BIDDING AND CONTRACT DOCUMENTS
FOR THE
METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY
WEAVERVILLE PUMP STATION AND FORCEMAIN SYSTEM IMPROVEMENTS

****

ADDENDUM NO. 3

Date Issued: December 13 2023

****

Bidders on this Project are hereby notified that this Addendum shall be attached to and made a part of the above-named Bidding and Contract Documents dated October 2023.

The following items are issued to add to, modify, and clarify the Bidding and Contract Documents. These items shall have full force and effect as the Bidding and Contract Documents, and cost involved shall be included in the bid prices. Bids, to be submitted on the specified bid date, shall conform with the additions and revisions listed herein.

Acknowledge receipt of the Addendum by inserting its number and date on the second page of the bid form, i.e., page 004153-3.a. Failure to do so may subject the bidder to disqualification.

SECTION 009113 – ADDENDUM #3

1.1 PROJECT INFORMATION

A. Project Name: Weaverville Pump Station and Force Main Improvements.

B. Owner: Metropolitan Sewerage District of Buncombe County.

C. Owner Project Number: 2019080.

D. Engineer: CDM Smith.

E. Engineer: Project Number: 265366.

F. Date of Addendum: 12/13/2023

1.2 NOTICE TO BIDDERS

A. This Addendum is issued to all registered plan holders pursuant to the INSTRUCTIONS to Bidders and Conditions of the Contract. This Addendum serves to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.

B. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.

C. The date for receipt of bids is unchanged by this Addendum, at same time and location.

ATTACHMENTS

D. This Addendum includes the following attached Documents:

1. Responses to questions received during bidding phase.
2. Plan holders list.
3. Existing bypass pump curve and data sheet at PS#1.
4. Pre-Bid Meeting Minutes.
5. Pre-Bid Meeting Sign-In Sheet.

E. This Addendum includes the following specifications:

1. Reissued:

a. 004153 Bid Form
b. 012001 SFL – Price and Payment

c. 012200 FL – Unit Prices
d. 333111 Fiberglass Reinforced Polymer Mortar Pipe.

1.3 REVISIONS TO DIVISION 00 PROCUREMENT REQUIREMENTS AND CONTRACTING REQUIREMENTS

A. See attached specification section.

1.4 REVISIONS TO DIVISION 01 GENERAL REQUIREMENTS

A. See attached specification sections.

1.5 REVISIONS TO DIVISIONS 02 - 49 SPECIFICATION SECTIONS

A. SECTION 262923

1. On page 262923 – 4, Part 2 A

a. Add item 4:

1) “Danfoss”

B. SECTION 330513

1. On page 330513 – 4, Section 2.1. B.6.b:

a. Delete item 2 and replace with the following:

1) “Pipe interior shall be gray, black or other.”

C. SECTION 330516

1. On page 330516 – 5, Paragraph 2.5

a. Delete item A and replace with the following:

1) “Manhole frames and covers shall conform to ASTM A48, Class 35B for any manhole not being used for sewage air release valves. Acceptable manufacturers are US Foundry (Item IB-ORS or Series 577) or East Jordan Iron works (Item NPR 10-508D or Item 1045Z-1040AGS). Refer to Drawing CD-2.”

b. Delete item E and replace with the following:

1) “Cover Design: Refer to Detail F/CD-2.”

c. Delete item F.

2. On page 330516 – 6, Paragraph 2.6

    a. Delete item C and replace with the following:

        1) “Manhole pipe connections shall be as shown in Detail H/CD-2.”

D. SECTION 331210

1. On page 331210 - 3, Paragraph 2.2

    a. Add item H “Estimated design flows:

        1) Pump Station 1: 0.8 mgd (ADF), 3.9 mgd (PHF, 5-yr storm)

        2) Pump Station 2: 0.08 mgd (ADF), 0.36 mgd (PHF, 5-yr storm)”

E. SECTION 331216

1. On page 331216 - 1, Paragraph 1.5

    a. Delete item B and replace with the following:

        1) “Perform work according to MSD of Buncombe County standards”.

F. SECTION 400551

1. On pages 400551 – 9 through 400551 – 12 (valve schedule)

    a. Change all Valve Specification Tags with “CAV” of 2-inch Size to End Connection from “FLG” to “Threaded, NPT”.

G. SECTION 462433

1. On page 462433 – 2, Paragraph 1.6 A.2

    a. Change “Three cutters and three spacers.” To “One set of spare cutters and spacers for each unit provided.”

2. On page 462433 – 4, Paragraph 2.1 E

    a. Add item 5 “Double-spaced cutting elements and spacers.”

3. On page 462433 – 4, Paragraph 2.1 G

    a. Change “Drum Screen: The screen shall be made of a stainless-steel spiral coil drum. The coil stock diameter shall be ¼ inch (6 mm) with ½ inch (13 mm) spacing.” To “Drum Screen: The screen shall be made of stainless-steel perforated plate screen. The coil stock diameter shall be ¼ inch (6 mm) with ½ inch (13 mm) spacing.”

1.6 REVISIONS TO DRAWING SHEETS

A. C-106 PUMP STATION 1 YARD PIPING PLAN

1. At sheet location B2, change callout to read “CONNECT NEW 4” PVC WATER TO EXISTING WM BOX”.

A. Drawing C-311 EMERGENCY TRAINING FACILITY FORCEMAIN PLAN AND PROFILE STA 10+00 THRU STA 18+04

1. Add note 10: ALL SECTIONS SHOULD BE REPLACED FROM RELIEF CUT TO RELIEF CUT 12'X12'. UPON EXCAVATION COMPLETE REPLACEMENT OF BASE AND COMPACTION SHOULD BE OBTAINED OF EACH 12'X12' SECTION. ALL CONCRETE SHALL BE POURED TO A MINIMUM DEPTH OF ORIGINAL CONCRETE OF 8". TOTAL CONCRETE REPLACEMENT IS 25 SECTIONS OF 12'X12'.

A. Drawing C-400 EXISTING FORCEMAIN AIR VALVE REPLACEMENT PLAN

1. Change detail bubble M/MD-2 underneath callout “REMOVE AIR RELEASE VALVE ASSEMBLY2 REPLACE WITH FM-CAV-04” to D/MD-2

B. Drawing CD-1 PIPING DETAILS

1. Detail C, after note “ROMAC” (305H FOR 20” AND 24”, 306H FOR 6”) ALL SST. SERVICE SADDLE OR EQUAL” add the note “FOR FLANGED CONNECTIONS INSTALL ROMAC FTS423-H TAPPING SLEEVE WITH FUSION BONDED EPOXY, OR EQUAL”

C. Drawing CD-9 MISCELLANEOUS DETAILS I

1. Trench Detail A

a. For FRP pipe, provide #57 stone bedding and encasement from a point 6” below invert to a point 6’ above crown of pipe for a trench width of approximately 1.5 x pipe OD.

2. Pipe Jacking Detail B

a. Update callouts of casing spacer to say “STAINLESS STEEL CASING SPACER”

b. Update callouts for casing pipe to say “CARBON STEEL CASING PIPE”

END OF DOCUMENT 009113

DATE: December 13, 2023

RESPONSES TO QUESTIONS RECEIVED DURING BIDDING PHASE:

1. **QUESTION:** Bid Items 11 and 12 specify 24" DR11 HDPE. Can 20" Fusible C-900 PVC pipe be approved as equal to the specified HDPE?
   RESPONSE: FPVC will not be allowed as a bid alternate to HDPE.

2. **QUESTION:** Bid Item 6 specifies 30" DIP CL 250 SS installed by open cut. Can 30" Vylon PS 75 PVC be approved as alternate?
   RESPONSE: No.

3. **QUESTION:** Will the Engineer allow Danfoss to bid FC202 Aqua drives with a passive harmonic filter in each drive cabinet in lieu of the specified active front end? This is called out on page 262923-3 1.11 A. The 2nd option is the Danfoss AAF-007 advance active filter that is placed in each drive cabinet, and the third option is a filter that would be placed before all drives that would handle all harmonic mitigation for the three (3) installed drives and the future pump when it comes online.
   RESPONSE: No, Danfoss drives with passive harmonic filter are not acceptable.
   It appears Danfoss is proposing an “active filter” rather than an “active front end” vfd. This is not the same type of product that we specified, so Danfoss will not be allowed.

4. **QUESTION:** Can the French Broad River water used for testing be discharged back to the river or will it need to be discharged to the sewer?
   RESPONSE: Must be discharged to the sanitary sewer.

5. **QUESTION:** How much can be cleared at one time and how is this impacted by the bat habitat?
   RESPONSE: There is no limit on how much can be cleared at one time; however, clearing in bat habitat must be within the allowable window and cleared areas must be temporarily stabilized and be provided with erosion control measures.

6. **QUESTION:** Were the Geotechnical Report recommendations incorporated into the design? Is the report a contract document?
   RESPONSE: Yes, the Geotechnical Report recommendations were incorporated into the design. The report is not a contract document; it is provided for reference information.

7. **QUESTION:** Can the forcemain alignment be walked during the bid period since easements are still be acquired?
   RESPONSE: There are existing easements. General contractors are allowed to access these areas but need to notify MSD in advance to allow them time to notify property owners.

8. **QUESTION:** Is the existing force main condition okay for tie-ins?

RESPONSE: The high points have all been replaced with the exception of the Goldview Road ARV. All low areas are believed to be in good condition.

9. **QUESTION:** Why is the HDPE interior lining specified to be Grey?
   RESPONSE: This is to make future inspections of the pipe easier. However, MSD has recently stated that black interior color would be acceptable.

10. **QUESTION:** Sheet C-100 note 7 indicates previous demolition of existing structures is unknown and the contractor is required to include costs for removal of previous structures in their base bid. Would this qualify as a differing site condition and be paid under a change order per Article 5.04 of the contract, instead of over inflating the bid price with unknown costs?
    RESPONSE: A bid item for an estimated quantity has been included in bid item 31.

11. **QUESTION:** Will the owner coordinate with the owner of the Electrical Company for relocation of the overhead Electrical line and poles shown as Demolition Feature #15 on drawing C-101, or will this be the Contractor's responsibility?
    RESPONSE: Owner can provide assistance as needed in coordinating with the Electrical Company, but initial contact is to be made by the Contractor to determine timing and procedures involved in the relocation. Refer to Sheet E-3 for additional information.

12. **QUESTION:** Please clarify whether the new 4" water line shown on drawing C-106 is ductile iron or PVC? There are two callouts for the line, one calling it ductile, the other calling it PVC.
    RESPONSE: New 4” water line shown on C-106 is PVC

13. **QUESTION:** Please confirm that there are only 8 ea. 2" Sewage Combination Air Release Valves that connect to the 24" HDPE force main and correspond to Bid Item #14. The remaining 6 ea. Air Release Valves are located at PS #1 and do not connect to the 24" HDPE force main.
    RESPONSE: This is mostly correct except 2 of the 8 CAVs connect to the existing forcemain per sheet C400. The remaining 6 air release valves will be included with either PS#1 or PS#2 construction and the bid schedule has been updated accordingly

14. **QUESTION:** Can fire hydrants in close proximity to the 24" force main be used for hydro testing purposes, in addition to the water from the French Broad River that is mentioned in the Field-Testing section of spec section 330533.13?
    RESPONSE: Yes. Contractor will need to follow all requirements of the hydrant owner including payment for water.

15. **QUESTION:** The following Division have been uploaded twice to MSDBC website: Division 40 (Pages 1592-1895); Division 41 (Pages 1898-1909); Division 43 (Pages 1914-1939); Division 46 (Pages 1944-1957)

The title pages for Divisions 40, 41, 42, 44-45, and 46 after the first set of the duplicate divisions are needed as they were not provided in the first set.
RESPONSE: All necessary specifications are included. Any duplicates will be removed in the contract documents.

16. **QUESTION:** The specs call for manual gates, the drawings show electric operators. Can you confirm how you want the gates operated? I assume manual but want to make sure as that would be a big bust if they are electric.
    RESPONSE: Yes, they are manual.

17. **QUESTION:** Will you accept a Danfoss (VACON) NXP 20 drive with AFE? This is one of Danfoss' industrial drives and has been a workhorse for many years.
    RESPONSE: The Danfoss (VACON) NXP 20 drive with AFE is acceptable if the VFD can meet our specifications.

18. **QUESTION:** Detail C/CD-1 shows a Romac 305-H saddle for the 20 and 24" FM with a 3" flange outlet. These saddles are only offered in a 3" MIP or FIP threaded outlet. Would a tapping sleeve be preferred (FTS423-H — ROMAC INDUSTRIES)? Also, the end connections for all the 2" CAVs are listed as flanged. Should those end connections not be a 2" threaded outlet?
    RESPONSE: Updates to C CD-1 and the valve schedule addressing this question have been added to the addendum.

19. **QUESTION:** Is there the possibility of a bid date extension?
    RESPONSE: The bid date was extended one week to 12/21/23 as shown in Addendum 2.

20. **QUESTION:** Is the existing 20" HDPE DIPS or IPS? We need to know for the connection fitting.
    RESPONSE: A review of record information shows this as DIPS.

21. **QUESTION:** Can HDPE Spirolite be considered as an alternate to the 30 DI gravity line (similar as FRP)?
    RESPONSE: No.

22. **QUESTION:** Detail B, Sheet CD-9 shows the casing pipe as stainless steel. Is this correct?
    RESPONSE: Per Addendum 1 the casing pipe was updated to carbon steel. Additional clarification has been added to this addendum.

