

00 91 13.04

ADDENDUM NO. 4

DATE: April 7, 2020

FROM: Baxter & Woodman, Inc., Consulting Engineers

TO: Planholders of record for the Work titled:

VILLAGE OF HOFFMAN ESTATES, ILLINOIS
GOLF ROAD LIFT STATION REPLACEMENT

The Meeting Minutes and Attendance Sheet from the Mandatory Pre-Bid Conference on March 31, 2020 are attached.

The Bidding Documents are amended as follows:

1. DRAWINGS

- A. Delete Sheet M-1 in its entirety, and insert attached Sheet M-1, revision dated April 2, 2020 in lieu thereof.

2. SPECIFICATIONS

- A. Section 00 01 10 TABLE OF CONTENTS revise accordingly for the following:
- B. Section 01 22 29-2, MEASUREMENT AND PAYMENT, delete paragraph 1.5.A.2., and replace it with the following:

"2. The work includes applying an interior protective coating system."
- C. Section 33 39 43.51, INTERIOR STRUCTURE PROTECTION – POLYURETHANE:

Insert attached new Section 33 39 43.51, INTERIOR STRUCTURE PROTECTION – POLYURETHANE into the project manual.
- D. Section 33 39 43.52, INTERIOR STRUCTURE PROTECTION – POLYUREA:

Insert attached new Section 33 39 43.52, INTERIOR STRUCTURE PROTECTION – POLYUREA into the project manual.

Nothing in this Addendum shall be construed as changing other requirements of the Bidding Documents. Each Bidder shall acknowledge receipt of this Addendum where indicated in the Bid Form.

END OF ADDENDUM NO. 4

ADDENDUM NO. 4
00 91 13.04-1 (161150.40)

VILLAGE OF HOFFMAN ESTATES, ILLINOIS
WPLCP Loan No. L173548
Golf Road Lift Station Replacement

MANDATORY PRE-BID CONFERENCE
March 31, 2020

Skype for Business

For screen sharing and audio: <https://meet.lync.com/baxterwoodman/585smf/WCWYMFS5>

For audio only: 815-516-0257 (Dial-in Number)

Introductions:

<i>Village of Hoffman Estates:</i>	Haileng Xiao, Superintendent of Water & Sewer
<i>Village of Hoffman Estates:</i>	Jeremy Jahnke, Water Operation Supervisor
<i>Baxter & Woodman, Inc.:</i>	Shane Firsching, Project Manager

An Optional site visit to the work site may be scheduled individually with the Village.

Project Description

The project is described generally in the ADVERTISEMENT FOR BIDS, and is repeated below as part of this Pre-Bid Conference.

The proposed construction consists of replacing the existing steel can style lift station with a submersible pump lift station. The work includes temporary bypass pumping, excavation, backfill, demolition of the existing lift station, wet well rehabilitation, installation of a cast-in-place lift station with a concrete wet well and adjacent valve vault, submersible pumps and motors, piping and valves, flow meter in vault, bypass connection vault, controls in a prefabricated concrete building, emergency power generator and transfer switch, integration of the new equipment to the existing electrical service, an asphalt access driveway, site restoration, and other miscellaneous items of work.

The Engineers' Opinion of Probable Construction Cost is \$1,400,000.

Bid Receiving

Sealed proposals will be received at the Office of the Village Clerk at 1900 Hassel Road, Hoffman Estates, Illinois 60169 until 10:00 A.M., Thursday, April 23, 2020 and at that time will be publicly opened and total amount of bid proposal read aloud.

Schedule

Bids are scheduled to be received and opened April 23, 2010. The Notice to Proceed is subject to IEPA Loan approval.

Funding

The project is designated as L173548 for funding through the Illinois Environmental Protection Agency (IEPA) Water Pollution Control Loan Program (WPCLP).

All Bidders must comply with the IEPA WPCLP policy regarding the increased use of disadvantaged businesses. This policy requires all Bidders to advertise in a daily, Regional newspaper, OR the Bidders may publish the Advertisement in an established, online Bidder's Clearinghouse such as the "Dodge Report". The Advertisement must run one (1) day at least ten (10) days prior to Bid opening, **no later than Monday, April 13, 2020**. If there will be no subcontracts awarded, no advertisement is required. See loan requirements in Section 00 21 00.61 and in Sections 00 74 23.01 through 00 74 23.07, inclusive, of the Project Manual.

Compliance with American Iron and Steel is required for Loan Funding. See requirements on Page 43 of Section 00 21 00.61 and the following:

American Iron & Steel Requirement

Compliance is required with the "Use of American Iron and Steel" requirements as contained in Section 608 of the Water Resources Reform and Development Act.

A requirement of the Illinois Water Pollution Control Loan Program is the American Iron and Steel requirements for state revolving funds as contained in section 436 of H.R. 3547, Consolidated Appropriations Act (CAA), 2014. The Act was signed into law in January of 2014 as P.L. 113-76. The law requires that all iron and steel products used in a water system or treatment works project funded by a state water pollution control revolving fund are produced in the United States.

The law states that "iron and steel products" refers to the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal iron or steel castings, fire and yard hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforcing steel for reinforced precast concrete, and other construction materials."

The AIS requirements of the CAA are not the same as the Buy American provisions of ARRA.

USEPA also has provisions for Nationally Approved and Project Specific Waivers.

Information and clarification about the AIS requirements are at the USEPA website http://water.epa.gov/grants_funding/aisrequirement.cfm.

Additionally, the IEPA has required specific language related to AIS requirements be added to loan program projects. This language can be found in multiple sections of the Project manual. For example, in the WRF Improvements project, CERTIFICATE 00 62 33.13 BIDDER CERTIFICATION REGARDING THE USE OF AMERICAN IRON AND STEEL PRODUCTS is required to be submitted with the Bid.

