 16.
 - s. Submit a certified statement from the motor manufacturer that the motors are capable of a minimum of 12 variable frequency drive starts per hour and continuous operation on the power supply from the variable frequency drives to be furnished without affecting their design life for bearings and windings.
- C. Complete description of surface preparation and shop painting for pumps and motors.
- D. Design Data:
1. Data on the characteristics and performance of each pump. Data shall include guaranteed performance curves for specified (intermediate) design point and acceptance grade 2B for the other specified points, based on actual factory tests of similar units, which show that they meet the specified requirements for head, flow rate, overall efficiency, guaranteed maximum net positive suction head required (NPSH3), submergence and horsepower. Curves shall be submitted on 8 1/2-inch by 11-inch sheets, at as large a scale as is practical. Curves shall be plotted from zero flow at shut off head to pump flow rate at minimum specified total head (TH). The POR and AOR (refer to ANSI/HI 9.6.3) shall be clearly shown on the curves. This information shall be prepared specifically for the pump proposed. Catalog sheets showing a family of curves will not be acceptable.
- E. Submit warranty information.

1.5 INFORMATIONAL SUBMITTALS

A. Manufacturer's Certificate:

1. Manufacturer's certification of installation meeting Manufacturer's installation, operation and maintenance manuals and as specified in PART 3.
2. Manufacturer's field report as specified in PART 3.

B. Test and Evaluation Reports:

1. Description of proposed pump factory test plan including procedures and equipment.
2. Factory and field performance test data as specified in PART 2 and PART 3 for approval.
3. A schedule of the date of factory testing and delivery of the equipment to the job site.

C. Manufacturer's Instructions:

1. Submit detailed instructions on installation requirements, including storage and handling procedures.

D. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1. Identify the entity and experienced individual who will inspect the installation in accordance with Article "Inspection and Testing."

F. Manufacturer Reports: Indicate that equipment has been installed according to manufacturer's instructions.

G. Qualifications Statement:

1. Submit qualifications for Manufacturer.

1.6 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations and final orientation of equipment and accessories.

1. Operation and Maintenance Data:

The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, description, etc. that are required to instruct operating and maintenance personnel unfamiliar with such equipment. The maintenance instructions shall include trouble shooting data, full preventative maintenance schedules, and complete spare parts lists with ordering information.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish all special tools and test equipment required for the proper servicing of all equipment. All such tools and test equipment shall be furnished in a suitable steel tool chest complete with lock and duplicate keys.
- B. The Manufacturer shall furnish a complete list of recommended spare parts, gaskets, lubricants and sealants necessary for the first five years operation of each pumping system.
- C. Furnish the following spare parts for each size pump:
 - 1. Furnish all spare parts as recommended by pump manufacturer.