23. **QUESTION:** We didn't locate any specifications for FRP. Can you provide?
    RESPONSE: Specifications for FRP bid alternate 2 have been provided with this addendum.

24. **QUESTION:** Can any creek/stream water be used for testing?

RESPONSE: No, only the French Broad River.

25. **QUESTION:** Is the Bypass pump S08-P-05 part of this contract if so, what is the spec for this pump?
    RESPONSE: No, the bypass pump is not being procured as part of this contract. This is an existing pump that will be reconnected as part of this contract. Refer to drawings. See attached pump curve and data sheet.

26. **QUESTION:** In Spec section 013513.24 -4 Section 1.4.B.6/7 it says no by passing will be required but once the 24" is tied to the 20" would you need to bypass past the 12" that is no longer connected?
    RESPONSE: The contractor has the option to modify this construction sequence by submitting for review/approval. For this particular area near Riverside drive, the forcemain can either be installed in a parallel trench without bypassing and then connect to the 20" HDPE; or install the connection first and work away from there. Either way, some temporary bypassing will be required to keep the ex. 12" DIP in service during construction until the new 24" HDPE can be tested and placed in service.

27. **QUESTION:** In Spec section 013513.24 -5 Section 1.5.B.12 it says NCDOT will require active shoring. Pavement replacement and pavement overlay to the centerline of Old Marshall Hwy. Can this be explained? Meaning until we pass the centerline of Old Marshall Hwy?
    RESPONSE: This will be addressed in Addendum 4.

28. **QUESTION:** In the bid form item 32 Rock removal by mechanical methods would this item only be used if we were using mechanical methods? So, if we were needing to blast it would we be paid in another pay item?
    RESPONSE: It includes both mechanical methods and blasting. See reissued specifications 004153 Bid Form and 012200 FL Unit Prices.

29. **QUESTION:** Is there an engineer's estimate available to contractors?
    RESPONSE: The engineer's estimate range is shown in section 001113: Advertisement for Bids.

30. **QUESTION:** Do the ARV Replacements on page C-400 get paid for in item 14?
    RESPONSE: Yes.

31. **QUESTION:** Is item 32 rock removal by mechanical means for any rock that we encounter we are paid to remove?
    RESPONSE: This includes all rock removed via mechanical means or blasting.

32. **QUESTION:** There are two types of silt fence called for, but one pay item can these be broken into two?
    RESPONSE: Yes. See updated bid schedule.

33. **QUESTION:** Reference specification Section 330516-2.5.A, E & F. These specifications reference ReWa Standard Detail SS-9. I cannot find this on the plans. Please provide or otherwise clarify.
    RESPONSE: Section has been updated.

34. **QUESTION:** Reference specification Section 330516-2.6.C. This specification references ReWa Standard Detail SS-20. I cannot find this on the plans. Please provide or otherwise clarify.
    RESPONSE: Section has been updated.

35. **QUESTION:** Addendum #1 confirmed no AIS, but will DIP be domestic per 330519-1.7.B? Please clarify.
    RESPONSE: Made in the U.S. is preferred but not required.

36. **QUESTION:** Per Addendum 1, can the GC ignore any submittal requirements pertaining to AIS certification as stated in 400519-1.4.E, et. al.?
    RESPONSE: Yes

37. **QUESTION:** Please clarify when Protecto 401 lining is required in DIP. Section 330519-2.6.A.3 says for "all pipe other than potable and plant water" & Section 400519-2.1.C.3 seems to state otherwise. Exhibit A at the end of Section 400519 only gives "Linings Available for DIP" and common uses but does not give clear direction for this project.
    RESPONSE: 330519 2.6 A 3 is correct. Ceramic Epoxy (Protecto 401 or equal) is required for all ductile iron pipe and fittings not used for potable water.

38. **QUESTION:** Reference is given to Brunswick County standards in Section 331216-1.5.B. I presume this should be Buncombe County.
    RESPONSE: Yes, see updated language in addendum.

39. **QUESTION:** Reference plan sheet C-400. I cannot find Detail M/MD-2 on MD-2 or any other detail sheet. Please provide or otherwise clarify.
    RESPONSE: This is referencing Detail D/MD-2. See addendum.

METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY

Weaverville Pump Station and Force Main Improvements, Project No. 2019080
Mandatory Pre-Bid Meeting November 29, 2023 @ 11:00 AM
Bid Opening December 21, 2023 @ 2:00 PM

Planholder's List

T.P. Howard's Plumbing Company 90 Number Nine Road Fairview, NC 28730 Contact: Danny Dash dannyd@tphowardsplumbing.com 828-628-1369	Thalle Construction Company 900 NC HWY 86 North Hillsborough, NC 27278 Contact: Seth Rowney srowney@thalle.com 919-245-1490
Haren Construction Company, Inc. 1715 Highway 411 N. Etowah, TN 37331 Contact: Cindy Osborne cosborne@harenconstruction.com 423-263-5561	

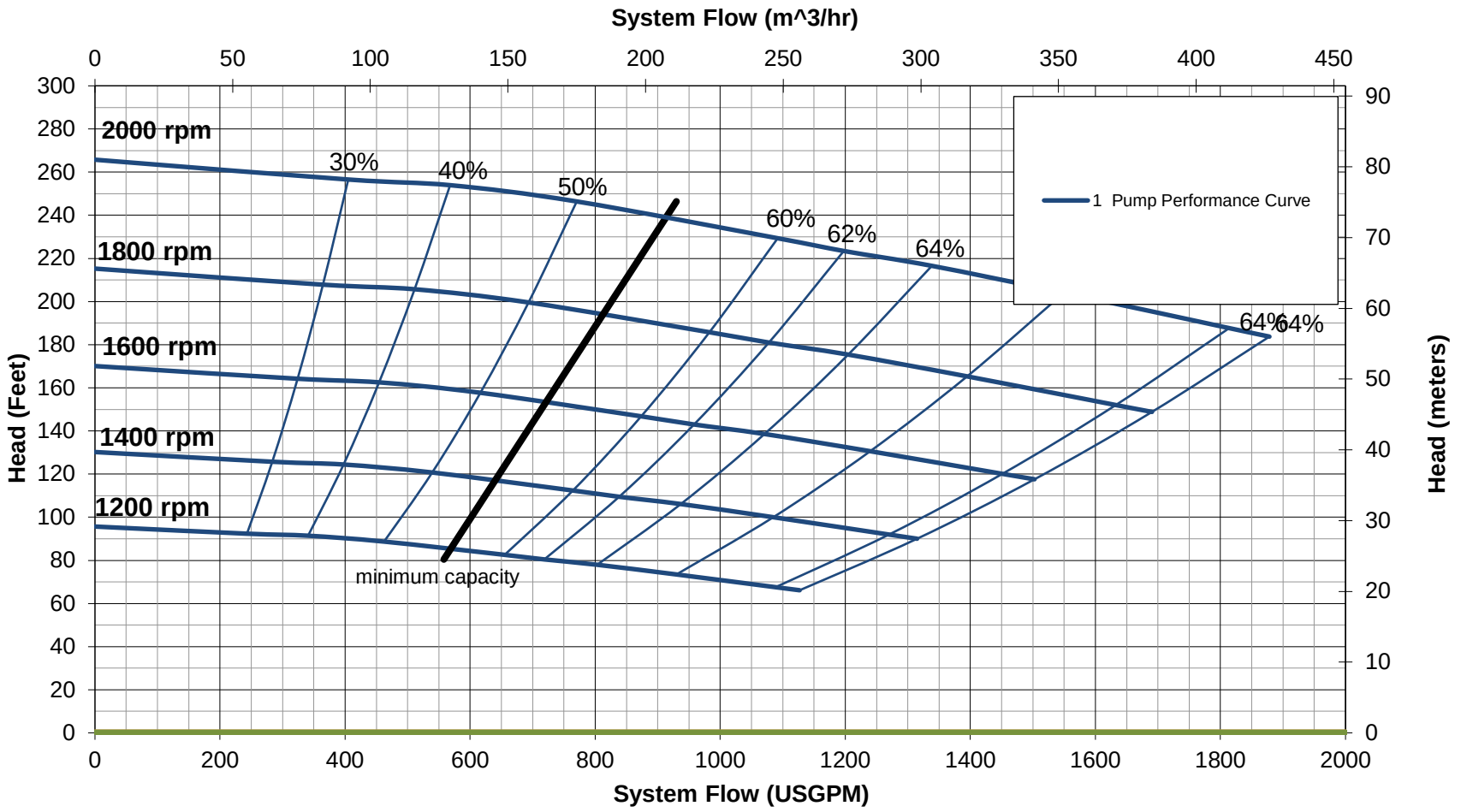
GODWIN DRI-PRIME® CD160M
ONE (1) PUMP | SYSTEM CURVE

CD160M

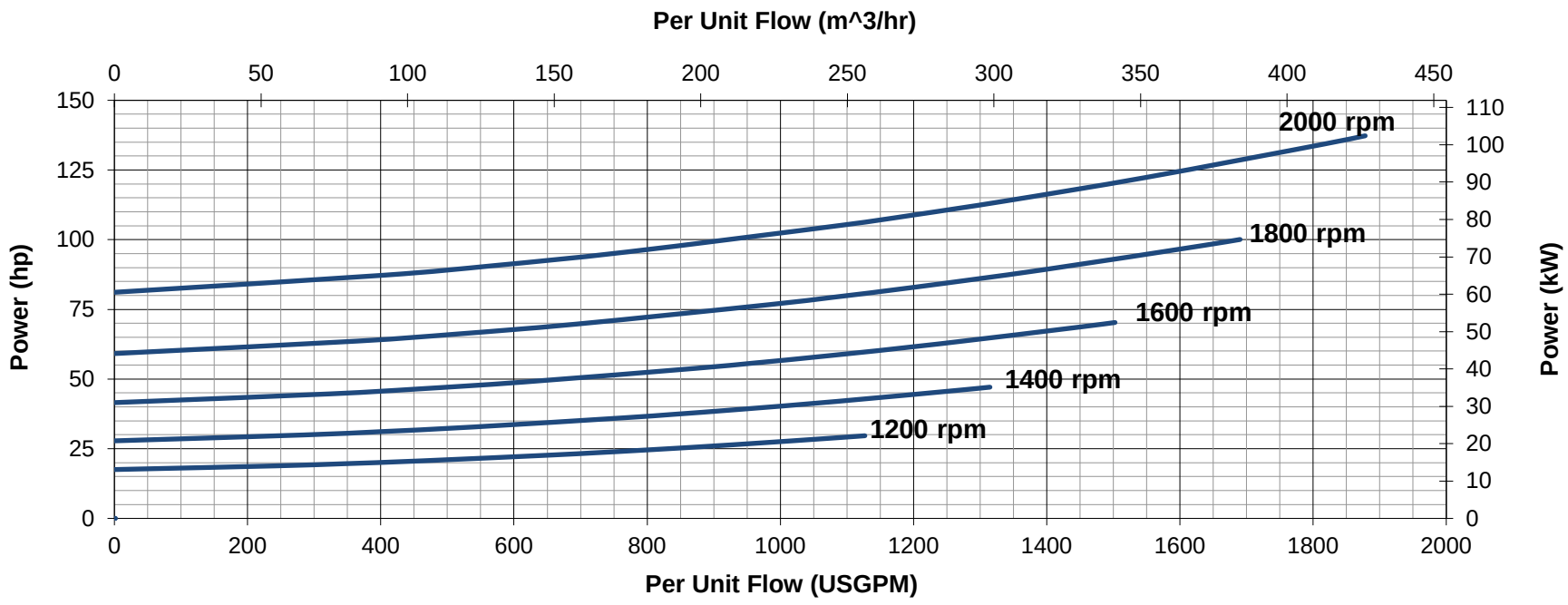
Suction Lift:
Suction Pipe:

Discharge Head:
Discharge Pipe:

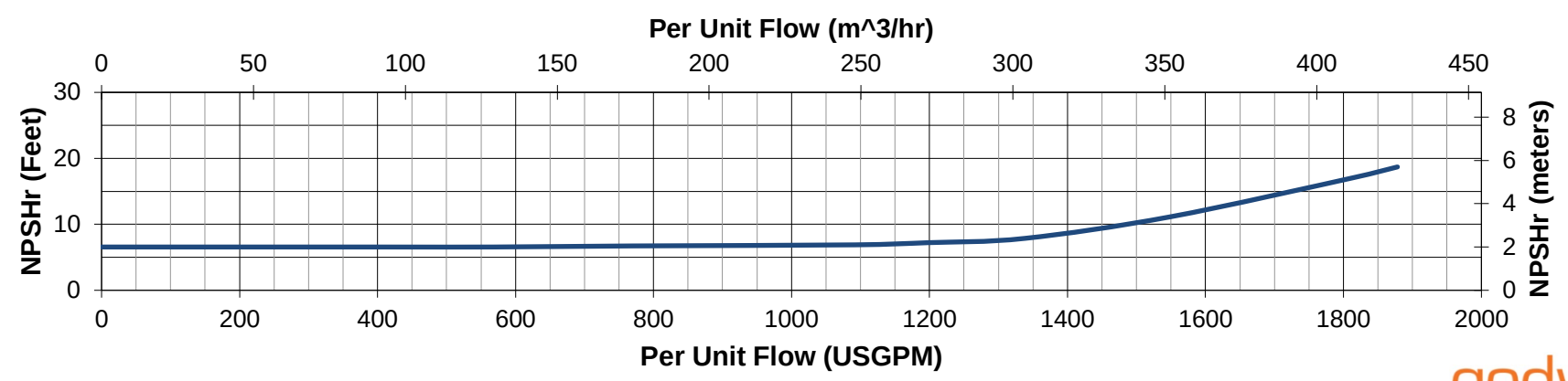
Performance - 356 mm Impeller | Variable Speed Curve



Power



NPSHr



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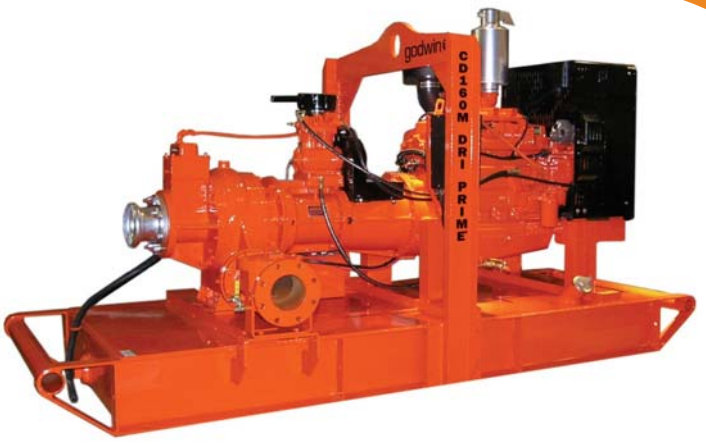
CD160M Dri-Prime® Pump

The Godwin Dri-Prime CD160M pump offers flow rates to 1880 USGPM and has the capability of handling solids up to 3.0" in diameter.