The Project Manual also describes documentation requirements. These projects are using the step certification process recommended by USEPA. Step certification requires a certification from each handler of the product from the source iron and/or steel through manufacturing and finishing for each covered/coated item. A certification form is included in the project manuals for this purpose.

Below is the process that will be followed during construction:

- Contractor will submit a list of items subject to American Iron and Steel requirements prior to first application for payment, but no later than 7 calendar days after the date of the Pre-Construction Meeting.

- American Iron and Steel Conference with Owner and Engineer to finalize the list used to track certification submittals. An AIS Conference will be held for this project.
- Submit Preliminary Documentation with shop drawings or sixty days prior to shipment for items not requiring shop drawing submittals.
- Submit Final Documentation no later than seven calendar days prior to shipment.

Information during Bidding Period

Contractors can visit the work site during normal working hours (8:00 a.m. to 2:00 p.m.) Monday through Friday. Contact Jeremy Jahnke, Water Operation Supervisor at (847) 781-2703 to make arrangements. Please give 24 hours notice.

All pertinent documents may be examined at the Office of the Village Clerk at 1900 Hassel Road, Hoffman Estates, Illinois 60169 or online at bhfxplanroom.com. Documents can be purchased **only** through BHFx Digital Imaging at bhfxplanoom.com.

Questions during the bidding phase should be directed to the project engineer – Shane Firsching, Baxter & Woodman, Inc., 815.444.3395, sfirsching@baxterwoodman.com.

Plan holders are reminded the Project Manual for the project stipulates all questions and requests for information must be submitted at least five (5) business days before the bid opening to provide sufficient time to inform all bidders of the information. The bid opening is on Thursday, April 23, 2020, so questions must be received no later than noon on Thursday, April 16, 2020. Questions received after April 16, 2020 may not be answered. Only questions answered by formal written Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect.

Contractor Registration with Village

Contractor and their Subcontractors are required to register with the Village only **after** a Contract has been awarded for the project.

All Contractors and Subcontractors doing work for the Village of Hoffman Estates are required to first obtain a registration certificate from the Village. The fee for the registration certificate is \$100.00, and the certificate is valid for one year. The Contractor and Subcontractors are required to maintain a valid registration certificate throughout the duration of their Work. Registration certificate forms can be obtained at Village Hall. More information can be found at the following website:

<https://www.hoffmanestates.org/home/showdocument?id=18971>

Other Specifications of Special Note (required by the Village, not WPCLP funding)

Submittal Exchange

Electronic submittals are required to be made through Submittal Exchange as described in Paragraph 3.3 of Section 01 33 01. Submittal Exchange is a website designed specifically for transmitting submittals between construction team members. Baxter & Woodman will set up and define the requirements of the Project to be submitted, transmitted, and maintained through Submittal Exchange. Training is available from Submittal Exchange regarding use of the website and PDF submittals.

Warranty

The contract documents are written with the specific intention that the project as a whole is warranted for a period of 3 years after the date of acceptance of the Work and final payment by Owner. Therefore, the Project Manual includes language (Section 00 73 00.61, paragraph 1.6.D.1. – 6.19A) stating:

Contractor shall execute and deliver to Owner, before the final payment will be issued, a written warranty that guarantees that all work is in accordance with the Contract Documents and will not be defective. This warranty shall guarantee all work for a period of three years from the date of acceptance of the Work and final payment by Owner, except for equipment, motors, electrical controls, and other mechanical devices, which shall be guaranteed for a period of two years from the date of acceptance of the Work and final payment by Owner unless a different guarantee period of time is specified under other parts of the Contract Documents.

Deducts

IEPA loan funding will not reimburse for spare parts, extra materials, or extended warranties. The Bid Form includes a requirement for the bidder to provide deducts for the cost of these items. This will allow the construction loan manager to indicate the correct reimbursement amount to IEPA.

PROJECT SPECIFIC INFORMATION

A list of items that must be submitted with the Bid can be found in Section 00 43 93.61 BID SUBMITTAL CHECKLIST.

Bids are to be submitted as required in Section 00 41 00.61 BID FORM. This project will be awarded on the basis of the total summed amount of each Pay item quantity times the unit price for that Pay Item, without consideration of deduct prices provided in the BID FORM.

Contract Times

Contract Times are listed on the BID FORM, Section 00 41 00.61, paragraph 5. The work will be Substantially Complete in 270 calendar days and completed and ready for final payment in 310 calendar days after the Contract Time has begun.

Liquidated damages are listed in the SUPPLEMENTARY CONDITIONS, Section 00 73 00.61. Paragraph 1.19 includes the addition of 12.06 Liquidated Damages. Contractor shall pay Owner as liquidated damages for delay (but not as a penalty) \$1,200 for each day that expires after the time specified in the BID FORM for Substantial Completion until the Work is substantially complete. Contractor shall pay Owner \$600 for each day that expires after the time specified in the BID FORM for completion and readiness for final payment.

Bidder Requirements

Bidders are instructed that the apparent low Bidder, or any other Bidder so requested, shall submit to the office of Engineer within five (5) days after the receipt of Bids a list of the names of Bidder's proposed subcontractors whose portion of the Work exceeds \$10,000, along with a description of the Work to be performed by each.

Permits

Obtain a building permit from the Village for the Controls Building.
Comply with IDOT permitting requirements as described in Section 01 41 26.

Facility Start-up

The Facility Startup specification Section 01 91 58 provides requirements for submitting detailed plans and schedule for startup, scheduling pre-startup conference, specific process startups requirements and required steps for substantial completion.

Testing

Section 01 45 29 TESTING LABORATORY SERVICES states the Contractor is to provide an independent testing laboratory service. Contractor needs to include within the Contract Unit Prices amounts sufficient to cover all testing required of the Contractor under pertinent Sections of the Specifications.

Miscellaneous

- The Contractor should pay attention to Section 01 22 29 Measurement and Payment for a description of the various pay items and what is included in each pay item.