1.8 QUALIFICATIONS

- A. To assure unity of responsibility, the pumps, motors, guide rails, and other auxiliary equipment shall be furnished and coordinated by the Manufacturer. The Contractor and Manufacturer shall assume responsibility for the satisfactory installation and operation of the entire pumping system including pumps, motors, and accessories.
- B. The equipment covered by this Section is intended to be standard pumping equipment of proven ability as manufactured by companies having extensive experience in the production of such equipment similar to the applications stated in Articles "System Description" and "Conditions of Operation". Units specified herein shall be furnished by a single manufacturer. The equipment provided shall be designed, constructed and installed to operate satisfactorily when installed as shown on the Drawings or as approved by the Engineer.
- C. Manufacture pumps in accordance with the Hydraulic Institute Standards, except where otherwise specified.
- D. The Manufacturer or its representative shall have an authorized warranty center within a 300 mile radius of the job site, fully staffed with factory trained mechanics, and equipped with a stock of strategic spare parts for each model of pump furnished under this contract. The service facility and strategic spare parts shall be established prior to delivery of equipment for this project.
- E. Manufacturer: All equipment furnished under this Specification shall be new and unused, shall be the standard product of manufacturers having a successful record of manufacturing and servicing similar equipment and systems to that specified herein for a minimum of five years.
- F. The pumping equipment shall be furnished complete with accessories required and shall meet the detailed requirements of the Specifications.
- G. The Manufacturer shall be certified to the ISO 9001 standard for design and manufacture of submersible solids handling pumps.
- H. At startup, the pumps shall operate throughout the entire operating range with the maximum vibration velocity in inches per second RMS, measured in the field, shall conform to the requirements of ANSI/HI 11.6.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Section 01600 “Product Requirements” specifies requirements for transporting, handling, storing, and protecting products.
- B. All equipment and parts must be properly protected against any damage during shipment. Store the equipment in accordance with Manufacturer's recommendations.
- C. Long Term Storage:
 - 1. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of fabrication, including storage in accordance with Manufacturer’s requirements, until the unit and equipment are ready for operation.
 - 2. If long-term storage is required on-site, Contractor shall follow Manufacturer's detailed recommendations for long term storage.
- D. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.
- E. The finished surfaces of all exposed pump openings shall be protected by wooden or equivalent blank flanges, strongly built and securely bolted thereto or by other approved means.
- F. Protect unpainted finished iron or steel surfaces to prevent rust and corrosion.
- G. After hydrostatic or other tests, all entrapped water shall be drained prior to shipment and proper care shall be taken to protect parts from the entrance of water during shipment, storage and handling.
- H. Each box or package shall be properly marked to show its net weight in addition to its contents.
- I. No shipment shall be made until approved by the Engineer in writing.

1.10 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

1.11 WARRANTY

- A. In addition, Manufacturer shall warrant the pump/motor for a period of five years, prorated after the initial 1.5 years. This Manufacturer warranty duration includes the warranty period identified above and as outlined in Divisions 01 and 00.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. The system will pump raw wastewater from High Level Pump Station (HLPS) to the Rome Water Pollution Control Facility (WPCF). The equipment to be furnished under this Section includes four submersible wastewater pumps, motors, and accessories.
- B. The pumping units required under this Section shall be complete including pumps and motors with proper alignment and balancing of the individual units. The materials, including coatings in the pumps shall be complete with motor and shall conform to ANSI/NSF 61 and ANSI/NSF 372 where not in conflict with the requirements specified herein. All parts shall be so designed and proportioned as to have liberal strength, stability, and stiffness and to be especially adapted for the work to be done. Ample room shall be provided for inspection, repairs, and adjustments.
- C. Stainless steel nameplates giving the name of the manufacturer, the rated flow rate, head, speed, and all other pertinent data shall be permanently attached to each pump and/or motor.
- D. The pumps shall be totally submersible, solids handling, rotodynamic pumps with submersible close coupled motors designed to pump raw, unscreened wastewater. The design shall be such that the pumping units shall be automatically connected to the discharge piping when lowered into place on the discharge connection, providing a water tight seal. The pumps shall be designed to be easily removed from their discharge connections and the wet well for inspection or service. Lifting the pumps from their discharge connections or the wet well shall require neither the removal of any bolts, nuts or other fastenings nor the need for personnel to enter the pump well.

2.2 CONDITIONS OF OPERATION

- A. Manufacturer:
 - 1. Model 300DSC4GO, by Ebara.
- B. Each pump shall be designed for the conditions of service tabulated as follows and shall operate within the system head curve envelope as appended. All pumps with specific speed less than 4,500 rpm shall have a continuously rising (from runout toward shutoff) head performance curve for stable pump operation from the minimum head operating point to the shut-off head. For pumps where the specific speed is greater than or equal to 4,500 rpm, the intersection of the pump head and system head curves shall be used to demonstrate stable operation.
- C. The pumps shall operate throughout the specified operating range, within the vibration limitations specified above.