The CD160M is able to automatically prime to 28' of suction lift from dry. Automatic or manual starting/stopping available through integral mounted control panel or optional wireless-remote access.

Indefinite dry-running is no problem due to the unique Godwin liquid bath mechanical seal design. Solids handling, dry-running, and portability make the CD160M the perfect choice for dewatering and bypass applications.



Features and Benefits

- Simple maintenance normally limited to checking fluid levels and filters.
- Dri-Prime (continuously operated Venturi air ejector priming device) requiring no periodic adjustment. Optional compressor clutch available.
- Extensive application flexibility handling sewage, slurries, and liquids with solids up to 3.0" in diameter.
- Dry-running high pressure liquid bath mechanical seal with high abrasion resistant solid silicon carbide faces.
- Close-coupled centrifugal pump with Dri-Prime system coupled to a diesel engine or electric motor.
- All cast iron construction (stainless steel construction option available) with cast steel impeller.
- Also available in a critically silenced unit which reduces noise levels to less than 70 dBA at 30'.
- Standard engine John Deere 6068HF285 (T3 Flex). Also available with John Deere 6068HC93 (IT4).

Specifications

Suction connection	6" 150# ANSI B16.5
Delivery connection	6" 150# ANSI B16.5
Max capacity	1880 USGPM †
Max solids handling	3.0"
Max impeller diameter	14.0"
Max operating temp	176°F*
Max pressure	115 psi
Max suction pressure	73 psi
Max casing pressure	173 psi
Max operating speed	2000 rpm

* Please contact our office for applications in excess of 176°F.

† Larger diameter pipes may be required for maximum flows.

Please contact the factory or office for further details. A typical picture of the pump is shown. All information is approximate and for general guidance only.

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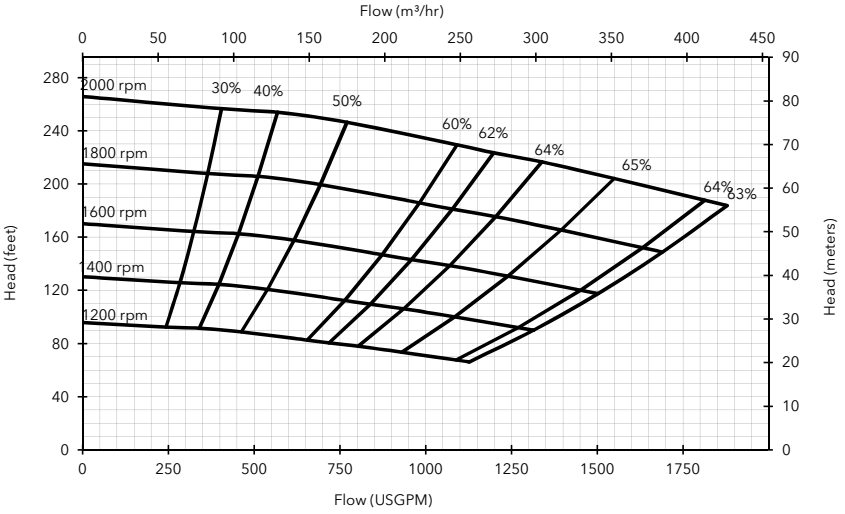
Performance Curve



Materials

Pump casing & suction cover	Cast iron BS EN 1561 - 1997
Wearplates	Cast iron BS EN 1561 - 1997
Pump Shaft	Carbon steel BS 970 - 1991 817M40T
Impeller	Cast Steel BS3100 A5 Hardness to 200 HB Brinell
Non-return valve body	Cast iron BS EN 1561 - 1997
Mechanical seal	Silicon carbide face; Viton elastomers; Stainless steel body

Engine option 1

John Deere 6068HF285 (T3 Flex), 149 HP @ 2000 rpm

Impeller diameter 14.0"

Pump speed 2000 rpm

Suction Lift Table

Total Suction Head (feet)	Total Delivery Head (feet)				
	144	185	201	221	245
	Output (USGPM)				
10	2006	1712	1468	1027	489
15	2006	1614	1370	734	367
20	2006	1517	1223	612	-
25	1614	1223	1076	489	-

Fuel capacity: 180 US Gal

Max Fuel consumption @ 2000 rpm: 8.0 US Gal/hr

Max Fuel consumption @ 1600 rpm: 7.0 US Gal/hr

Weight (Dry): 5,610 lbs

Weight (Wet): 6,910 lbs

Dim.: (L) 147" x (W) 56" x (H) 84"

Performance data provided in tables is based on water tests at sea level and 20°C ambient. All information is approximate and for general guidance only. Please contact the factory or office for further details.

Engine option 2

John Deere 6068HC93 (IT4), 156 HP @ 2000 rpm

Impeller diameter 14.0"

Pump speed 2000 rpm

Suction Lift Table

Total Suction Head (feet)	Total Delivery Head (feet)				
	144	185	201	221	245
	Output (USGPM)				
10	2006	1712	1468	1027	489
15	2006	1614	1370	734	367
20	2006	1517	1223	612	-
25	1614	1223	1076	489	-

Fuel capacity: 180 US Gal

Max Fuel consumption @ 2000 rpm: 7.9 US Gal/hr

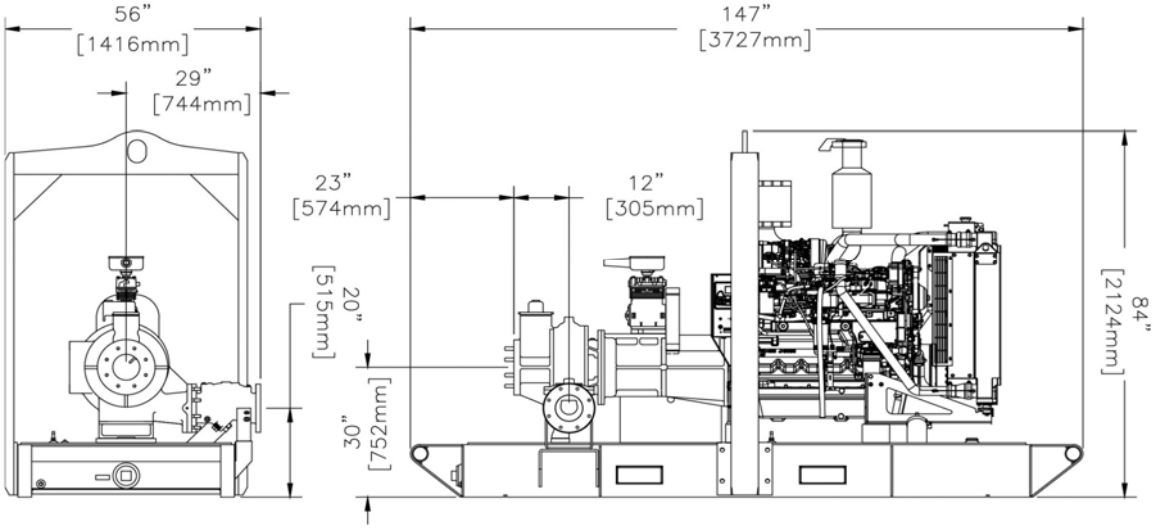
Max Fuel consumption @ 1600 rpm: 6.8 US Gal/hr

Weight (Dry): 6,270 lbs

Weight (Wet): 7,570 lbs

Dim.: (L) 147" x (W) 56" x (H) 84"

Performance data provided in tables is based on water tests at sea level and 20°C ambient. All information is approximate and for general guidance only. Please contact the factory or office for further details.



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Email: sales@godwinpumps.com

Reference number : 95-1012-3000
Date of issue : February 26, 2014
Issue : 5

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AGENDA/Minutes

Mandatory Pre-Bid Meeting

Date: November 29, 2023
Time: 11:00 a.m.

Location/Call in Details: MSD Training Center
2229 Riverside Drive
Woodfin, NC

Project Name: Weaverville Pump Station and Forcemain Replacement Project

Bid Opening: December 14, 2023, 2:00 PM

Introductions

- MSD of Buncombe County - Owner
- CDM Smith Inc. – Design Engineer and Construction Administration
- Attendees - See Sign-In Sheet at the End of these Minutes.

MSD's Minority Business Enterprises

- MBE forms have been included in the bid package.
    - There were no questions.

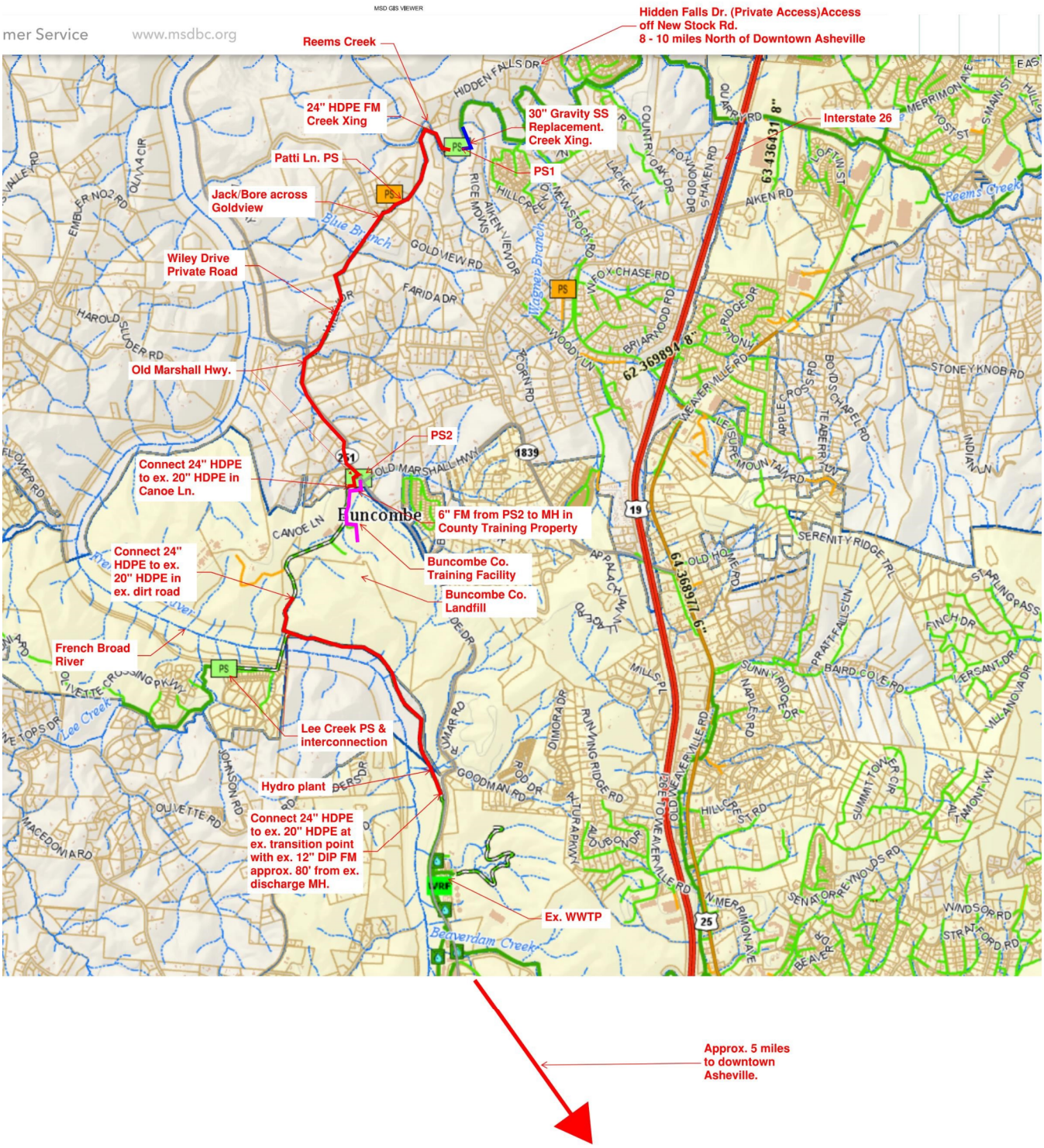
Project Description

Metropolitan Sewerage District (MSD) of Buncombe County owns and operates a sanitary sewer collection system that serves customers in Buncombe County and northern Henderson County, including a subsystem that serves the Town of Weaverville. That subsystem includes the following components:

- 30-inch Reems Creek gravity sewer discharging to Weaverville Pump Station #1 (PS1)
- Weaverville PS1
- #5 Patti Lane (Private sewer pump station)
- Weaverville Pump Station #2 (PS2)
- Lee Creek Pump Station (Lee Creek PS)
- 24-inch force main system from PS1 to Buncombe Country Training Center, 6-inch force main from PS2 to Buncombe County Training Center, 24-inch force main parallel to the French

Broad River to the point near Riverside Drive where it converts to gravity sewer upstream of WRF. The force main is approximately 16,200 LF of 24-inch pipe and 1,800 LF of 6-inch pipe .