Recap / Concluding Remarks

Addendum No. 4:

- Minutes from this meeting, including questions and answers; and questions and answers from the optional site visit will be included.

Additional Addenda might be required to address questions from Bidders/Vendors.

An optional site visit at the work site located at 1513 Golf Road, Hoffman Estates, Illinois may be scheduled individually with the Village.

Questions

1. Can contractors visit the site without contacting the Village?
 - a. *Yes, but you won't have access inside the fence which means no access to the dry well, wet well, control cabinet, and generator.*
2. What business certifications need to be provided?
 - a. *Section 00 43 93.61 BID SUBMITTTAL CHECKLIST includes all the certifications required for the bid proposal.*
3. Is there rehabilitation work to the steel structure?
 - a. *There is no rehabilitation work to the existing steel structure. The existing concrete wet well and new wet well will receive a protective coating.*
4. What are the dry weather and wet weather flow rates to the lift station?
 - a. *Dry weather: 1,000 – 1,200 gpm*
 - b. *Wet weather: 5,000 gpm*



PRE-BID CONFERENCE SIGN-IN SHEET

PROJECT: Village of Hoffman Estates – Golf Road Lift Station Replacement

DATE: Tuesday, March 31, 2020

TIME: 10:00 a.m.

LOCATION: Skype for Business Conference Call

Name	Representing	Phone Number	Email Address
Haileng Xiao, Supt. of Water & Sewer	Village of Hoffman Estates	847-781-2703	haileng.xiao@hoffmanestates.org
Jeremy Jahnke, Water Operation Supervisor	Village of Hoffman Estates	847-490-6800	jeremy.jahnke@hoffmanestates.org
Shane Firsching	Baxter & Woodman	815-444-3395	sfirsching@baxterwoodman.com
George Ismail	Martam Construction Inc.	847-608-6800	George@martam.com
Tyler Walker	DiMeo Brothers Inc.	847-640-2240	john@dimeobros.com
William Rausch	Rausch Infrastructure LLC	708-667-0165	wmrausch@riccllc.com
Joseph Magnani	MAG Construction Company	847-432-7783	joe@mag-construction.com

CONSULTANTS

MILESTONE

FOR BIDDING

NO.	DATE	DESCRIPTION
1	4/2/2020	ADDENDUM NO. 4

*** REFER TO EQUIPMENT MANUFACTURER'S SHOP DRAWING ***

PLAN SHEET DESIGNATION

- C - COVER
- G - GENERAL
- H - HAZARDOUS MATERIALS
- C - CIVIL
- L - LANDSCAPE
- S - STRUCTURAL
- A - ARCHITECTURAL
- I - INSTRUMENTATION
- O - EQUIPMENT
- F - FIRE PROTECTION
- P - PLUMBING
- M - MECHANICAL
- E - ELECTRICAL
- T - TELECOMMUNICATIONS
- R - RESOURCE