Design each pump for the conditions of operation tabulated as follows:

<u>Item Description – Influent Pumps</u>	<u>Design Conditions</u>
Service	Raw Wastewater
Number of Pumps (operating/standby)	4 (3/1)
Maximum Motor Full Load Speed (rpm)	1190
Maximum Allowable Motor Horsepower (non-overloading throughout operating range) (HP)	75
Motor Design Voltage/Phase/Frequency	480/3/60
Maximum Anticipated Pumped Fluid Temperature (degrees F.)	90
Minimum Base Elbow Discharge Size (inches)	12
Minimum Pump Shut-Off Head at Motor FLS Acceptable Range (minimum/maximum) (feet)	70.02
Minimum Overall Efficiency at BEP (%)*	85.14
Primary Operation Point TH (feet)	35
Minimum Flow Rate at Primary Operation Point (gpm)	4166
Maximum NPSHa at Primary Operation Point (feet)	20.1
Minimum Submergence Above Pump Casing (feet)/Maximum Duration at Min. Submergence (minutes)	5.2/6.2

- D. Each pumping unit and its driving equipment shall be designed and constructed to withstand the maximum turbine run-away speed of the unit due to back flow through the pump.

2.3 PUMP CONSTRUCTION

- A. The overall pump design shall combine high efficiency, low required NPSH3, the ability to handle high solids concentrations effectively. The impeller/casing design shall result in a passage free of surfaces to which solid or fibrous materials can adhere and shall be capable of passing fibrous and nonwoven materials as found in domestic wastewater. The design shall permit low liquid velocities and gradual acceleration and change of flow direction of the pumped media. The overall pump design shall combine high efficiency and low required NPSH3 and shall conform to ANSI/NSF 61 and ANSI/NSF 372 where not in conflict with the specific requirements contained herein. The design shall permit low liquid velocities and gradual acceleration and change of flow direction of the pumped media.
- B. All external pump and motor parts shall be of close grained cast iron, ASTM A48 Class 30 construction, with all parts in contact with wastewater protected by corrosion resistant epoxy coatings. All external bolts and nuts shall be type 316 stainless steel.
- C. Impellers shall be constructed of ASTM A532 III Type A1 hardened cast iron. Impellers shall be dynamically balanced as specified below.
- D. The impeller shall be a rotodynamic semi-open, solids handling type capable of passing solids either due to internal clearances or other features to facilitate solids processing including a wear plate with groove. The wear plate to impeller clearance shall be easily adjustable without the need for disassembly of the pump or the need to add or remove shims. The impeller may include pump out vanes on the upper shroud to reduce axial thrust and minimize clogging due to debris accumulation around the mechanical seal. The impeller shall be two-plane dynamically

balanced in accordance with ISO 1940-1 quality grade G2.5 standard to provide smooth, vibration free operation.

- E. Each pump shall be provided with a balanced tandem mechanical shaft seal system. The upper (inner) of the tandem set of seals shall operate in a seal lubricant chamber located just below the stator housing. At a minimum, this set shall contain one stationary silicon carbide and one positively driven rotating carbon ring and shall function as an independent secondary barrier between the pumped liquid and the stator housing. The lower (outer) of the tandem set of seals shall function as the primary barrier between the pumped liquid and the stator housing. This set shall consist of a stationary ring and a positively driven rotating ring, both of which shall be either tungsten carbide or silicon carbide. Each interface shall be held in contact by its own Hastelloy-C[®] or Elgiloy[®] spring system. The seal body shall be Type 316 stainless steel. The o-rings shall be FKM (Viton)[®]. The seals shall require neither maintenance or adjustment but shall be easily inspected and replaceable. Seal design shall provide pressure applied to the outside diameter of the face. Shaft seals with conventional double mechanical seals containing either a common single or double spring acting between the upper and lower units are not acceptable nor equal to the dual independent seal specified.
- F. The minimum pump discharge size shall be the minimum allowable nominal diameter of the discharge connection provided for attachment to the discharge piping, as shown on the Drawings, except as allowed otherwise by this specification. Unless otherwise noted, the diameter of the opening at the connection between the pump and the discharge connection should normally be the same as the minimum specified discharge size.
- G. A sliding guide bracket shall be an integral part of or bolted to the pumping unit. The pump casing shall have a machined connection system to attach to the ASTM A48, Class 35 cast iron discharge connection. The sealing system shall consist of two machined metal to metal flanges or flanges with a replaceable rubber seal, form fitted to the machined discharge coupling to ensure and guarantee a positive leak proof system and to provide ease of pump removal. The discharge connection shall be rigidly and accurately anchored to the floor of the wet well, precisely leveled and aligned, so that the completed installation is free from stress or distortion with type 316 stainless steel sleeve cast-in anchor bolts, monel nuts and accessories and so designed as to receive the pump connection without the need of any bolts or nuts. The pump shall be tightly sealed against the discharge connection and shall be accomplished by a simple linear downward motion of the pump with the pumping unit guided by two guide rails as specified below. No portion of the pump shall bear directly on the wet well floor.
- H. Each pump shall be fitted with a Type 316 stainless steel lifting cable and a short piece of suitably sized Type 316 stainless steel chain between the bail and cable. The lifting cable and chain shall be rated for five times the pump weight (minimum). The lifting cable and chain combined length shall be equal to the wet well depth (top slab finished grade to wet well bottom) plus six feet to permit raising the pump for inspection and removal.
- I. The lifting cable shall be attached to a lifting bail on the pump. Eyebolts will not be considered as an acceptable alternate to a lifting bail.