The existing system is a series pumping arrangement where PS1 pumps to PS2. PS2 receives full flow from PS1 and additional flow from an adjacent 8-inch gravity sewer. This combined flow is pumped from PS2 to the WRF. The #5 Patti Lane PS (Sheet C302) is a single, residential grinder pump that manifolds into the existing force main along with Lee Creek PS, (Sheet C313) with the two pumping in parallel. Commissioned in 1983, the original facilities have undergone expansions, repairs, and improvements.


MSD GIS VIEWER
mer Service
www.msdbc.org
Hidden Falls Dr. (Private Access)Access off New Stock Rd.
8 - 10 miles North of Downtown Asheville
Reems Creek
24" HDPE FM Creek Xing
30" Gravity SS Replacement. Creek Xing.
Interstate 26
Patti Ln. PS
PS1
Jack/Bore across Goldview
Wiley Drive Private Road
Old Marshall Hwy.
PS2
Connect 24" HDPE to ex. 20" HDPE in Canoe Ln.
Buncombe
6" FM from PS2 to MH in County Training Property
Buncombe Co. Training Facility
Buncombe Co. Landfill
Connect 24" HDPE to ex. 20" HDPE in ex. dirt road
French Broad River
Lee Creek PS & interconnection
Hydro plant
Connect 24" HDPE to ex. 20" HDPE at ex. transition point with ex. 12" DIP FM approx. 80' from ex. discharge MH.
Ex. WWTP
Beaverdam Creek
Approx. 5 miles to downtown Asheville.

Work by Others

The following work will be performed by others concurrently with the Work of this Contract.

- Systems Integration by CITI – note that this is part of the Contract work. CITIs scope of work and pricing proposal has been added via Addendum No. 1.

Bid Opening

- December 14, 2023, 2:00 pm
    - This has since been changed to 12/21/2023, 2:00 pm at the address below. This information was included in addendum #2.
- Location: MSD of Buncombe County Administration Office
  2028 Riverside Drive
  Woodfin, NC

Examination of Site

- A site visit to PS1 will be held at the completion of this pre-bid meeting.
    - 111 Hidden Falls Drive, Asheville, NC
    - Site visit was held following the pre-bid meeting.
- Any additional site visit requests to be coordinated directly with MSD Staff

Interpretations of Contract Documents

- All questions to CDM Smith Inc. attention Michael Pollard (pollardma@cdmsmith.com). All questions must be e-mailed only. Responses will be provided in a formal addendum.
- No phone calls will be accepted from contractors, suppliers or others.
- Questions should reference the drawing or specification page to expedite the process.
- Final day for questions is 5 days prior to bid opening.
    - Final addendum will be distributed within 3 days of bid opening.
- Only questions answered by formal addenda will be binding.

Contract Time

- Section 007300.16 Supplementary Conditions
- Approximately 6-month administrative period beginning with NTP.

    - Dependent upon easement acquisitions
- 600 calendar days from Construction NTP to substantial completion
- 630 calendar days from Construction NTP to final completion
- LD's $1,000 per day (005214.16 Agreement)

Work Hours, MSD Holidays and Weather Delays

- Section 007300.16 Supplementary Conditions
- Monday – Friday between 8:00 am and 4:30 pm.
    - Requests to work different hours to be submitted to Engineer a minimum of 48 hours prior to any work.
- MSD Holidays:
    - New Year's Day
    - Martin Luther King Jr. Day
    - Good Friday
    - Memorial Day
    - Juneteenth
    - Independence Day
    - Labor Day
    - Veteran's Day
    - Thanksgiving Day (and Friday)
    - Christmas (3 days)
- Weather Delays:
    - Daily rainfall exceeding 0.10 inch in excess of anticipated inclement weather days as shown in the charge, SC-4.05.
    - Take into consideration these monthly anticipated days when submitting the bid. These days are to be included in the contract time.

Special Project Procedures

- The 24" HDPE forcemain and PS1 should be constructed simultaneously and must be complete before the rest of the project.
- If a minor ex. PS shutdown is required, it shall be performed between 7 pm and 5am on weekdays or weekends except where otherwise approved. Provide MSD staff min. 48 hours' notice.

- Contractor pays for power used for construction. Owner pays for power at startup and operation of new equipment. Owner pays for water for pump testing.
    - The French Broad River may be used for testing water as long as <100,000 gpd are used; otherwise, reporting is required. Water must be discharged to the sewer.
        - A question was posed on whether the requirement to discharge to sewer is required if it's new pipe. This will be addressed in future addendum.
- Refer to section 013513.24 Sequence of Construction for more information.
    - Contractor may propose modifications to this sequence subject to Engineer and Owner approval.
- Items to be salvaged (Section 024119 – Selective Demolition)
    - PS1
        - Backup pump
        - Generator
        - Fuel Tank
        - All remaining mechanical and electrical equipment.
    - PS2
        - All mechanical and electrical equipment.
    - Deliver salvaged items to MSD's French Broad WRF in a designated storage area.
- Storage areas for equipment delivered during admin phase:
    - PS1
    - Lot beside PS2
    - Area behind WWTP
    - Other sites may be available but shall be coordinated directly by the Contractor with copy of any agreements with private land owners provided to MSD.

Bid Form

- Submit bid on the form provided.
- Bid Form contains both Lump Sum and Unit Price Items
- Bid Alternate #1: Polymer Concrete MH's in lieu of Precast concrete MHs.
    - Identify this as an adder or deduct.
- Bid Alternate #2: 30" FRP gravity sewer in lieu of 30" DIP gravity sewer.
    - Identify this as an adder or deduct.

- Bid must identify the key subcontractors noted in the Bid Form
- Bid must identify the selected major equipment suppliers for the equipment identified in the bid form
- Contractor must submit 5 references for similar size and complexity projects. The Engineer will contact references during review of bid submissions
- Certified Check, or Bond in the amount of 5% of the Bid
    - Section 001113-1 Advertisement for Bids
- Payment and Performance Bonds required by awarded Contractor.

Submission of Bids

- Bids will only be accepted by MSD on 12/14/23 at 2028 Riverside Dr., Woodfin, NC (see above regarding change in Bid Date via Addendum No. 2).
- General Contractor bidders must be a registered plan holder by purchasing plans and specifications. Documents are available on the MSD website for reference to vendors, subcontractors, suppliers free of charge.
- See section 004393: Bid Submittal checklist for required documents to be submitted.
    - Be sure to include MWBE forms.

Contract Award

- For determining lowest responsible bidder, Owner has the discretion to consider the base bid only, base bid with bid alternates or any combination. Section 002113.16, Instruction to Bidders, Article 11.5.

Permits

- The following permits have been or will be obtained prior to the construction NTP.

1. Clean Water Act Section 404 Permit
2. Clean Water Act 401 Water Quality Certification
3. NCDWR Sewer System Extension Permit – Fast-Track
4. Sedimentation and Erosion Control Plan and NPDES Stormwater Permit
5. NC DAQ Air Quality Permit
6. NCDOT Encroachment Agreements
7. NCDOT Driveway Permits

8. Buncombe County Site Plan Approvals

9. Buncombe County Stormwater Permits

10. Buncombe County Floodplain Development Permits
    a. Post construction survey is required to confirm there have been no changes to the floodplain. The post construction survey is the responsibility of the contractor.

11. Buncombe County Building Permits

12. Bat Habitat Locations 9Section 013544 – Environmental Protection Procedures
    a. No tree removal between April 1 and October 15 in areas of probably bat habitat.

13. Final addendum to include all permits that have been received.

Project Funding

- MSD of Buncombe County will fund this project using budgeted District funds.

Bypassing

- Refer to section 331210 Temporary Bypass Pumping System – specific constraints and requirements for the bypass pumping systems and the piped bypass systems including transfer of purchased HDPE temporary bypass piping to MSD after construction.
- Estimated design flows:
    - Pump Station 1: 0.8 mgd (ADF), 3.9 mgd (PHF, 5-yr storm)
    - Pump Station 2: 0.08 mgd (ADF), 0.36 mgd (PHF, 5-yr storm)
- For non-pumped bypassing of the forcemain, the Construction Sequence has some recommendations; however, the Contractor shall ultimately determine locations and number of temporary interconnections.
    - Maintain access to all driveways during construction.
    - Above ground pipe to match existing 12" DIP forcemain.

County Training Center

- Contact: Ryan Cole, Training Facility Manager
    - Ryan.cole@buncombecounty.org
    - Mobile: 828-674-8986
- Contractor to maintain access to this property at all times.

- Coordination will be required with County staff. Certain training times/days will require a pause in construction.
- Concrete pavement replacement to match existing conditions.

Reems Creek Crossings

- Open cut construction
- Maintain flow in creek during construction.
- Stream bed returned to current condition. Slopes to be armored.
- Remove existing sewer and piers completely.

General

- WSP USA Environment & Infrastructure, Inc. prepared a soils report dated March 2023. A copy of the soils report is available on the project web site.

Questions

- All questions and responses are shown in addendum 3.

Adjourn for Site Tour

Weaverville Pump Station and Forcemain Improvements Project

Pre-Bid Meeting

Virtual Attendance Sheet
Date: November 29, 2023
Time: 11:00 AM
Location: MSD Administration Office, 2028 Riverside Drive, Woodfin, NC

Name	Organization	Email
Molly Halpin	**Kiewit Infrastructure South Co.**	**Molly.halpin@kiewit.com**
Wes Gaskins	**Haren Construction**	**cosborne@harenconstruction.com**
Jacob Yeckley	**Sun Belt Rentals**	**Jacob.yeckley@sunbeltrentals.com**
Steven Briggs	**MSDBC**	**ssbriggs@msdbc.org**
Rebecca Nance-Gonzalez	**CDM Smith**	**nancegonzalezrn@cdmsmith.com**

Weaverville Pump Station and Forcemain Improvements Project

Pre-Bid Meeting

Attendance Sheet
Date: November 29, 2023
Time: 11:00 AM
Location: MSD Administration Office, 2028 Riverside Drive, Woodfin, NC

MICHAEL POLLARD CDM SMITH POLLARDMA@CDMSMITH.COM

Name	Organization	Email
RICK KESLER	HAREN CONSTRUCTION	Cosborne@harenconstruction.com
Steve Ovsak	McClam + Assocs	Steve@Mcclam.Net
Kyle Carbin	Kiewit	Kyle.Carbin@Kiewit.com
Denise Moore	MSD	denisem@msdbc.org
MIKE PRESLEY	MSD	MPRESLEY@MSDBC.ORG
John Patrick	Teraflex	jpatrick@teraflexgroup.com
Eric Sims	Teraflex	esims@teraflexgroup.com
Shane Herbert	Buckeye Bridge	sherbert@buckeyebridgellc.com
Tim Coates	MSD	tim@msdbc.org
KEVIN LESLEY	MSD	Klesley@MSDBC.ORG
R.L. HAYNES	MSD	rlhaynes@msd.org
DREW KIEHL	ISCO	drew.kiehl@isco-pipe.com
Zachary Williams	Xylem	GIS 712025 Zachary.williams@xylem.com
Jesse Bates	Herc Pump Solutions	Jesse.bates@hercrentals.com
JACOB REID	CLEARWATER	jacob.reid@clearwaterinc.net
Jake Howard	TPH	Jacobh@TPhowards.com
JOSH HOWARD	TPH	JOSHH@TPHOWARDS.COM
Josh Redden	TPH	Joshr@tphowards.com
Danny Dash	TPH	dannyd@tphawards.com
Hunter Carson	MSD	hcarson@msdbc.org
SHAUN ARMISTEAD	MSD	SARMISTEAD@MSDBC.ORG
Ken Stines	MSD	KSTINES@MSDBC.ORG

Weaverville Pump Station and Forcemain Improvements Project

Pre-Bid Meeting

Attendance Sheet
Date: November 29, 2023
Time: 11:00 AM
Location: MSD Administration Office, 2028 Riverside Drive, Woodfin, NC

Name	Organization	Email
Mike Stamey	MSD	mstamey@msdbc.org
William Woods	Thalle	wwoods@thalle.com
Tyler Mathis	Thalle Construction co	Tmathis@thalle.com
Josh Allman	Haynes Electric	jallman@mbhaynes.com
Jon Lapsley	CDM Smith	LapsleyJS@CDMSMITH.com
Glendon Fetterolf	CDM Smith	Fetterolfgj@CDMSmith.com
Mona Ellum	Ellum Engineering	mona.ellum@ellumengineering.com

SECTION 004153 - BID FORM

SUBMITTED _____
(Date)

BY _____
(Bidder)

PROJECT NAME: Metropolitan Sewerage District of Buncombe County
Weaverville Pump Station and Forcemain Improvements

MSD Project No. 2019080

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid Form and the Agreement, and in accordance with the other terms and conditions of the Contract Documents.