PROJECT NO: 161150

SCALE: AS NOTED
DATE: 03-04-2020
DESIGNED BY: SMF
DRAWN BY: RGE
CHECKED BY: SMV

CLIENT

**VILLAGE OF
HOFFMAN ESTATES, ILLINOIS**

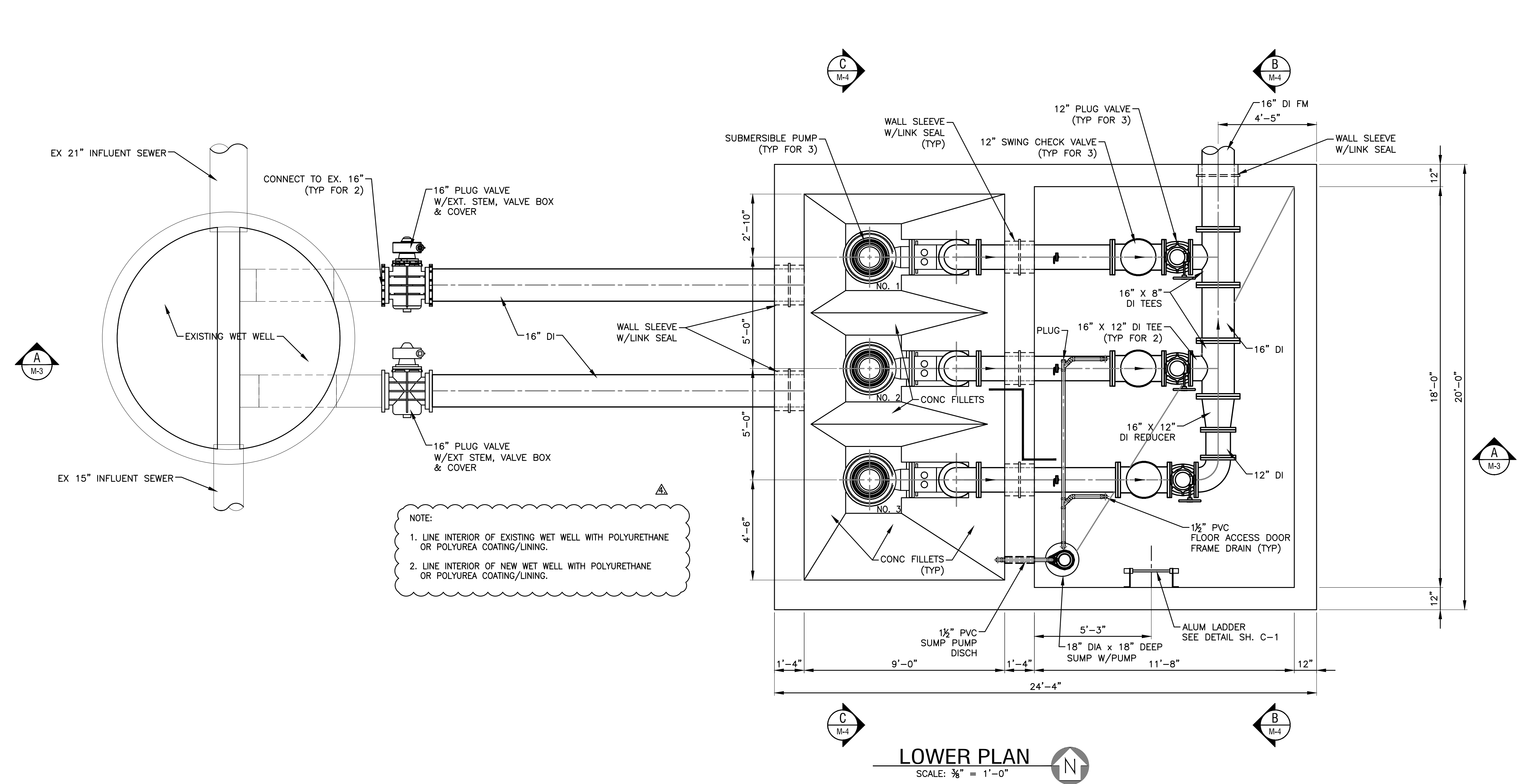
**SANITARY SEWER SYSTEM
IMPROVEMENTS**

**GOLF ROAD LIFT STATION
REPLACEMENT**

SHEET TITLE

LOWER PLAN

M-1



NOTE:
1. LINE INTERIOR OF EXISTING WET WELL WITH POLYURETHANE OR POLYUREA COATING/LINING.
2. LINE INTERIOR OF NEW WET WELL WITH POLYURETHANE OR POLYUREA COATING/LINING.

LOWER PLAN
SCALE: 3/8" = 1'-0"

I:\CRYSTAL LAKE\HOFFMAN\161150-GOLF ROAD LIFT STATION\SHEETS\MECHANICAL\M-1 LOWER PLAN.DWG M-1 LOWER PLAN
Plotted: 04/2/2020 By: 078MSB
Copyright © 2018, By: Baxter & Woodman, Inc.
State of Illinois - Professional Design Firm
License No. - 184-001121 - Expires 4-30-19

SECTION 33 39 43.51

INTERIOR STRUCTURE PROTECTION - POLYURETHANE

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide dry well rehabilitation as shown and noted on the Drawings, as specified herein, and as needed for a complete and proper installation, and in accordance with the latest revision of the "Standard Specifications for Water and Sewer Construction in Illinois", except as revised herein.
- B. This specification covers work, materials and equipment required for protecting the concrete wet well by monolithic spray-application of a fast setting, high-build, elastomeric, and solvent-free polyurethane coating; to provide corrosion protection as required.
 - 1. Procedures for surface preparation, cleaning, application, and testing are described herein.
- C. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
- D. References:
 - 1. ASTM D638 – Tensile Strength, psi
 - 2. ASTM D638 – Elongation %
 - 3. ASTM D624 – Tear Strength, force per unit thickness
 - 4. ASTM E96 – Water Permeation g/day/m²
 - 5. ASTM D4060 – Abrasion, mg loss/1,000 cycles
 - 6. ASTM D7234 (Concrete) - Pull-off Strength of Coatings Using a Portable Adhesion Tester
 - 7. ASTM D4541 (Steel)
 - 8. ASTM D2584 - Volatile Matter Content
 - 9. ASTM D6866 – Biobased Content
 - 10. ASTM D2240 - Durometer Hardness, Shore D
 - 11. ASTM C109 - Compressive Strength Hydraulic Cement Mortars.
 - 12. ACI 506.2-77 - Specifications for Materials, Proportioning, and Application of Shotcrete.
 - 13. ASTM C579 - Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars.
 - 14. ASTM - The published standards of the American Society for Testing and Materials.
 - 15. SSPC - The published standards of the Society of Protective Coatings.
 - 16. NACE - The published standards of National Association of Corrosion Engineers (NACE International).

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Technical data sheet on each product used, including ASTM test results indicating the product is suitable for its intended use per these specifications.
 - 2. Material Safety Data Sheets (MSDS) for each product used.
 - 3. ASTM References.
 - 4. Descriptive literature including manufacturer's recommended installation procedures and surface preparation requirements.
 - 5. Project specific guidelines and recommendations.
 - 6. Work procedures including flow diversion plan, and method of repair.
 - 7. Qualification of Applicator:
 - a. Manufacturer certification that applicator has been trained and approved in the handling, mixing, and application of the products to be used.
 - (1) Certification letter shall be dated within six months of bid date.
 - b. Certification that the equipment to be used for applying the product has been manufactured or approved by the protective coating manufacturer and the applicator personnel have been trained and certified for the proper use of the equipment.
 - c. Five (5) recent references of applicator indicating successful application of intended product(s).
 - d. Proof of any necessary federal, state, or local permits or licenses necessary to complete the project.
 - 8. Design details for any additional ancillary systems and equipment to be used in site and surface preparation, application, and testing.
 - 9. Submit all drawings, technical information, and shop drawings to Engineer at least 10 working days prior to, and receive approval of same prior to ordering any interior structure protection materials.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Spare Parts – None Required.
- E. Comply with pertinent provisions of Section 01 33 01.

1.3 QUALITY ASSURANCE

- A. Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM, NACE, and SSPC standards and the protective coating manufacturer's recommendations.
- B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

- C. Corrosion materials/products shall be suitable for installation in a severe hydrogen sulfide environment without any deterioration to the liner.
- D. Use only approved equipment designed and manufactured by the material supplier specifically for the application of the coating system in sanitary systems.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Materials are to be kept dry, protected from weather and stored under cover.
- B. Protective coating materials are to be stored between 50° F and 90° F.
 - 1. Do not store near flame, heat or strong oxidants.
- C. Protective coating materials are to be handled according to their material safety data sheets.

1.5 SITE CONDITIONS

- A. Applicator shall conform with all local, state and federal regulations including those set forth by OSHA, RCRA, and the EPA and any other applicable authorities.
- B. Procedures shall be provided by Contractor for flow diversion or bypass pumping to allow Applicator to perform the specified work.