2.4 SUBMERSIBLE MOTORS

- A. Pump motors shall be inverter duty rated, housed in an air filled, water-tight casing, and shall have Class F or better non-hygroscopic insulated windings which shall be moisture resistant. Oil

filled motor housing is not acceptable for motors greater than 15 HP. The motors shall be suitable for use with the solid-state starters. The motor stator shall be dipped and baked three times in a VPI process and heat shrunk fitted into the stator housing. As an alternative, trickle impregnation method may be used for motor stator windings. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. Motors shall be NEMA Design B, equipped with a 1.15 service factor, as defined in the NEMA MG1 standard, based upon the nameplate horsepower rating for across-the-line service. A service factor of 1.0 will be acceptable when driven by a VFD (non-sinusoidal power supply). The motor insulation system shall be rated at 180° C or better. Motor shall be capable to operate in an ambient temperature of 40 ° C continuously with Class B temperature rise. The motor shall be NEMA Starting Code G or H, or better. Motors shall be non-overloading and capable of sustaining a minimum of ten starts per hour. Upper motor bearing shall be insulated. Motors shall be provided with a minimum power factor of 0.80 at full load. If motor is below this minimum power factor value, then power factor correction capacitors shall be furnished by the Manufacturer for constant speed applications. The motor efficiency shall comply with the minimum established herein: 82% at full load to meet the wire-to-water efficiency specified in Article "Conditions of Operation."

- B. Pump motors shall have cooling characteristics suitable to permit continuous operation in a non-submerged condition. Each motor shall incorporate three overheat sensing devices, one in each motor winding. These devices shall trip at 140°C. The sensing device shall be wired into the pump controls relay modules in a manner such that if the device operates, the pump will shut down. The temperature device shall be self-resetting.
- C. The pump motor shall incorporate a closed-loop cooling circuit with an integrated cooling pump rated for continuous duty in a completely dry mode; as well as; in a fully submerged condition without damage. The cooling jacket shall be cast iron ASTM A48 class 30 or steel. The coolant pump impeller shall be mounted directly on the motor shaft between the tandem mechanical seals to circulate coolant fluid into the top inter-space between the cooling jacket and motor housing, over the surface of the motor, through ducts in the bearing housing and into a casing heat exchanger. Heat losses from the motor shall be transferred to the fluid pumped in the casing heat exchanger, which forms a structural unit together with the discharge cover of the pump. After passing through the volute-casing heat exchanger, the coolant shall return to the suction side of the internal coolant pump (impeller). Coolant shall be an environmentally safe glycol based antifreeze or an environmentally safe food grade oil rated for use down to temperatures of minus 20° C (minus four degrees Fahrenheit). Fans, blowers or auxiliary cooling systems that are mounted external from the pump motor enclosure are not acceptable.
- D. When applied in wet pit application, the pump motors shall be designed so that the pump will be capable of running continuously in a totally dry condition under full load without damage for a cleaning cycle (15 minutes maximum). Pump motor shall be non-overloading within the range of operation between shutoff and the low head run-out conditions shown on the pump conditions of operation data table above. For pumps where specific speed is greater than or equal to 4,500, the range from the pump head and system head curves intersection point and low-head run out conditions shall be used to demonstrate non-overloading over the range of operating conditions.
- E. The pump/motor shaft shall be constructed of type 420 or type 431 stainless steel. When operating at the pump design point, the shaft shall have a maximum deflection of 0.2 mm at the lower seal face and a maximum deflection of 0.45 mm at the wear ring area. The shaft shall rotate on permanently lubricated ball bearings properly sized to withstand the axial and radial