2. Bidder accepts all of the terms and conditions of the Bidding Documents, including without limitation those dealing with the disposition of Bid Security.

3. In submitting this Bid, Bidder makes all representations required by the Instructions to Bidders and further warrants and represents that:

   (a) Bidder has examined copies of all the Bidding Documents, including the Advertisement for Bids, the Instructions to Bidders and of the following Addenda (receipt of all which is hereby acknowledged):

No._____	Dated_____	No._____	Dated_____
No._____	Dated_____	No._____	Dated_____
No._____	Dated_____	No._____	Dated_____

   (b) Bidder has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing the Work.

   (c) Bidder has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions in Section 007300.16, and accepts the determination set forth in the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which Bidder is entitled to rely.

   (d) Bidder has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or to supplement those referred to in

(c) above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 5 of the Standard General Conditions of the Construction Contract; and no additional examinations, investigations, explorations, tests, reports or similar information or data are or will be required by Bidder for such purposes.

(e) Bidder has reviewed and checked all information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said Underground Facilities are or will be required by Bidder in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 5 of the Standard General Conditions of the Construction Contract.

(f) Bidder has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

(g) Bidder has given Engineer written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Bidder.

(h) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over Owner.

4. Bidder agrees to complete the Work for the prices(s) indicated in the Unit Price Bid Schedule which follows and is further described in Section 012001 - Price and Payment.

UNIT PRICE BID SCHEDULE

BASE BID

Item No.	Description	Units	Estimated Quantity	Bid Unit Price	Bid Price
1	Mobilization/Demobilization (maximum 3 percent of total base bid)	LS	1		
2	Demolition and Removal of Pump Station #1	LS	1		
3	Demolition and Removal of Pump Station #2	LS	1		
4	Demolition, Removal and Cut, Cap, Abandonment of existing forcemain	LS	1		
5	Demolition, Removal, Cut, Cap, Abandonment of existing 30-inch DIP Sanitary Sewer	LF	520		
6	30-inch DIP CL 250 Sanitary Sewer				
	a. Depth 5 feet – 15 feet	LF	350		
	b. Depth 15 feet – 20 feet	LF	200		
	c. Depth > 20 feet	LF	25		
7	Precast Concrete Manhole (30-inch Sanitary Sewer)				
	a. Depth < 15 feet	EA	2		
	b. Depth 15 feet – 25 feet	EA	2		
	c. Depth 15 feet – 25 feet (6 foot Manhole)	EA	1		
8	Construct Pump Station #1	LS	1		
9	Construct Pump Station #2	LS	1		
10	Reems Creek Diversion, Restoration of Invert, Side Slopes	EA	2		
11	24-inch DR11 HDPE Force Main	LF	16,300		
12	Jack and Bore 36-inch Casing with 24-inch DR11 HDPE Carrier Pipe	LF	60		
13	6-inch DR13.5 HDPE Force Main	LF	1,850		
14	2-inch Sewage Combination Air Release Valves with Manholes and Filters	EA	8		
15	3-inch Vacuum Breakers with 2-inch Air Release Valves with Manholes and Filters	EA	8		
16	Lee Creek Pump Station Interconnection	LS	1		
17	Pumped Bypassing (30-inch Sanitary Sewer)	LS	1		
18	Pumped Bypassing at Pump Station #2	LS	1		
19	Above Grade 12 inch HDPE bypass piping for 12-inch DIP forcemain	LS	1		
20	Traffic Control	LS	1		

Item No.	Description	Units	Estimated Quantity	Bid Unit Price	Bid Price
21	Trench Pavement Repairs (Asphalt)				
	a. NCDOT Roads	SY	4,700		
	b. Training Center Site	SY	100		
	c. Hydro Building Access Road, Driveways.	SY	1,750		
22	Trench Pavement Repairs (Concrete)	SY	250		
23	Trench Pavement Repairs (Gravel)	SY	3,000		
24	Trench Miscellaneous Repairs (Curb, Sidewalk, Dirt Roads)	LS	1		
25	New Concrete Pavement (PS #1)	CY	160		
26	New Asphalt Pavement (PS #2)	CY	30		
27	Grind and Overlay (Hidden Falls Dr.)	SY	3,500		
28	Grind and Overlay (Old Marshall Hwy.)	SY	4,270		
29	Undercut of Unstable Pipe Foundation and Replacement with #57 Stone	CY	500		
30	Removal of Unsuitable Material and Replacement with Select Backfill	CY	500		
31	Removal of old WWTP on PS1 site	CY	100		
32	Rock Excavation	CY	2500		
33	Level A and B Subsurface Utility Engineering	LS	1		
34	Erosion Control Matting	SY	20,000		
35	Silt Fence	LF	19,000		
36	Super Silt Fence	LF	6,000		
37	Silt Fence Outlets	EA	130		
38	Electrical Work	LS	1		
39	Permanent Stormwater BMPs	LS	1		
40	Systems Integration (CITI)	AL	1		$461,740

TOTAL BASE BID PRICE (Sum of Items 1 – 40) $ _____

ALTERNATE BIDS

Alternate Bid No. 1 – Polymer Concrete Manholes In lieu of Precast Concrete Manholes

Bidder shall complete the Alternate Bid No. 1 Schedule below and provide a price reduction (-) or addition (+) for the net difference in cost to provide and install precast polymer concrete manholes in lieu of standard precast concrete manholes in the Base Bid for the depth classes and

sizes described in the Alternate Bid Schedule. All polymer concrete manholes shall include composite frames and cover. The Bidder must complete the Alternate Bid Schedule in full for bid proposal to be acceptable and indicate if the prices are deducts (-) or adders (+).

Item No.	Description	Units	Estimated Quantity	Bid Unit Price	Bid Price
7	Polymer Concrete Manhole (30-inch Sanitary Sewer)				
	a. Depth < 15 feet	EA	2		
	b. Depth 15 feet – 25 feet	EA	6		
	c. Depth 15 feet – 25 feet (6' Manhole)	EA	1		

ALTERNATE 1 BID PRICE (Sum of above Items 7A, 7B and 7C)

$_____ (ADD OR DEDUCT) _____

Alternate Bid No. 2 – 30-inch FRP Gravity Sewer in lieu of 30-inch DIP Gravity Sewer

Bidder shall complete the Alternate Bid No. 2 Schedule below and provide a price reduction or addition for the net difference in cost to provide and install 30-inch FRP gravity sewer in lieu of 30-inch DIP gravity sewer. The Bidder must complete the Alternate Bid Schedule in full for bid proposal to be acceptable and indicate if the prices are deducts (-) or adders (+).

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
6	30-inch FRP SN46 Sanitary Sewer				
	a. Depth 5 feet – 15 feet	LF	350		
	b. Depth 15 feet – 20 feet	LF	200		
	c. Depth > 20 feet	LF	25		

ALTERNATE 2 BID PRICE (Sum of items 6a, 6b, 6c above)

$_____ (ADD OR DEDUCT) _____

TOTAL WRITTEN BID PRICE

The price shown below includes the base bid and all alternates:

TOTAL BID PRICE (Base with Alternates) $ _____

5. The Bidder agrees that the Work shall be substantially completed within the prescribed calendar days as stipulated in Article 4 of the Standard General Conditions of the Construction Contract. Time commences to run as provided in Article 4 of the Standard General Conditions of the Construction Contract and will run continuously until the project is completed and ready for final payment in accordance with Article 15 of the Standard General Conditions of the Construction Contract and Section 005214.16 - Agreement.

6. The following documents are attached to and made a condition of this Bid. For items requiring the Contractor to identify subcontractors or suppliers, the Contractor shall make a good faith effort to complete all fields requested. Use of "to be determined" is not acceptable. Failure to complete all fields in the Bid Form are grounds for the bid to be deemed Non-Responsive and rejected at the Owner's discretion.

   A. Bid Bond.

   B. Corporate Authority to Execute Bid and Contract (any corporate employee other than President or Vice-President).

   C. List of Proposed Subcontractors (Item 7).

   D. Equipment Suppliers (Item 8)

   E. Qualifications - List of 5 Project References (Item 9).

   F. Evidence of authority to do business in the state of North Carolina.

   G. NC General Contractor's License No.: _____ (License Number and evidence of current license shall be required at the time of bid opening, no exceptions).

   H. Applicable MSD Minority Business Enterprise Form included at the end of section 007300.16, Supplementary Conditions.

7. List the names and addresses of the subcontractors to be used for the portions of the work listed below (list "self" if work will be performed by prime contractor).

WORK	**CONTRACTOR**
DEMOLITION	
CONCRETE WORK	
PAVING	
JACK AND BORE	

ELECTRICAL WORK	
SEWER BYPASSING	
HVAC WORK	

8. The Bidder proposes to furnish and install the indicated products from the below-listed Manufacturers/Suppliers.

(List must be completely filled out for bid proposal to be acceptable)

EQUIPMENT/PRODUCT	**SUPPLIER**
HDPE Pipe	
Ductile Iron Pipe	
FRP Pipe	
Manholes (Standard Precast)	
Manholes (Polymer Concrete)	
Pumps (PS1)	
Pumps (PS2)	
Grinders	
Sewage Vacuum Breaker and Air Release Valves	
Sewage Combination Air & Vacuum Valves	
Bridge Crane	
Generator (PS1)	
Electrical Building	

9. Contractor References:

Attach to the bid a separate document(s) listing five (5) reference projects of similar size and complexity where the Contractor has performed work to modify or upgrade existing process mechanical equipment at an active municipal wastewater treatment facility. The Engineer will contact references during the bid review period. Provide the following minimum information:

- Name of Project and brief description of the work.
- Dollar value of the work completed by the Contractor.
- Name of Owner with Contact, Address and Telephone Number.
- Name of Engineer with Contact, Address and Telephone Number.
- Name of Contractor's superintendent who oversaw work in the field on a daily basis.
- Name of Contractor's project manager.
- Describe schedule compliance – was the project completed on schedule, were liquidated damages withheld?
- Describe any disputes on the project that required formal dispute resolution (mediation, arbitration, or other).
- Description and dollar amount of each Change Order.

10. Communications concerning this Bid shall be addressed to:

Contact Name: Shaun Armistead, PE, ShaunA@msdbc.org, 828-225-8269

Address: Mull Building

2028 Riverside Drive

Woodfin, NC

11. The terms used in this Bid which are defined in the Standard General Conditions of the Construction Contract included as part of the Contract Documents have the meanings assigned to them in the Standard General Conditions of the Construction Contract.

(REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK)

Submitted on _____, 20__.

Bidder is:

An Individual

By:_____(SEAL)
(Individual's Name and Signature)

Doing business as: _____

Business address: _____

_____

_____

Phone No.: _____

A Partnership

By:_____(SEAL)
(Firm Name)

_____
(General Partner's Name and Signature)

Business address: _____

_____

_____

Phone No.: _____

A Corporation

By: _____(SEAL)
(Corporation Name)

_____
(State of incorporation)

By: _____
(Name and signature of person authorized to sign)

_____
(Title)

(Corporate Seal)

Attest: _____
(Secretary)

Business address: _____

_____

_____

Phone No.: _____

A Joint Venture

By: _____
(Name and Signature)

Business address: _____

_____

_____

Phone No.: _____

By: _____
(Name and Signature)

Business address: _____

_____

_____

Phone No.: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above).

END OF SECTION

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SECTION 012001 - PRICE AND PAYMENT

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. Lump sum prices.

1.3 LUMP SUM PRICES

A. BID ITEM #1: Mobilization/Demobilization (Maximum 3 percent of Total Base Bid).

Payment of the lump sum price bid for Item No. 1 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment and incidentals, mobilization/demobilization, bonds, insurance, permit fees, shop drawing submittals, as-built documentation, photos/videos, schedule of values, project schedule, temporary sanitation, meetings, office supplies, temporary utility hookups necessary for constructing the project complete, as shown and as specified in Divisions 01 through 46. The price shall not exceed 3 percent of the total bid. Half the mobilization may be requested on the first pay request and the remainder on the second.

B. BID ITEM #2: Demolition and Removal of Pump Station #1.

Payment of the lump sum price bid for Item No. 2 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment and incidentals, necessary for removal, abandonment and salvage of existing pump station #1 complete, as shown and as specified in Divisions 01 through 46.

C. BID ITEM #3: Demolition and Removal of Pump Station #2.

Payment of the lump sum price bid for Item No. 3 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment and incidentals, necessary for removal, abandonment and salvage of existing pump station #2 complete, as shown and as specified in Divisions 01 through 46.

D. BID ITEM #4: Demolition, Removal and Cut, Cap, Abandonment of Existing Forcemain.

Payment of the lump sum price bid for Item No. 4 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment and incidentals, necessary for removal,

and/or abandonment of the existing 12 inch DIP forcemain, portions of the existing 20 inch HDPE forcemain complete, as shown and as specified in Divisions 01 through 46.

E. BID ITEM #8: Construct Pump Station #1.

Payment of the lump sum price bid for Item No. 8 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment, and incidentals, necessary for construction of pump station #1 complete, as shown and as specified in Divisions 01 through 46.

F. BID ITEM #9: Construct Pump Station #2.

Payment of the lump sum price bid for Item No. 9 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment, and incidentals, necessary for construction of pump station #2 complete, as shown and as specified in Divisions 01 through 46.

G. BID ITEM #16: Lee Creek Pump Station Interconnection.

Payment of the lump sum price bid for Item No. 16 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment, and incidentals, necessary for the temporary diversion and reconnection of the Lee Creek Pump Station forcemain interconnection including all excavation, backfill, compaction, spoils offhaul, fittings, valves, and appurtenances as shown and specified in Divisions 01 through 46.