1.6 MAINTENANCE – Reserved.

1.7 WARRANTY

- A. Applicator shall warrant all work against defects in materials and workmanship for a period of three (3) years, from the date of final acceptance of the project.
- B. Applicator shall, within a reasonable time after receipt of written notice, repair defects in materials or workmanship which may develop during said warranty period, and any damage to other work caused by such defects or the repairing of same, at Applicator's expense and without cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide prepackaged materials that are designed, manufactured, and intended for existing concrete rehabilitation and the specific application in which they are used.
 - 1. Properly clean and prepare all surfaces as specified and required for the application of the intended products.
 - 2. Stop all active points of infiltration using chemical grout as specified prior to applying the liner system.

2.2 INTERIOR STRUCTURE SEALING

- A. Minor Infiltration Control Material:
1. Use a rapid setting cementitious product to stop minor water infiltration with the following minimum requirements:
 - a. Compressive strength (ASTM C 109): 1,000 psi, 1 hr.; 2,500 psi, 24 hrs.
 - b. Set time: <1.0 minute.
 2. Acceptable manufacturers/products:
 - a. Strong-Seal Corp., Strong-Plug.
 - b. Sauereisen, Instaplug No. F-180.
 - c. Or equal.
- B. Heavy Infiltration Control Material:
1. Use a quick setting, one or two component, expanding chemical grout.
 2. Acceptable manufacturers/products:
 - a. Spetec N450.
 - b. Avanti AV-280 Hydrofoam.
 - c. Or equal.
- C. Topcoating Material:
1. Factory blended, rapid setting, high early strength, non-shrink cementitious or epoxy repair mortar that can be troweled or pneumatically spray applied.
 - a. Must be compatible with proposed protective coating/lining material.

2.3 PROTECTIVE COATING (LINING) MATERIAL

- A. General:
1. The solvent-free, 100% Solids, biobased resin material shall be used to form a corrosion protective monolithic liner covering all interior surfaces of the structure.
 2. Material must be fast setting with a return to service time within one hour of completion.
- B. Properties:
- | | | |
|--|------------|-----------------------------------|
| 1. Tensile strength | ASTM D638 | >2,900 psi |
| 2. Tear Strength | ASTM D624 | 593 pli |
| 3. Bond (Concrete) | ASTM D7234 | > 200 psi
or Substrate Failure |
| 4. Water Permeation g/day/m ² | ASTM E96 | 1.49 |
| 5. Elongation | ASTM D638 | 43% |
| 6. Hardness, Shore D | ASTM D2240 | 62-68 |
| 7. Abrasion, mg loss/1000 cycles | ASTM D4060 | 42 mg loss |
| 8. Density, lbs./ft ³ | ASTM D792 | 67.5 lbs./ft ³ |
| 9. Biobased Content | ASTM D6866 | 34 % |
- C. Applied thickness:
1. Lining shall be installed to a thickness necessary to qualify as a monolithic (void free) liner.

2. Roughness of the substrate will dictate the thickness needed to create the monolithic liner and eliminate any opportunity for voids in the lining.
 3. The minimum value for coating thickness for corrosion protection shall be 125 mils.
- D. Acceptable manufacturer:
1. Sprayroq, Inc. – SprayShield Green II.
 2. Or approved equal.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed.
1. Correct conditions detrimental to timely and proper completion of the Work.
 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 FIELD MEASUREMENTS AND INSPECTIONS

- A. Make necessary inspections and measurements in the field to assure application methods and materials are in accordance with these Specifications and manufacturers recommendations.
- B. Comply with all local, state, and federal regulatory agency requirements regarding environment, health, and safety.

3.3 SURFACE PREPARATION

- A. Remove all loose material from manhole wall and bench using a high pressure water spray.
1. Minimum water pressure: 3,000 psi.
 2. Remove loose and protruding mortar and concrete.
 3. Remove oil, grease, roots, or other contaminants that may inhibit bonding of the rehabilitation materials.
 4. Fill voids and active leaks on the fillet and pipe seals as necessary with patching mix as recommended by the manufacturer.
 5. If required, drill and pressure grout large leaks as recommended by the manufacturer.

3.4 STRUCTURE SEALING AND LINING

- A. See Notes on Sheet M-1 of Drawings regarding video recording of conditions in wet well prior to work inside wet well and after coating/lining has been completed.
- B. Repair mortar applicators shall be trained to properly apply the cementitious mortar according to manufacturer's recommendations.

- C. Protective coating (lining) must be applied by a Certified Applicator of the protective coating (lining) manufacturer and according to manufacturer's requirements and specifications.
- D. All leaks shall be plugged and/or grouted, and all sewage flows shall be stopped, prior to preparation for topcoating and coating/lining work on interior surfaces of the wet well structure.
- E. Pump discharge elbows, pump discharge piping, valve vault sump pump discharge piping, and concrete fillets shall be installed prior to coating/lining of wet well.
- F. Cover pumps, motors, power and control cables, guide rails, and pump receiving flange on discharge elbow to prevent coating/lining application on this equipment.
 - 1. If this equipment is installed after the coating/lining, protect the coating/lining from damage with mats, pads, etc.
- G. Surfaces to be coated/lined include:
 - 1. Bottom and new fillets of wet well.
 - 2. Wet well walls, including new pipe penetrations and intermediate pipe support connections to wall.
 - 3. Underside of new wet well flat slab top. (Coated/lined prior to installation on the existing wet well walls).
 - a. Protect access hatch from spray application of coating/lining.
- H. Conform to the recommendations of the manufacturer, including materials handling, mixing, environmental controls during application, safety, and spray equipment.
 - 1. A representative of the lining materials manufacturing company shall be on-site the day of lining application.
 - 2. Use spray equipment specifically designed for the liner system.
 - 3. Installation of the protective coating/lining shall not commence until the wet well walls are dry to the touch.
 - 4. Temperature of the surface to be coated should be maintained between 55° F and 110° F during application.
 - a. Prior to and during application, care should be taken to avoid exposure of direct sunlight or other intense heat source to the structure being coated/lined.
 - 5. Affix a permanent identification of the date of work performed to the structure in a readily visible location.
 - 6. Provide a final written report to the Owner detailing the date of work, description of repairs, and coating/lining application.