forces. The ABMA Minimum L-10 bearing life shall be at least 30,000 hours rated at the pump BEP.

- F. The pump motor with its appurtenances and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet. All mated surfaces shall be machined, fitted with O-rings for watertight sealing.
- G. The pumps shall be provided with a cable entry design that shall preclude specific torque requirements to insure a water tight and submersible seal. The cable entry shall be certified by UL or FM to have passed pull-testing requirements. The cable entry junction chamber and motor shall be separated by a stator lead, sealing gland or terminal board, which shall isolate the motor interior from foreign material gaining access to the pump motor top. The cable entry system shall be field serviceable. The power and control cable entry into the lead connection chamber may also be epoxy encapsulated for positive moisture sealing. A BUNA-N cable grommet shall be provided in addition to the epoxy sealed leads.
- H. Cables, Conduits and Accessories:
 - 1. The pumps shall be supplied with power and sensor conductors. Pump motor cables shall be sized to meet applicable NEC requirements. The cable shall consist of a type SPC or SEOW insulated cable with a double jacketed protection system. The cable shall have a neoprene or chlorinated polyethylene outside and synthetic rubber inside, and shall exceed industry standards for oil, gas and sewage resistance. Individual conductors shall be of type RUW. Pump cables shall be provided of sufficient length so that the cables will be continuous between the pump and the disconnect with no splices being allowed.
 - 2. If more than one cable is being provided per pump, the Contractor shall furnish and provide for the installation of the additional conduits, etc. as required for each additional cable. Only one cable per conduit will be allowed at the pump station. Conduit sized per manufacturers recommendations but not smaller than 3/4-inch.
 - 3. Contractor shall furnish all required stainlesssteel conduit hardware and fittings.
 - 4. Water tight connectors shall be equal to Crouse-Hinds Type "CGB", with neoprene lands shall be furnished with and installed in the control panel enclosure or disconnect to terminate each conduit and seal each cable entry.
 - 5. Conduit seals shall be equal to Crouse-Hinds Type "EYS".
 - 6. Coordinate the installation of the above materials with the Manufacturer.

2.5 SHOP PAINTING

- A. Each pump and associated equipment shall be shop-primed and finished-coated in accordance with the Manufacturer's standard practice prior to shipment. Color shall be Manufacturer's standard.
- B. All interior and exterior surfaces of pumps and of motor enclosure shall be thoroughly cleaned, dry and free of all rust, mill scale, grease, dirt, other foreign matter and supplied with Manufacturer's standard epoxy coatings.
- C. All nameplates shall be properly protected during painting.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Take all necessary measurements in the field to determine the exact dimensions for all work and the required sizes of all equipment under this Contract. All pertinent data and dimensions shall be verified.