H. BID ITEM #17: Pumped Bypassing (30-inch Sanitary Sewer).

Payment of the lump sum price bid for Item No. 17 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment and incidentals, necessary for the temporary pumped bypassing of the 30-inch sanitary sewer crossing Reems Creek at pump station #1. Work will include mobilization, installation, operation, maintenance, and removal of the full pumping system including backup generators, odor and noise control, complete as shown and specified in Divisions 01 through 46.

I. BID ITEM #18: Pumped Bypassing at Pump Station #2.

Payment of the lump sum price bid for Item No. 18 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment, and incidentals, necessary for the temporary pumped bypassing of pump station #2. Work will include mobilization, installation, operation, maintenance, and removal of the full pumping system including backup generators, odor and noise control, complete as shown and specified in Divisions 01 through 46.

J. BID ITEM #19: Above Grade 12 inch HDPE bypass piping for 12-inch DIP Forcemain.

Payment of the lump sum price bid for Item No. 19 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment and incidentals, necessary for the temporary 12-inch HDPE piping used to bypass the existing 12-inch forcemain. Work will include mobilization, installation of temporary piping, joint fusion, temporary valves, fittings, operation, maintenance and removal of the full system and relocation to locations as necessary, complete as shown and specified in Divisions 01 through 46.

K. BID ITEM #20: Traffic Control.

Payment of the lump sum price bid for Item No. 20 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment, and incidentals, necessary for traffic control along both private and public roads, complete as shown and specified in Divisions 01 through 46.

L. BID ITEM #24: Trench Miscellaneous Repairs (Curb, Sidewalk, Dirt Roads).

Payment of the lump sum price bid for Item No. 24 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment, and incidentals, necessary for cutting, removal and disposal of all other trench surfaces including curb & gutter, sidewalks, dirt roads, complete as shown and specified in Divisions 01 through 46.

M. BID ITEM #33: Level A and B Subsurface Utility Engineering.

Payment of the lump sum price bid for Item No. 33 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment, and incidentals, necessary for Levels and B subsurface utility engineering required, complete as shown and specified in Divisions 01 through 46.

N. BID ITEM #38: Electrical Work.

Payment of the lump sum price bid for Item No. 38 shall include, but not be limited to, full compensation for all labor, materials, tools, equipment, and incidentals, necessary for electrical work at pump stations #1 and #2, complete as shown and specified in Divisions 01 through 46.

O. BID ITEM #39: Permanent Stormwater BMPs.

Payment of the lump sum price bid for Item No. 39 shall include, but not be limited to, full reimbursement for all labor, materials, tools, equipment, and incidentals, necessary for construction of the stormwater pond with rip rap outlet along with grass-lined swales on the pump station #1 site, complete as shown and specified in Divisions 01 through 46.

P. BID ITEM #40 (Allowance): Systems Integration (CITI).

Payment of the lump sum price bid for Item No. 40 shall include, but not be limited to, full reimbursement for all labor, materials, tools, equipment, and incidentals, necessary for systems integration work at pump stations #1 and #2, complete as shown and specified in Divisions 01 through 46. CITI's proposal excludes sales tax. CITI is the systems integrator that will be performing the work. Refer to Section 012100 Allowances for more information.

1.4 TOTAL BID

A. Part I covers the work of the General Contractor and Part II covers the work of the Subcontractors.

1.5 PAYMENT

A. Payment of the total price bid in the Form for General Bid, shall fully compensate Contractor for furnishing all labor, materials, equipment and incidentals required to complete the work as outlined above and under Section 011000 “Summary”. Payment shall also include compensation for all other work required to complete the Project as described in the Contract Documents and not specifically mentioned.

1.6 EXTRA WORK

A. Extra work, if any, will be performed in accordance with Article 11 of the General Conditions and will be paid for in accordance with the provisions of Article 13 of the General Conditions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 012001

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 012100 "Allowances" for procedures for using unit prices to adjust quantity allowances.
2. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
3. Section 014000 "Quality Requirements" for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the Part 3 “Schedule of Unit Prices” Article contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. BID ITEM #5: Demolition, Removal, Cut, Cap, Abandonment of existing 30-inch DIP Sanitary Sewer.

1. Description: Abandonment and/or removal of 30-inch DIP sewer, removal of manholes, removal of aerial crossing with concrete piers as required, in accordance with the contract documents.
2. Unit of Measurement: Linear Feet of pipe removed or abandoned.

B. BID ITEM #6: 30-inch DIP CL 250 Sanitary Sewer.

1. Description: Installation of 30-inch Sanitary Sewer, 4-inch lateral reconnection, including excavation, compaction, backfill, trench shoring, dewatering, surface repairs, testing and inspection as required, in accordance with the contract documents.
2. Unit of Measurement: Linear Feet of Sewer Installed at various depths.

C. BID ITEM #7: Precast Concrete Manhole (30-inch Sanitary Sewer).

1. Description: Installation of 5-foot precast concrete manholes and a single 6-foot precast concrete manhole for the 30 inch Sanitary Sewer, including excavation, compaction, backfill, trench shoring, dewatering, and testing and inspection as required, in accordance with the contract documents.
2. Unit of Measurement: Each manhole is a unit based on the various depths shown.

D. BID ITEM #10: Reems Creek Diversion, Restoration of Invert, Side Slopes.

1. Description: Installation and removal of a stream diversion, restoration of the stream bottom and side slopes after pipeline installation for the 30-inch gravity sewer crossing and 24-inch force main crossing, in accordance with the contract documents.
2. Unit of Measurement: Each location.

E. BID ITEM #11: 24-inch DR11 HDPE Force Main.

1. Description: Installation of 24-inch DR11 HDPE Force Main with fittings and appurtenances, Patti Lane service reconnection including, but not limited to, excavation, compaction, backfill, pipe bedding, trench shoring, dewatering, and testing and inspection as required, in accordance with the contract documents.
2. Unit of Measurement: Linear Feet of 24-inch DR11 HDPE Force main installed.

F. BID ITEM #12: Jack and Bore 36-inch Casing with 24-inch DR11 HDPE Carrier Pipe.

1. Description: Installation of a 36-inch Welded Steel Casing with 24-inch DR11 HDPE Force Main Carrier pipe via jacking and boring under Goldview Road with fittings, appurtenances, casing spacers, end seals including, but not limited to, excavation,

compaction, backfill, trench shoring, dewatering, for trenchless pits, and testing and inspection as required, in accordance with the contract documents.

2. Unit of Measurement: Linear Feet of 36-inch Welded Steel Casing installed.

G. BID ITEM #13: 6-inch DR13.5 HDPE Force Main.

1. Description: Installation of 6-inch DR13.5 HDPE Force Main with fittings and appurtenances, connection to existing 20-inch HDPE force main including, but not limited to, excavation, compaction, backfill, pipe bedding, trench shoring, dewatering, and testing and inspection as required, in accordance with the contract documents.
2. Unit of Measurement: Linear Feet of 6-inch DR13.5 HDPE Force main installed.

H. BID ITEM #14: 2-inch Sewage Combination Air Release Valves with Manholes and Filters.

1. Description: Installation of 2-inch sewage combination air release valves with manholes, odor filters, service saddle and connection to the 24-inch HDPE force main and/or existing 20-inch forcemain, piping fittings and appurtenances in accordance with the contract documents.
2. Unit of Measurement: Each valve.

I. BID ITEM #15: 3-inch Vacuum Breakers with 2-inch Air Release Valves with Manholes and Filters.

1. Description: Installation of 3-inch Vacuum Breakers with 2-inch Air Release Valves with manholes, odor filters, service saddle and connection to the 6-inch and/or 24-inch HDPE force main, piping fittings and appurtenances in accordance with the contract documents.
2. Unit of Measurement: Each valve.

J. BID ITEM #21: Trench Pavement Repairs (Asphalt)

1. Description:
   a. NCDOT Roads: Installation of asphalt trench pavement repair including all labor, materials, tools, equipment and incidentals, necessary for cutting, removal and disposal of existing asphalt, tack coat, aggregate base course, asphalt repairs, seal coat, associated striping and incidentals in accordance with the contract documents along NCDOT roads.
   b. Training Center Site: Installation of asphalt trench pavement repair including all labor, materials, tools, equipment and incidentals, necessary for cutting, removal and disposal of existing asphalt, tack coat, aggregate base course, asphalt repairs, seal coat, associated striping and incidentals in accordance with the contract documents within the Training Center.
   c. Hydro Building Access Road, Driveways: Installation of asphalt trench pavement repair including all labor, materials, tools, equipment and incidentals, necessary for cutting, removal and disposal of existing asphalt, tack coat, aggregate base course, asphalt repairs, seal coat, associated striping and incidentals in accordance with the contract documents along the Hydro building access road and any asphalt driveways impacted along the full alignment.
2. Unit of Measurement: Square yards of asphalt installed.

K. BID ITEM #22: Trench Pavement Repairs (Concrete)

1. Description: Installation of concrete trench pavement repair including all labor, materials, tools, equipment, and incidentals, necessary for cutting, removal and disposal of existing concrete, aggregate base course, concrete repairs, and incidentals in accordance with the contract documents.
2. Unit of Measurement: Square yards of concrete installed.

L. BID ITEM #23: Trench Pavement Repairs (Gravel)

1. Description: Installation of gravel trench pavement repair including all labor, materials, tools, equipment, and incidentals, necessary for removal and disposal of existing gravel, installation of new gravel and incidentals in accordance with the contract documents.
2. Unit of Measurement: Square yards of gravel installed.

M. BID ITEM #25: New Concrete Pavement (PS1)

1. Description: Installation of new concrete pavement at pump station #1 including all aggregate base courses, formwork, steel reinforcement, concrete sealants, and incidentals in accordance with the contract documents.
2. Unit of Measurement: Cubic yards of concrete installed.

N. BID ITEM #26: New Asphalt Pavement (PS #2)

1. Description: Installation of new asphalt pavement at pump station #2 including all aggregate base courses tack coat, asphalt, seal coat and incidentals in accordance with the contract documents.
2. Unit of Measurement: Cubic yards of asphalt installed.

O. BID ITEM #27: Grind and Overlay (Hidden Falls Drive).

1. Description: Grinding and Overlaying Hidden Falls Drive including maintaining access to private drives and offhaul of excess material in accordance with the contract documents.
2. Unit of Measurement: Square Yards of pavement.

P. BID ITEM #28: Grind and Overlay (Old Marshall Hwy.).

1. Description: Grinding and Overlaying Old Marshall Hwy. to the centerline of the road including maintaining access to private drives and offhaul of excess material in accordance with the contract documents. This does not include trench repairs.
2. Unit of Measurement: Square Yards of pavement.

Q. BID ITEM #29: Undercut of Unstable Pipe Foundation and Replacement with #57 Stone.

1. Description: Removal of unsatisfactory material and replacement with #57 stone including excavation, compaction, backfill, spoils offhaul in accordance with the contract documents.
2. Unit of Measurement: Cubic Yards of soil removed.

R. BID ITEM #30: Removal of Unsuitable Material and Replacement with Select Backfill.

1.
2. Unit of Measurement: Cubic Yards of soil removed.

S. BID ITEM #31: Removal of old WWTP on PS1 Site.

1.
2. Unit of Measurement: Cubic Yards of abandoned WWTP removed.

T. BID ITEM #32: Rock Excavation.

1.
2. Unit of Measurement: Cubic Yards of rock removed.

U. BID ITEM #34: Erosion Control Matting

1. Description: Installation of erosion control matting including all labor, materials, tools, equipment, and incidentals, necessary for placement of erosion control matting and incidentals in accordance with the contract documents.
2. Unit of Measurement: Square yards of erosion control matting installed.

V. BID ITEM #35: Silt Fence

1. Description: Installation of silt fence, in accordance with the contract documents.
2. Unit of Measurement: Linear feet of silt fence installed.

W. BID ITEM #36: Super Silt Fence

1. Description: Installation of super silt fence, in accordance with the contract documents.
2. Unit of Measurement: Linear feet of super silt fence installed.

X. BID ITEM #37: Silt Fence Outlets

1. Description: Installation of silt fence outlets, in accordance with the contract documents.
2. Unit of Measurement: Number of silt fence outlets installed.

3.2A. ALTERNATE BID ITEM #1: Polymer Concrete Manholes In lieu of Precast Concrete Manholes (30-inch Sanitary Sewer).

1. Description: Installation of polymer concrete manholes for the 30-inch Sanitary Sewer, including excavation, compaction, backfill, trench shoring, dewatering, and testing and inspection as required, in accordance with the contract documents.
2. Unit of Measurement: Each manhole is a unit based on the various depths shown.

B. ALTERNATE BID ITEM #2: 30-inch FRP SN46 Sanitary Sewer.

1. Description: Installation of 30-inch fiberglass reinforced pipe with an SN of 46, 4 inch lateral reconnection, including excavation, compaction, backfill, trench shoring, dewatering, surface repairs, and testing and inspection, as required, in accordance with contract documents.
2. Unit of Measurement: Linear Feet of Sewer Installed at various depths.

END OF SECTION 012200

SECTION 33 31 11
FIBERGLASS REINFORCED POLYMER MORTAR PIPE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work under this section includes, but is not limited to, fiberglass reinforced polymer mortar (FRP) piping and appurtenances for a complete sanitary sewer collection system.