3.5 INSPECTION

- A. Liner thickness shall be the minimum value specified, and shall be confirmed during the Adhesion Testing described below.
- B. Final liner system shall be completely free of pinholes or voids as evidenced by High Voltage Spark Testing.

1. After the protective coating has set hard to the touch it shall be inspected with high-voltage spark testing (holiday detection) equipment and procedures.
 2. Surface shall first be dried, an induced holiday shall then be made on to the coated concrete surface and shall serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that particular area.
 3. The spark tester shall be initially set at 100 volts per 1 mil of film thickness applied, but may be adjusted as necessary to detect the induced holiday (refer to NACE RPO188-99).
 4. All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method.
 - a. After abrading and cleaning, additional protective coating material can be hand applied to the repair area.
 - b. All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.
- C. Final liner system shall be properly installed to adhere to the concrete substrate of the wet well wall as evidenced by Adhesion Testing.
1. Adhesion (pull) testing shall be conducted after the coating/lining system has cured per manufacturer instructions and in accordance with ASTM 7234 (Concrete).
 2. Adhesion tests shall be performed on a minimum of three areas of the structure – in the upper 1/3, at the mid-section, and in the lower 1/3 of the wet well wall.
 3. A minimum of one ¾" dolly shall be affixed to the lined surface at each testing location.
 - a. The adhesive used to attach the dollies to the liner shall be rapid setting with a tensile strength in excess of the liner material and permitted to cure in accordance with manufacturer recommendations.
 - b. The lining material and dollies shall be adequately prepared to receive the adhesive.
 4. Prior to pull test, the Contractor shall utilize a scoring device to cut through the coating until the substrate is reached.
 - a. Extreme care shall be required while scoring to prevent micro-cracking in the coating.
 - b. Failure due to improper dolly adhesive or scoring shall require retesting.
 5. The pull test in each area shall meet or exceed 200 psi and shall include subbase adhered to the back of the dolly or no visual signs of coating material in the test hole.
 6. Pull tests with results between a minimum 150 psi and 200 psi shall be acceptable if more than 50% of the subsurface is adhered to the back of the dolly.
 7. If any test fails, a minimum of three additional re-test locations in the same section of the wet well shall be tested, as directed by the Engineer.
 8. If any of the retests fail, all loosely adhered or unadhered liner in the failed area, as determined by the Engineer, shall be removed and replaced at the Applicator's expense.

- D. Visual inspection will be performed by the Owner and Engineer and the coating/lining manufacturer's representative.
 - 1. Any deficiencies in the finished liner system shall be marked and repaired according to the procedures of the manufacturer.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Measurement will not be made for the mobilization/demobilization required for the work of this Section and for the coating/lining work specified in this Section.
- B. Due to unknown conditions within the wet well, measurement will be made for preparation work and materials as follows:
 - a. Repair and substrate preparation crew time; per day
 - b. Chemical Grout for stopping leaks; per gallon
 - c. Cementitious Grout or Mortar (40 pound bag) per bag

4.2 PAYMENT

- A. This payment will include all the labor, materials, and any equipment required to complete the work.
- B. Payment for work specified in this Section will be made at the Contract Unit Lump Sum Price for the listed Items, in the Schedule of Prices:

33 39 43.51/01;	Mobilization/Demobilization	
33 39 43.51/02;	Coating/Lining Work inside Wet Well	
- C. Payment for work specified in this Section will be made at the Contract Unit Prices for the following listed Items, in the Schedule of Prices:

33 39 43.51/03;	Repair and Substrate Preparation	- day
33 39 43.51/04;	Chemical Grout	- gallon
33 39 43.51/05;	Cementitious Grout or Mortar	- bag
- D. Payment will not be made for any other items except as listed above. All other costs associated with such work shall be considered incidental and shall be included in the prices bid for various items to which they pertain in the Schedule of Prices.

END OF SECTION

SECTION 33 39 43.52

INTERIOR STRUCTURE PROTECTION - POLYUREA

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide wet well rehabilitation as shown and noted on the Drawings, as specified herein, and as needed for a complete and proper installation, and in accordance with the latest revision of the "Standard Specifications for Water and Sewer Construction in Illinois", except as revised herein.
- B. This specification covers work, materials and equipment required for protecting the concrete wet well by monolithic spray-application of a fast setting, high-build, two component, elastomeric, 100% solids, and solvent-free polyurea coating; to provide corrosion protection as required.
 - 1. Procedures for surface preparation, cleaning, application, and testing are described herein, and on the Drawings.
- C. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
- D. References:
 - 1. ASTM D638 – Tensile Strength, psi
 - 2. ASTM D638 – Elongation %
 - 3. ASTM D624 – Tear Strength, force per unit thickness
 - 4. ASTM E96 – Water Permeation g/day/m²
 - 5. ASTM D4060 – Abrasion, mg loss/1,000 cycles
 - 6. ASTM D7234 (Concrete) - Pull-off Strength of Coatings Using a Portable Adhesion Tester
 - 7. ASTM D4541 (Steel)
 - 8. ASTM D2584 - Volatile Matter Content
 - 9. ASTM D6866 – Biobased Content
 - 10. ASTM D2240 - Durometer Hardness, Shore D
 - 11. ASTM C109 - Compressive Strength Hydraulic Cement Mortars.
 - 12. ASTM D412 – Test Methods for Thermoplastic Elastomers - Tension
 - 13. ASTM C579 - Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars.
 - 14. ASTM - The published standards of the American Society for Testing and Materials.
 - 15. SSPC - The published standards of the Society of Protective Coatings.
 - 16. NACE - The published standards of National Association of Corrosion Engineers (NACE International).