3.2 INSTALLATION

- A. Installation shall be in strict accordance with the Manufacturer's instructions and recommendations in the locations shown on the Drawings. The Contractor shall furnish all required oil and grease for initial operation, if required, in accordance with the Manufacturer's recommendations. Anchor bolts shall be set in accordance with the Manufacturer's recommendations.
- B. Upon completion of each pump application, the Manufacturer shall inspect the installation and submit a certificate stating that the installation of the equipment meeting Manufacturer's installation, operation and maintenance manuals is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication and care of each unit.
- C. If the Contractor does not provide qualified installation staff on the job during the pump installation, the Engineer may direct the Contractor to provide the services of a Manufacturer's factory representative to give the necessary instructions to ensure a proper installation.

3.3 INSPECTION AND TESTING

- A. General:
 - 1. The Engineer shall have the right to inspect any equipment to be furnished under this Section prior to their shipment from place of manufacture.
 - 2. Field tests shall not be conducted until such time that the pumping system, including controls, is complete and ready for testing.
- B. Factory Pump Testing:
 - 1. Examine cast surfaces of all components shall be examined by visual inspection per MSS SP-55.
 - 2. The Contractor shall furnish all water, power, facilities, labor, materials, supplies and test instruments required to conduct the field testing.
 - 3. The Final Acceptance Test shall demonstrate that all items of these Specifications have been met by the equipment as installed and shall include, but not be limited to, the following tests:
 - a. That the quick release lift-out feature functions properly and allows the pump to be raised and lowered without draining the pit.
 - b. That all units have been properly installed and are in correct alignment.

- c. The Contractor shall check for correct lubrication in accordance with manufacturer's instructions. The Contractor shall check direction of rotation of all motors and reverse connections, if necessary.
 - d. That the units operate without overheating or overloading any parts and without objectionable vibration.
 - e. That there are no mechanical defects in any of the parts.
 - f. That the pumps can deliver the specified total head and flow rate to demonstrate that the pumps generally meet the requirements specified (factory performance test is the basis of pump acceptance).
 - g. That the pump sensors and controls perform satisfactorily as to sequence control, correct start and stop elevations, and proper level alarm functions.
4. If the pump performance does not meet the specifications, corrective measures shall be taken, or pumps shall be removed and replaced with pumps which satisfy the conditions specified.
 5. A five-day continuous operating period of the pumps will be required before acceptance. If pumping system fails during the test period, the test shall be restarted (including reset of time to zero) after repair (or replacement) has been completed.

C. Field Vibration Testing:

1. When full speed operation can be accomplished, and in the presence of the Engineer, perform vibration tests in accordance with ANSI/HI 11.6 on each unit by a minimum level III qualified vibration technician as defined by Vibration Institute or equivalent to (a) demonstrate compliance with specified limitations, and (b) demonstrate that there are no field installed resonant conditions due to misalignment, the foundation, or the connecting piping and its supports, when operating at any speed within the specified operating range.
2. If required, take corrective action and have the units retested to ensure full compliance with the specified requirements. All costs associated with the field tests or any required corrective action shall be borne by the Contractor.

3.4 MANUFACTURER SERVICES INCLUDING OPERATING INSTRUCTIONS

A. Installation Inspection and Startup:

1. The Contractor shall include in his bid price the services of a Manufacturer's factory representative who has complete knowledge of proper operation and maintenance shall be provided to instruct representatives of the Owner and the Engineer on proper operation and maintenance. This work may be conducted in conjunction with the inspection of the installation and start-up. If there are difficulties in operation of the equipment because of the Manufacturer's design or fabrication, additional service shall be provided at no additional cost to the Owner. The listed service requirements are exclusive of travel time and shall not limit or relieve the Contractor of the obligation to provide sufficient service necessary to place the equipment in satisfactory and functioning condition.
2. Start-Up: Provide written report, summarizing test procedures, tested and measured variables (flow rates, total heads, shaft-speed, vibration measurements, alignment check, etc.):

a. Minimum time on-site shall be one 8-hour day.