1.02 RELATED SECTIONS

A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
   1. Section 01 35 13 Specific Project Requirements
   2. Section 31 23 33 Trenching for Utilities

1.03 REFERENCES

A. Publications are referred to in the text by basic designation only.
   1. American Society for Testing and Materials (ASTM)

      a. A126 Gray Iron Castings and Valves, Flanges and Pipe Fittings.
      b. B117 Operating Salt Spray (Fog) Apparatus
      c. C33 Concrete Aggregates
      d. C76 Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
      e. C150 Portland Cement
      f. C361 Reinforced Concrete Low-Head Pressure Pipe.
      g. C443 Flexible Watertight Joints for Precast Manhole Sections
      h. C478 Precast Reinforced Concrete Manhole Sections
      i. C497 Standard Methods Testing Concrete Pipe, Manhole Sections or Tile
      j. C618 Coal Fly Ash and Raw or Calcined natural Possolan for Use as a Mineral Admixture in Portland Cement Concrete
      k. C655 Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
      l. C822 Definition of Terms Related to Concrete Pipe and Related Products
      m. C890 Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures
      n. C891 Standard Practice for Installation of Underground Precast Concrete Utility Structures
      o. C923 Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
      p. C990 Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants
      q. C1103 Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines
      r. C1131 Least Cost (Life Cycle) Analysis of Concrete Culvert, Storm Sewer, and Sanitary Sewer Systems
      s. C1244 Test Method for Concrete Sewer Manholes by the Negative Air Pressure
      t. C1619 Elastomeric Seals for Joining Concrete Structures

u. D638 Tensile Properties of Plastics
v. D695 Test Method for Compressive Properties of Rigid Plastics
w. D714 Evaluating Degree of Blistering of Paints
x. D1248 Polyethylene Plastics Molding and Extrusion Materials
y. D1784 Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
z. D2241 Poly(Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR Series)
aa. D2321 Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe
bb. D2412 Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
cc. D2794 Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
dd. D2924 Standard Test Method for External Pressure Resistance of Fiberglass (Glass Fiber Reinforced Thermosetting Resin) Pipe
ee. D2996 Filament Wound Fiberglass (Glass Fiber Reinforced Thermosetting Resin) Pipe
ff. D2997 Centrifugally Cast Fiberglass (Glass Fiber Reinforced Thermosetting Resin) Pipe
gg. D3034 Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
hh. D3139 Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ii. D3262 “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
jj. D3350 Polyethylene Plastics Pipe and Fittings Materials
kk. D3567 Determining Dimensions of Fiberglass (Glass Reinforced Thermosetting Resin) Pipe and Fittings
ll. D3681 Chemical Resistance of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition
mm. D3839 Underground Installation of “Fiberglass” (Glass Fiber Reinforced Thermosetting Resin) Pipe
nn. D3753 Glass-Fibered Reinforced Polyester Manholes
oo. D4060 Abrasion Resistance of Organic Coatings by the Taber Abraser
pp. D4161 “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals
qq. D4541 Pull-Off Strength of Coatings Using Portable Adhesion Testers
rr. D4258 Surface Cleaning Concrete for Coating
ss. D4259 Abrading Concrete
tt. E96 Water Vapor Transmission of Materials
uu. F477 Elastomeric Seals (Gaskets) for Joining Plastic Pipe
vv. F1417 Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air
ww. G95 Cathodic Disbondment Test of Pipeline Coatings

2. American Water Works Association (AWWA)
   a. C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
   b. C110 Ductile-Iron and Gray-Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids
   c. C151 Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids

d. C153 Ductile-Iron Compact Fittings, 3 inch through 16 inch, for Water and Other Liquids
e. C504 Rubber-Seated Butterfly Valves
f. C508 Swing-Check Valves for Waterworks Service, 2 inch Through 24 inch NPS
g. C512 Air-Release, Air / Vacuum, and Combination Air Valves for Waterworks Service
h. C550 Protective Epoxy Interior Coatings for Valves and Hydrants
i. C600 Standard for Installation of Ductile Iron Water Mains and Their Appurtenances
j. C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 60 inch.
k. C950 Standard for Fiberglass Pipe
l. M23 PVC Pipe - Design Installation
m. M41 Ductile Iron Pipe and Fittings
n. M45 Fiberglass Pipe Design

3. National Sanitation Foundation (NSF) Standards
   a. 14 Plastic Piping Components and Related Materials
4. UNI-BELL Plastic Pipe Association (UNI)
   a. B-5 Recommended Practice for the Installation of Polyvinyl Chloride (PVC) Sewer Pipe
   b. B-6 Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe
5. Ductile Iron Pipe Research Association (DIPRA)
   a. 8-08/5M Design of Ductile Iron Pipe
6. Reinforced Concrete Pipe
   a. American Concrete Pipe Association (ACPA) Design Data 9 Standard Installations and Bedding Factors for the Indirect Design Method.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00, Submittal Procedures:
   1. Affidavit of Compliance: Affidavit shall attest that supplied products conform to the referenced standard and this specification and that tests set forth in each applicable referenced publication have been performed and that test requirements have been met. Submit for each of the following materials:
      a. Pipe
         1) All pipe used on Project including couplings, gaskets, distribution rings and other appurtenances
         2) All pipe coatings or liners
   2. Catalog Data and Calculations: Submit manufacturer's standard drawings or catalog cuts and calculations for pipe pressure/thickness class, based on the Drawings and Specifications for the following. Clearly indicate material to be furnished for the Project including options to be provided and indicate if a greater pipe pressure/thickness class, concrete reinforcement or pipe stiffness class will be necessary based on the manufacturer's calculations.
      a. Pipe
         1) All pipe used on Project

3. Reports:
    a. Field test report for each section of pipe for the following:
        1) Low-pressure air test for gravity mains.
        2) Deflection test for gravity mains.
4. Operation and Maintenance Instructions: Submit complete operation and maintenance manual for the following:
    a. None

1.05 DELIVERY, STORAGE, AND HANDLING

A. Provide a rope sling when handling the pipe. Lifting of the pipe shall be done in a vertical plane. Under no conditions shall the sling be allowed to pass through the pipe unless adequate measures are taken to prevent damage to both tongue and groove ends.

B. Deliver pipe in the field as near as practicable to the place where it is to be installed. Distribute pipe along the side of the trench opposite to the spoil bank. Where necessary to move the pipe longitudinally along the trench, it shall be done in such a manner as not to injure the pipe or coating.

PART 2 PRODUCTS

2.01 CENTRIFUGALLY CAST FIBERGLASS REINFORCED POLYMER MORTAR (CCFRPM) PIPE

A. CCFRPM Pipe is allowable only for gravity sewers.

B. Pipe and fittings shall conform to the following requirements:
    1. The inside diameter shall be as indicated on the Drawings. No diameters less than this will be allowed.
    2. Use SN46 throughout
    3. Pipe shall be supplied in 20-foot nominal lengths.
    4. Each length of pipe, fittings, couplings, and specials to be used shall be plainly and permanently marked with the following:
        a. Pipe class or strength designation
        b. Manufacturer’s name or trademark
        c. Date of manufacture
        d. Nominal pipe size.

C. CCFRPM Pipe shall conform to ASTM D3262, for CCFRPM pipe manufactured of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) materials, and to the following requirements:
    1. CCFRPM pipe shall be as manufactured by HOBAS Pipe or equal.
    2. The pipe shall be manufactured in accordance with ASTM D3262 and shall meet the following cell limits: Type 1, Liner 2, Grade 3, as described by Section 4.2 and Table 1 of ASTM D3262. The stiffness is to be measured in accordance with ASTM D2412. The corrosion liner shall not be considered as contributing to the structural strength of the pipe.

3. The pipe shall be manufactured by the centrifugal casting process resulting in a dense, nonporous, corrosion-resistant, consistent, composite structure to meet the operating conditions as shown on the Drawings.
4. Pipe shall conform to ASTM D2412 for minimum stiffness and external loading characteristics.
5. Couplings, fittings and push-on joints shall be manufactured with flexible, elastomeric seals conforming to the requirements of ASTM D4161 and ASTM F477 and shall meet or exceed the pipe class at the location of its installation.
6. Pipe joint shall be push-on type couplings unless specified otherwise.
7. Pipe shall meet the minimum requirements of ASTM D3681 and ASTM D3262. Manufacturer shall provide complete 10,000-hour test results on pipe produced at the proposed location of manufacture. Results shall reflect that the pipe has a minimum allowable strain of no less than 0.9% at fifty years when tested in accordance with ASTM D3681 and D3262.
8. Normal production pipe for this project shall not incorporate raw materials that are not in compliance with ASTM D3681 and ASTM 3262.
9. Interior of pipe shall be manufactured using a nonstructural resin with a minimum allowable elongation of 50% when measured in accordance with ASTM D638. The liner nominal thickness shall be 40-mils.
10. Exterior pipe surfaces shall be comprised of a layer of sand and resin to provide UV protection to the exterior.

2.02 FILAMENT-WOUND FIBERGLASS REINFORCED POLYMER MORTAR PIPE

A. Filament-Wound Fiberglass Reinforced Polymer Mortar Pipe is allowable only for gravity sewers.

B. Pipe and fittings shall conform to the following requirements:
   1. The inside diameter shall be as indicated on the Drawings. No diameters less than this will be allowed. If the Contractor proposes to use nominal SI Series diameter pipe, provide nominal pipe diameter equal to or greater than the design diameter in inches shown on the drawings.
   2. Use SN46 throughout.
   3. Pipe shall be supplied in 20-foot or 40-foot nominal lengths.
   4. Each length of pipe, fittings, couplings, specials to be used shall be plainly and permanently marked with the following: pipe class or strength designation, manufacturer's name or trademark, date of manufacture, and the nominal pipe size.
   5. Wall Thickness: The average wall thickness of the pipe shall not be less than the nominal wall thickness published in the manufacturer's literature, and the minimum wall thickness at any point shall not be less than 87.5% of the nominal wall thickness.
   6. End Squareness: All points around each end of a pipe unit shall fall within +/-1/4 inch or +/-0.5% of the nominal diameter of the pipe, whichever is greater, to a plane perpendicular to the longitudinal axis of the pipe.
   7. Stiffness: Each pipe shall have sufficient strength to exhibit the minimum pipe stiffness at 5% deflection as required by the Engineer. Stiffness shall be tested in accordance with the test method of ASTM D2412. A minimum of one pipe shall be tested every 100 lengths of each type, grade, and size pipe produced.

8. The minimum inside diameter of pipe shall meet the requirements of ASTM D3262 for Nominal Inside Diameters (ID) and Tolerances Inside Diameter Control Pipe.

C. Filament-Wound Fiberglass Reinforced Polymer Mortar Pipe shall conform to ASTM D3262, for fiberglass reinforced polymer mortar pipe manufactured of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) materials, and to the following requirements:
   1. The pipe shall be HOBAS Pipe or equal.
   2. The pipe shall be manufactured in accordance with ASTM D3262 with a minimum nominal pipe stiffness of 46 (SN). The pipe shall meet the following cell limits: Type 1, Liner 1, Grade 1, according to the parameters of ASTM D3262. The stiffness is to be measured in accordance with ASTM D2412. The corrosion liner shall not be considered as contributing to the structural strength of the pipe.
   3. The pipe shall be manufactured by the continuous advancing mandrel (filament wound) process resulting in a dense, nonporous, corrosion-resistant, consistent, composite structure to meet the operating conditions as shown on the Drawings.
   4. Pipe shall conform to ASTM D2412 for minimum stiffness and external loading characteristics.
   5. Couplings, fittings and push-on joints shall be manufactured with flexible, elastomeric seals conforming to the requirements of ASTM D4161 and ASTM F477 and shall meet or exceed the pipe class at the location of its installation.
   6. Pipe joint shall be push-on type double bell couplings with dual gaskets on either side of the coupling unless specified otherwise.
   7. Pipe shall meet the minimum requirements of ASTM D3681 and ASTM D3262. Manufacturer shall provide complete 10,000-hour test results on pipe produced at the proposed locaton of manufacture. Results shall reflect that the pipe has a minimum allowable strain of no less than 0.65% at fifty years when tested in accordance with ASTM D3681 and D3262. The pipe manufacturer may provide a 1,000 hr Reconfirmation Test of Strain Corrosion per ASTM D3681 to satisfy the requirement of testing of pipe at proposed manufacturing location. This does not relieve manufacture from original 10,000-hour test. All testing shall be 3rd party witnessed and reports submitted.
   8. Normal production pipe for this project shall not incorporate raw materials that are not in compliance with ASTM D3681 and ASTM 3262.
   9. Interior of pipe shall be manufactured using a glass reinforced thermoset liner.. The liner nominal thickness shall be 40-mils.
   10. Exterior pipe surfaces shall be comprised of non-structural layer of glass reinforced resin to provide UV protection to the exterior.

D. Resin Systems: The manufacturer shall use only approved polyester resin systems with a proven history of performance in this particular application.

E. Glass Reinforcements: The reinforcing glass fibers to be used to manufacture the components shall be of the highest quality commercial grade of glass filaments suitably treated with binder and sizing compatible with impregnating resins.

F. The internal liner shall be suitable for service in a sewer pipe and shall be highly resistant to exposure to sulfuric acid as produced by biological activity from hydrogen sulfide gases. Pipe shall meet or exceed requirements off ASTM D3681.

G. Silica Sand: Sand shall be minimum 98% silica with a maximum moisture content of 0.2%

H. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotrophic agents, etc., when used, shall not detrimentally affect the performance of the product.

I. Elastomeric Gaskets: Gaskets shall be supplied by qualified gasket manufacturers and be suitable for the service intended.