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Technical data sheet on each product used, including ASTM test results indicating the product is suitable for its intended use per these specifications.
 - 2. Material Safety Data Sheets (MSDS) for each product used.
 - 3. ASTM References.
 - 4. Descriptive literature including manufacturer's recommended installation procedures and surface preparation requirements.
 - 5. Project specific guidelines and recommendations.
 - 6. Work procedures including flow diversion plan, and method of repair.
 - 7. Qualification of Applicator:
 - a. Manufacturer certification that applicator has been trained and approved in the handling, mixing, and application of the products to be used.
 - (1) Certification letter shall be dated within six months of bid date.
 - b. Certification that the equipment to be used for applying the product has been manufactured or approved by the protective coating manufacturer and the applicator personnel have been trained and certified for the proper use of the equipment.
 - c. Five (5) recent references of applicator indicating successful application of intended product(s).
 - d. Proof of any necessary federal, state, or local permits or licenses necessary to complete the project.
 - 8. Design details for any additional ancillary systems and equipment to be used in site and surface preparation, application, and testing.
 - 9. Submit all drawings, technical information, and shop drawings to Engineer at least 10 working days prior to, and receive approval of same prior to ordering any interior structure protection materials.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Spare Parts – None Required.
- E. Comply with pertinent provisions of Section 01 33 00.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications shall include a manufacturer with a minimum of three years' experience providing polyurea base sealants and coatings.
 - 1. The manufacturer shall be a primary blender of pure polyurea products with proprietary formulations, and shall maintain a Certified Applicator program, and have capacity to provide field technical services as required.

- B. Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM, NACE, and SSPC standards and the protective coating manufacturer's recommendations.
- C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- D. Corrosion materials/products shall be suitable for installation in a severe hydrogen sulfide environment without any deterioration to the liner.
- E. Use only approved equipment designed and manufactured by the material supplier specifically for the application of the coating system in sanitary systems.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Materials are to be kept dry, protected from weather, and stored under cover.
- B. Protective coating materials are to be stored between 50° F and 90° F.
 - 1. Do not store near flame, heat or strong oxidants.
- C. Protective coating materials are to be handled according to their material safety data sheets.

1.5 SITE CONDITIONS

- A. Applicator shall conform with all local, state and federal regulations including those set forth by OSHA, RCRA, and the EPA and any other applicable authorities.
- B. Procedures shall be provided by Contractor for flow diversion or bypass pumping to allow Applicator to perform the specified work.
- C. Concrete substrate moisture shall be <5% at the surface.
- D. Provide ventilation and illumination as required for proper installation and application of the coating material.
 - 1. Verify no personal property or materials to be used in the project are within the spray fly pattern during application of the coating material.

1.6 MAINTENANCE – Reserved.

1.7 WARRANTY

- A. Applicator shall warrant all work against defects in materials and workmanship for a period of three (3) years, from the date of final acceptance of the project.

- B. Applicator shall, within a reasonable time after receipt of written notice, repair defects in materials or workmanship which may develop during said three year warranty period, and any damage to other work caused by such defects or the repairing of same, at Applicator's expense and without cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide prepackaged materials that are designed, manufactured, and intended for existing concrete rehabilitation and coating, and the specific application in which they are used.
1. Properly clean and prepare all surfaces as specified and required for the application of the intended products.
 2. Stop all active points of infiltration using chemical grout as specified prior to applying the liner system.

2.2 INTERIOR STRUCTURE SEALING

- A. Minor Infiltration Control Material:
1. Use a rapid setting cementitious product to stop minor water infiltration with the following minimum requirements:
 - a. Compressive strength (ASTM C 109): 1,000 psi, 1 hr.; 2,500 psi, 24 hrs.
 - b. Set time: <1.0 minute.
 2. Acceptable manufacturers/products:
 - a. Strong-Seal Corp., Strong-Plug.
 - b. Sauereisen, Instaplug No. F-180.
 - c. Or equal.
- B. Heavy Infiltration Control Material:
1. Use a quick setting, one or two component, expanding chemical grout.
 2. Acceptable manufacturers/products:
 - a. Spetec N450.
 - b. Avanti AV-280 Hydrofoam.
 - c. Or equal.
- C. Topcoating Material:
1. Factory blended, rapid setting, high early strength, non-shrink cementitious or epoxy repair mortar that can be troweled or pneumatically spray applied.
 - a. Must be compatible with proposed protective coating/lining material.

2.3 PROTECTIVE COATING (LINING) MATERIAL

A. General:

1. The solvent-free, 100% Solids, polyurea material shall be used to form a corrosion protective monolithic liner covering all interior surfaces of the structure.
2. Material must be fast setting with a return to service time within one hour of completion.

B. Materials:

1. Primer: Chemprime 3558, two-component epoxy primer for use on concrete substrates.
 - a. Apply at 3 to 6 mils and directed by manufacturer's technical data.
2. Coating/Liner: Chemline ARC rapid curing polyurea consisting of a plural component spray.

C. Properties:

- | | | |
|--------------------------|------------|-----------------------------------|
| 1. Tensile strength | ASTM D638 | >3,850 psi |
| 2. Tear Strength | ASTM D624 | 570 pli |
| 3. Bond (Concrete) | ASTM D7234 | > 200 psi
or Substrate Failure |
| 4. Elongation | ASTM D638 | 425% |
| 5. Hardness, Shore D | ASTM D2240 | 52 |
| 6. Modulus of Elasticity | ASTM D412 | 2,000 psi |

D. Applied thickness:

1. Lining shall be installed to a thickness necessary to qualify as a monolithic (void free) liner.
2. Roughness of the substrate will dictate the thickness needed to create the monolithic liner and eliminate any opportunity for voids in the lining.
3. The minimum value for coating thickness for corrosion protection shall be **125 mils**.