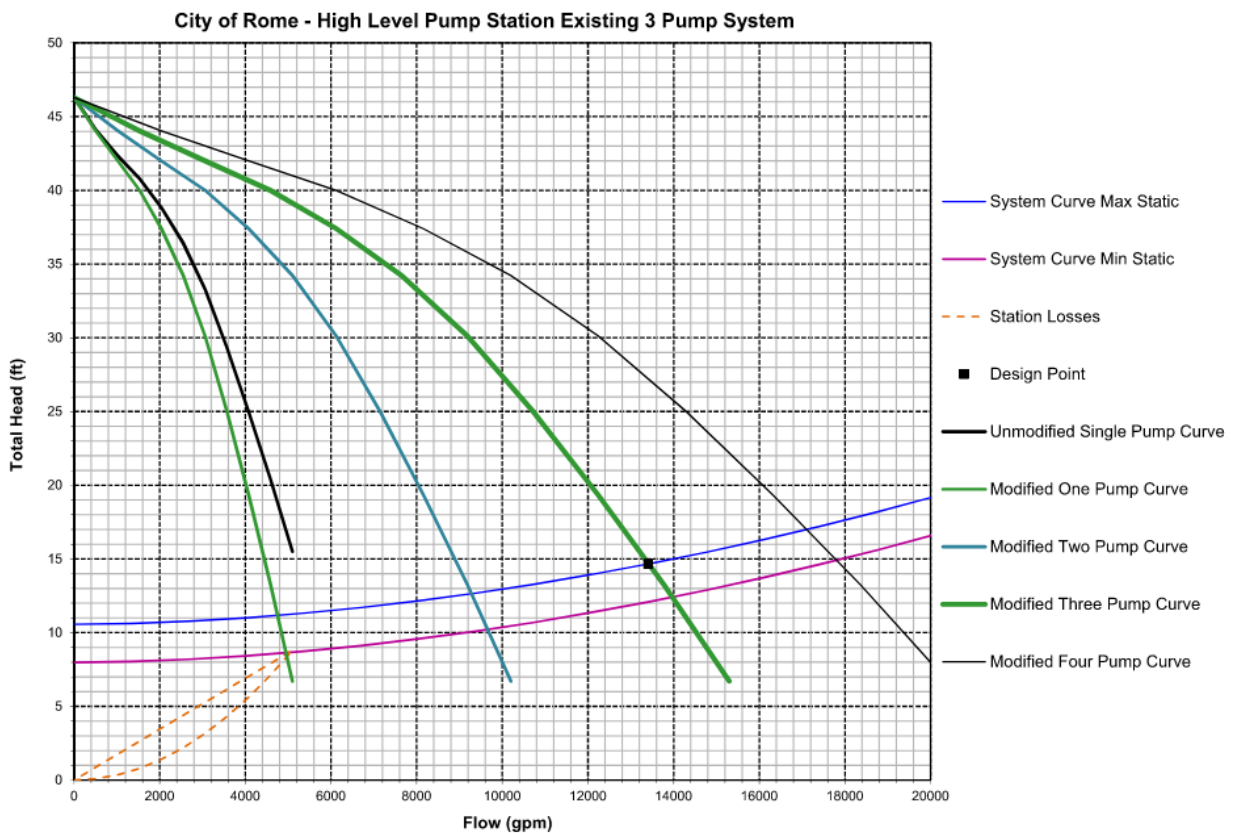
B. Training:

1. Field and classroom instruction on operation and maintenance of the equipment, including start-up, shut-down troubleshooting, lubrication, maintenance and safety.
2. The Manufacturer shall provide detailed manuals to supplement the training courses. The manuals shall include specific details of equipment supplied and operations specific to the project.
3. The Manufacturer shall make use of teaching aids, manuals, slide/video presentations, etc. After the training services, such materials shall be delivered to Owner.

a. Minimum time on-site shall be one 8-hour day per group of identical pumps.

C. The Contractor alone shall be responsible for requesting these services and shall coordinate these requests with all other relevant trades, to ensure the effectiveness of the Manufacturers' service. If the lack of coordination by the Contractor results in the need to recall the Manufacturer's factory representative, the lost time shall not be counted against the above days.

3.5 Figure 11219.1 – Pump and System Curve



END OF SECTION 11219