PART 3 EXECUTION

3.01 GENERAL

A. Pipe installation shall meet the following general guidelines:
   1. Lay pipe in the presence of the Owner's designated resident project representative, unless specifically approved otherwise.
   2. Handle pipe and accessories in accordance with manufacturer's recommendations. Take particular care not to damage pipe coatings.
   3. Carefully inspect pipe immediately prior to laying. Do not use defective pipe. Replace pipe damaged during construction.
   4. Lay pipe to grade and alignment indicated on the Drawings.
   5. Provide proper equipment for lowering pipe into trench.
   6. Provide tight closure pipe ends when work is not in progress.
   7. Keep pipe interior free of foreign materials.
   8. Do not lay pipe in water or when the trench or weather conditions are unsuitable for the work.
   9. Clean bell and spigots before joining. Make joints and lubricate gasket in accordance with pipe manufacturer recommendation.
   10. Block fittings with concrete or restrained as indicated on the Drawings or as required to prevent movement.

B. Gravity Pipe: Gravity pipe installation shall meet the following general guidelines:
   1. Lay pipe upgrade from the lower end and at the grades and alignment indicated on the Drawings.

3.02 RELATION OF WATER MAINS TO SEWERS

A. Lateral Separation: Lay water mains at least 10 feet laterally from existing and proposed sewers. Where existing conditions prevent a 10-foot lateral separation, the following shall be followed with approval of the Engineer:
   1. Lay water main in a separate trench, with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.
   2. Lay water main in the same trench as the sewer with the water main located at one side on a bench of undisturbed earth, and with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.

B. Crossing Separation: Lay bottom of water main at least 18 inches above the top of the sewer. Where existing conditions prevent an 18-inch vertical separation, construct both the water main and sewer of ferrous materials and with joints that are equivalent to water main standards for a distance of 10 feet on each side of the point of crossing.

C. Crossing a Water Main Under a Sewer: When it is necessary for a water main to cross under a sewer, construct both the water main and the sewer of ferrous materials and

with joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing.

3.03 GRAVITY SEWER PIPE

A. Lay sewer pipe to true lines and grades by using laser beam equipment or other acceptable means.

B. Minimum Separation Distances:
   1. In general, 100-foot horizontal separation from wells or other water supplies. If sewer pipe is installed within 50 foot of a public well or water supply or 25 foot of a private well or water supply, ferrous pipe must be used. Manholes shall not be located within 50-foot of a public well or water supply or 25 foot from a private well or water supply.
   2. 24-inch vertical separation from storm sewers or ferrous pipe shall be used.
   3. For separation from water mains see paragraph 3.02 above.

3.04 FIBERGLASS REINFORCED PIPE – CENTRIFUGALLY CAST AND FILAMENT WOUND

A. Install pipe in accordance with manufacturer's recommendations and the following requirements:
   1. The bedding and burial of pipe and fittings shall be in accordance with the Drawings and Specifications and e Manufacturer's requirements.
   2. Do not exceed forces recommended by the manufacturer when joining pipe.
   3. Gasket shall be wiped clean prior to joining. Damaged, defective, or bulging gaskets shall be replaced with a new coupling.
   4. Wipe the plain end of pipe clean prior to insertion in the coupling. The coupling components shall also be wiped clean prior to connection.
   5. Apply joint lubricant, as approved by pipe manufacturer, to pipe end and elastomeric gaskets.
   6. For handling pipe, use textile slings or other suitable materials or a forklift. Use of cables or chains is not permitted. Damaged pipe will be rejected.
   7. Pipe shall be free of nicks, scratches and gouges at the time of installation. Visible gouges shall be cause for rejection of pipe.
   8. Join pipe in straight alignment then deflect slightly if required. Do not allow the deflection angle to exceed the deflection permitted by the manufacturer.
   9. No blocking under the pipe will be permitted.
   10. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's recommendation and with approval of the Engineer.
   11. Under no circumstances shall pipe or fittings be dropped either into the trench or during unloading. The interior of the pipe shall be kept clean of oil, dirt, and foreign matter; and the machined ends and couplings shall be wiped clean immediately prior to jointing.
   12. Use a pipe cutter where necessary to cut and machine all pipe in the field. A "full insertion mark" shall be provided on each field-cut pipe end. Field-cut pipe shall be beveled with a beveling tool in accordance with the manufacturer's recommendations. Bevels shall be in accordance with the manufacturer's requirements.

13. If not integral to the bell or coupling, rubber gaskets shall be marked with manufacturer's identification sizes and proper insertion direction.
14. Before use, all pipe and specials shall be thoroughly examined for defects; and no piece shall be installed which is known to be defective. If any defective piece should be discovered after having been installed, it shall be removed and replaced with a sound on in a satisfactory manner at no additional cost to the Owner.
15. For open-trench construction, the laying of the pipe in finished trenches shall begin at the lowest point with the coupling/bell ends pointing opposite to the direction of flow. The interior of the pipe and the jointing seal shall be free from sand, dirt, and trash before installing in the line. Extreme care must be taken to keep the couplings of the pipe free from dirt and rocks so joints may be properly assembled without overstressing the coupling. The jointing of the pipe shall be done in strict accordance with the pipe manufacturer's instructions and shall be done entirely in the trench.
16. Fiberglass reinforced pipe shall be aligned and joined in accordance with each manufacturer's recommendations. Joining of pipe shall not exceed the maximum allowable misalignment for each manufacturer's installation requirements. Contractor shall inspect the joint of each section of pipe throughout the circumference of the joint prior to backfilling to determine offset or misalignment of the joint and measure. Any offset greater than the maximum allowable for the specified pipe material shall be field adjusted, re-inspected, and re-measured prior to backfilling of the pipe section.
17. Geotextile shall be utilized for filtration and stabilization of stone bedding, haunching, and initial backfill when loose, non-cohesive soils are encountered. Contractor is responsible for identifying potential locations for geotextile bedding wrap and confirming with Owner's geotechnical representative. Geotextile wrap shall be installed in accordance with AASHTO M288-06, Appendix X1 and manufacturer's installation recommendations. Prior to covering, the geotextile material shall be inspected for damage during installation. Damaged geotextiles shall be replaced or repaired immediately at no additional cost to the Owner. Sheets of fabric may be sewn or bonded together with a fungus resistant material in accordance with AASHTO M288-06, Appendix X1.1.4. No deviation from any physical requirements will be permitted due to the presence of the seam. When anchor pins are necessary, fabricate them of steel, 3/16" in diameter, at least 18" long, pointed at one end, and have a head that will retain a steel washer having an outside diameter of no less than 1.5". When wire staples are necessary, provide staples made of No. 11 gage new steel wire formed into a "U" shape. The size when formed must not be less than 6" in length with a throat of not less than 1" in width. Fabric will be rejected if more than 72 hours has elapsed between the time the protective wrapping has been removed and the fabric is covered up during installation. Replacement fabric will be obtained by the Contractor at no additional cost to the Owner. Construction vehicles shall not be allowed directly on geotextile. If placement of backfill material causes damage to the geotextile, the damaged area shall be repaired or replaced at no additional cost to the Owner.
18. When CCFRPM pipe is stored in an area where it is exposed to sunlight or other sources of UV radiation, the ends of each pipe shall be covered to protect the inner liner from exposure in accordance with the manufacturer's recommendations."

3.05 TESTING

A. General
   1. Clean and flush pipe system of foreign matter prior to testing.
   2. Notify Owner and Engineer a minimum of 48 hours prior to testing.
   3. Perform tests in the presence of Engineer.
   4. Length of line to be tested at one time shall be subject to approval of Engineer.
   5. Pipe sections shall not be accepted and placed into service until specified test have been performed and approved.
   6. Repair defects in the pipe system. Make repairs to the same standard as specified for the pipe system.
   7. Retest repaired sections until acceptance.
   8. Repair visible leaks regardless of the test results.

B. Gravity Sewer Mains
   1. Test gravity lines between manholes.
   2. Light Testing: Engineer will check for displacement of pipe as follows:
      a. A light will be flashed between the ends of the pipe section being tested.
      b. If the illuminated interior shows misalignment, or other defects as designated by Engineer, defects shall be repaired.
   3. General
      a. Infiltration shall not exceed 100 gallons per inch of diameter, per mile of pipe, per 24 hours. Engineer may require flow measurement for verification of infiltration.
      b. Verify that maximum infiltration rate shall not be surpassed by performing an air testing as follows.
   4. Low Pressure Air Test:
      a. Air testing of sewer mains shall conform to UNI-B-6 and the following requirements:
      b. Perform initial air test when each section of main is complete including services to right of way. Test as construction proceeds.
      c. Wet interior surfaces of porous pipe material prior to testing.
      d. Safety
         1) Provide a superintendent who has experience in low pressure air testing of gravity sewer mains.
         2) Follow safety recommendations of air testing equipment manufacturer.
         3) Properly brace sewer plugs during testing. Test plugs prior to use in air testing.
         4) No one shall be allowed in manhole or trench when pipe is under pressure.
         5) Pressurizing equipment shall include a regulator and a pressure relief valve, which are set no higher than 9 psig. Monitor gauges continuously to assure that the pressure does not exceed 9 psig.
      e. Equipment
         1) Sewer plugs shall be specifically designed for low pressure air testing.
         2) Use two separate air hoses.
            i) One to connect the control panel to the sealed line for introducing the air.
            ii) One from the sealed line to the control panel to provide constant monitoring of the air pressure in the line.

iii) If Pneumatic plugs are used a separate line shall be used to inflate the plugs.

3) As a minimum the above ground air testing equipment shall include a shutoff valve, pressure regulating valve, pressure relief valve, input pressure gauge, and a continuous monitoring pressure gauge having a pressure range from 0 to at least 10 psig.
4) Continuous monitoring pressure gauge shall be at least 4 inches in diameter with minimum divisions of 0.10 psi and an accuracy of +/- 0.04 psi.
5) Monitoring gauges shall be subject to calibration as deemed necessary.
6) Air used for testing shall pass through a single above ground control panel.

f. Testing
1) Groundwater Determination: Immediately prior to each air test, determine groundwater level by a method acceptable to the Engineer. Adjust pressure used in air test in accordance with groundwater level.
2) Apply air slowly to the test section until the pressure reached is 4.0 psi plus an adjustment of 0.433 psi for each foot of ground water above the crown of the pipe. Internal air pressure, including adjustment for ground water, should never exceed 9.0 psi for ductile iron and concrete pipe and 5.0 psi for Fiberglass pipes. The Contractor may have to dewater trench to maintain ground water at or below crown of fiberglass pipe when testing. Cost for this shall be included in unit price for pipe installation.
3) When the above required pressure is reached, throttle air supply to maintain internal pressure for at least two minutes to permit stabilization.
4) When pressure has stabilized at required pressure, shut off air supply.
5) While observing the continuous monitoring pressure gauge, decrease pressure approximately 0.5 psi from required pressure.
6) At this reading timing shall commence with a stop watch and allowed to run until pressure has dropped 1.0 psi or allowable time has lapsed. Line shall be “Acceptable” if the pressure drop does not exceed 1 psig in the time prescribed for the test below in Table 1, Low Pressure Air Testing for Gravity Sewer Mains.

TABLE I

LOW PRESSURE AIR TESTING
FOR
GRAVITY SEWER MAINS

MINIMUM TIME REQUIRED FOR A MAXIMUM 1.0 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED

1 Pipe Dia. (in.)	2 Minimum Time (min:sec)	3 Length for Minimum Time (ft)	4 Time for Longer Length (sec)	5 Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:36	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.324 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

This Table is from UNI-B-6-90. The table is based on a Q (allowable air loss rate in test section) = 0.0015 cubic feet / minute / square feet. To shorten required test time a maximum pressure drop of 0.5 psig may be used and time requirements reduced by half.

g. .

C. Vacuum test each manhole in accordance with ASTM C1244 and the following:
   1. No personnel shall be allowed in manhole during testing.
   2. Test manhole after assembly and prior to backfilling.
   3. Plug pipes with suitably sized and rated pneumatic or mechanical pipeline plugs. Brace plugs to prevent displacement.
   4. Position vacuum test head assembly to seal against interior surface of the top of cone section in accordance with manufacturer's recommendation.
   5. Draw vacuum of 10 inches of mercury on manhole. Shut off the vacuum pump and close valve on vacuum line.
   6. Measure time for vacuum to drop to 9 inches of mercury. Manhole shall pass if time meets or exceeds the following:

Manhole I.D. (inches)	48	60	72	84	96	120	T-series
Seconds	60	75	90	105	120	150	105

   7. If manhole fails test, remove head assembly, coat interior with a soap and water solution, and repeat vacuum test for approximately 30 seconds. Leaking areas will have soapy bubbles. Make necessary repairs to the satisfaction of Engineer and repeat test until manhole passes.

3.06 CLEANING AND TV INSPECTION

A. Upon completion of other testing, clean all newly installed sewer mains. This shall include all sewer main and lateral connections. This cleaning shall meet the following requirements:
   1. The Owner's designated resident project representative shall be present throughout the cleaning operations.
   2. The sewer mains shall be cleaned with a high-velocity water jet. No debris of any kind shall be released into the sewer system.

B. Upon completion of cleaning operations, within 2 hours, Owner shall televise all newly installed sewer mains.
   1. Contractor shall coordinate cleaning and televising operations with Owner to ensure time schedules can be achieved.
   2. If televising is not properly coordinated, Owner may request Contractor to clean sewer mains again at no additional cost to the Owner.

END OF SECTION