E. Acceptable manufacturer:

1. Chemline Inc., Chemline Polyurea Liner. Phone: 314-664-2230
2. Or approved equal.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed.

1. Correct conditions detrimental to timely and proper completion of the Work.
2. Do not proceed until unsatisfactory conditions are corrected.

3.2 FIELD MEASUREMENTS AND INSPECTIONS

- A. Make necessary inspections and measurements in the field to assure application methods and materials are in accordance with these Specifications and manufacturers recommendations.
- B. Comply with all local, state, and federal regulatory agency requirements regarding environment, health, and safety.

3.3 SURFACE PREPARATION

- A. Remove all loose material from manhole wall and bench using a high pressure water spray.
 - 1. Minimum water pressure: 3,000 psi.
 - 2. Remove loose and protruding mortar and concrete.
 - 3. Remove oil, grease, roots, or other contaminants that may inhibit bonding of the rehabilitation materials.
 - 4. Fill voids and active leaks on the fillet and pipe seals as necessary with patching mix as recommended by the manufacturer.
 - 5. If required, drill and pressure grout large leaks as recommended by the manufacturer.

3.4 STRUCTURE SEALING AND LINING

- A. See Notes on Sheet M-1 of Drawings regarding video recording of conditions in wet well prior to work inside wet well and after coating/lining has been completed.
- B. Repair mortar applicators shall be trained to properly apply the cementitious mortar according to manufacturer's recommendations.
- C. Protective coating (lining) must be applied by a Certified Applicator of the protective coating (lining) manufacturer and according to manufacturer's requirements and specifications.
- D. All leaks shall be plugged and/or grouted, and all sewage flows shall be stopped, prior to preparation for topcoating and coating/lining work on interior surfaces of the wet well structure.
- E. Pump discharge elbows, pump discharge piping, valve vault sump pump discharge piping, and concrete fillets shall be installed prior to coating/lining of wet well.
- F. Cover pumps, motors, power and control cables, guide rails, and pump receiving flange on discharge elbow to prevent coating/lining application on this equipment.
 - 1. If this equipment is installed after the coating/lining, protect the coating/lining from damage with mats, pads, etc.
- G. Surfaces to be coated/lined include:
 - 1. Bottom and new fillets of wet well.

2. Wet well walls, including new pipe penetrations and intermediate pipe support connections to wall.
 3. Underside of new wet well flat slab top. (Coated/lined prior to installation on the existing wet well walls).
 - a. Protect access hatch from spray application of coating/lining.
- H. Conform to the recommendations of the manufacturer, including materials handling, mixing, environmental controls during application, safety, and spray equipment.
1. A representative of the lining materials manufacturing company shall be on-site the day of lining application.
 2. Use spray equipment specifically designed for the liner system.
 3. Installation of the protective coating/lining shall not commence until the wet well walls are dry to the touch.
 4. Temperature of the surface to be coated should be maintained between 55° F and 80° F during application.
 - a. Prior to and during application, care should be taken to avoid exposure of direct sunlight or other intense heat source to the structure being coated/lined.
 5. Affix a permanent identification of the date of work performed to the structure in a readily visible location.
 6. Provide a final written report to the Owner detailing the date of work, description of repairs, and coating/lining application.

3.5 INSPECTION

- A. Liner thickness shall be the minimum value specified, and shall be confirmed during the Adhesion Testing described below.
- B. Final liner system shall be completely free of pinholes or voids as evidenced by High Voltage Spark Testing.
 1. After the protective coating has set hard to the touch it shall be inspected with high-voltage spark testing (holiday detection) equipment and procedures.
 2. Surface shall first be dried, an induced holiday shall then be made on to the coated concrete surface and shall serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that particular area.
 3. The spark tester shall be initially set at 100 volts per 1 mil of film thickness applied, but may be adjusted as necessary to detect the induced holiday (refer to NACE RPO188-99).
 4. All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method.
 - a. After abrading and cleaning, additional protective coating material can be hand applied to the repair area.
 - b. All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.

- C. Final liner system shall be properly installed to adhere to the concrete substrate of the wet well wall as evidenced by Adhesion Testing.
1. Adhesion (pull) testing shall be conducted after the coating/lining system has cured per manufacturer instructions and in accordance with ASTM 7234 (Concrete).
 2. Adhesion tests shall be performed on a minimum of three areas of the structure – in the upper 1/3, at the mid-section, and in the lower 1/3 of the wet well wall.
 3. A minimum of one $\frac{3}{4}$ " dolly shall be affixed to the lined surface at each testing location.
 - a. The adhesive used to attach the dollies to the liner shall be rapid setting with a tensile strength in excess of the liner material and permitted to cure in accordance with manufacturer recommendations.
 - b. The lining material and dollies shall be adequately prepared to receive the adhesive.
 4. Prior to pull test, the Contractor shall utilize a scoring device to cut through the coating until the substrate is reached.
 - a. Extreme care shall be required while scoring to prevent micro-cracking in the coating.
 - b. Failure due to improper dolly adhesive or scoring shall require retesting.
 5. The pull test in each area shall meet or exceed 200 psi and shall include subbase adhered to the back of the dolly or no visual signs of coating material in the test hole.
 6. Pull tests with results between a minimum 150 psi and 200 psi shall be acceptable if more than 50% of the subsurface is adhered to the back of the dolly.
 7. If any test fails, a minimum of three additional re-test locations in the same section of the wet well shall be tested, as directed by the Engineer.
 8. If any of the retests fail, all loosely adhered or unadhered liner in the failed area, as determined by the Engineer, shall be removed and replaced at the Applicator's expense.
- D. Visual inspection will be performed by the Owner and Engineer and the coating/lining manufacturer's representative.
1. Any deficiencies in the finished liner system shall be marked and repaired according to the procedures of the manufacturer.

END OF SECTION