CLACKAMAS
WATER ENVIRONMENT SERVICES

GREGORY L. GEIST | DIRECTOR
Water Quality Protection
Surface Water Management
Wastewater Collection & Treatment

October 26, 2023 BCC Agenda Date/Item: _____

Board of County Commissioners
Acting as the governing body of Water Environment Services
Clackamas County

Approval of a Contract with Michels Trenchless, Inc. for the Collection System Rehabilitation Project. Total value is $1,174,349.00 for 8 months. Funding through WES Sanitary Sewer Construction Fund. No County General Funds are involved.

Previous Board Action/Review	Presented at Issues – October 24, 2023		
Performance Clackamas	1. This project supports the WES Strategic Plan to provide Enterprise Resiliency, infrastructure Strategy and Performance and Operational Optimization. 2. This project supports the County's Strategic Plan of building a strong infrastructure that delivers services to customers and honors, utilizes, promotes and invest in our natural resources.		
Counsel Review	Yes	**Procurement Review**	Yes
Contact Person	Jeff Stallard	**Contact Phone**	503-278-2311

EXECUTIVE SUMMARY: Sanitary sewer pipe and manholes are subject to degraded condition through exposure to chemicals, organic growths, and soil movement. This degradation leads to defects in pipes and manholes, which can result in surface water and groundwater infiltration into the collection system. Water infiltration strains treatment capacities and increases risk of pipe failure.

WES tracks manhole and pipe condition through our asset management system called Lucity. WES has a sewer inspection program that aims to evaluate approximately 50 miles of sewer pipe annually. Staff uses specialized equipment to video the inside of sewer pipes and manholes. Any defects or condition issues found during the inspection are logged using an industry standard scoring system. The scores and video are then uploaded to Lucity for tracking, scoring, evaluation, and data storage purposes.

Each year, WES budgets to repair degraded pipe and manhole assets the greatest risk of failure. The chosen assets are further evaluated to determine the appropriate repair approach and then bundled into a repair project. This project

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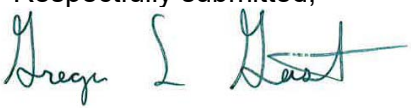
includes installation of approximately 6,800 lineal feet of pipe, as well as 4 manhole replacements.

Failure to address pipe and manhole condition issues could result in sanitary overflows from damaged or clogged pipes and increased water infiltration from structural defects.

RECOMMENDATION: Staff recommends that the Board of County Commissioners of Clackamas County, acting as the governing body of Water Environment Services, approve Contract #8572 with Michels Trenchless Inc. for the Collection System Rehabilitation Project.

Respectfully submitted,



Greg Geist
Director, WES

Attachment: Contract #8572

WATER ENVIRONMENT SERVICES
PUBLIC IMPROVEMENT CONTRACT
Contract #8572

This Public Improvement Contract (the "Contract"), is made by and between Water Environment Services, a political subdivision of the State of Oregon, ("Owner,") and **Michels Trenchless, Inc.**, (the "Contractor") both collectively the "Parties". This Contract shall become effective on the date this Contract has been signed by all the Parties and shall expire upon completion the completion of all obligations under the terms of this Contract unless terminated earlier by the Parties.

All capitalized terms in this Contract shall have the meanings identified in the Clackamas County General Conditions for Public Improvement Contracts (10/13/2021) ("General Conditions") referenced within the Instructions to Bidders.

Project Name: **BID#2023-66 2023 Collection System Rehab Project**

1. Contract Price, Contract Documents and Work.
The Contractor hereby agrees to perform all Work described in, and reasonably inferred from, the Contract Documents. In consideration of the Contractor performing the Work in accordance with the terms of the Contract, the Owner agrees to pay the Contractor the sum of **One Million One Hundred Seventy Four Thousand Three Hundred Forty-Nine Dollars ($1,174,349.00)** (the "Contract Price"). Payment will be made in accordance with the terms and conditions provided in the Contract Documents. The Contract Price is the amount contemplated by the Base Bid, as indicated in the accepted Bid.

The following documents are incorporated by reference in this Contract and made a part hereof:

- Notice of Contract Opportunity
- Supplemental Instructions to Bidders
- Bid Form
- Clackamas County General Conditions
- Prevailing Wage Rates
- Plans, Specifications and Drawings
- Instructions to Bidders
- Bid Bond
- Performance Bond and Payment Bond
- Supplemental General Conditions
- Payroll and Certified Statement Form
- Addenda 1

2. Representatives.
Contractor has named Scott Odell as its Authorized Representative to act on its behalf. Owner designates, or shall designate, its Authorized Representative as indicted below (check one):

☒ Unless otherwise specified in the Contract Documents, the Owner designates Nathan Seaver as its Authorized Representative in the administration of this Contract. The above-named individual shall be the initial point of contact for matters related to Contract performance, payment, authorization, and to carry out the responsibilities of the Owner.

☐ Name of Owner's Authorized Representative shall be submitted by Owner in a separate writing.

3. Key Persons.
The Contractor's personnel identified below shall be considered Key Persons and shall not be replaced during the project without the written permission of Owner, which shall not be unreasonably withheld. If the Contractor intends to substitute personnel, a request must be given to Owner at least 30 days prior to the intended time of substitution. When replacements have been approved by Owner, the Contractor shall provide a transition period of at least 10 working days during which the original and replacement personnel shall be working on the project concurrently. Once a replacement for any of these staff members is authorized, further

replacement shall not occur without the written permission of Owner. The Contractor's project staff shall consist of the following personnel:

Project Executive: Scott Odell shall be the Contractor's project executive, and will provide oversight and guidance throughout the project term.

Project Manager: Ryan McGraw shall be the Contractor's project manager and will participate in all meetings throughout the project term.

Job Superintendent: Nate Rodriguez shall be the Contractor's on-site job superintendent throughout the project term.

Project Engineer: Sam Zandofsky shall be the Contractor's project engineer, providing assistance to the project manager, and subcontractor and supplier coordination throughout the project term.

4. Contract Dates.
The Contractor agrees to complete the Work in accordance with the following key dates:

COMMENCEMENT DATE: Upon Issuance of Notice to Proceed
SUBSTANTIAL COMPLETION DATE: 210 days from issuance of NTP
FINAL COMPLETION DATE: 240 days from issuance of NTP

Time is of the essence for this Contract. It is imperative that the Work in this Contract reach Substantial Completion and Final Completion by the above specified dates.

5. Liquidated Damages
The Owner and the Contractor acknowledge and agree that if the Contractor fails to reach Substantial Completion of the entire Work by the Substantial Completion Date identified in Section 4 above, the Owner will suffer damages, which are both extremely difficult and impracticable to ascertain, and on that basis agree to the assessment by Owner of liquidated damages as provided in this Section. These damages may include, but are not limited to, use of the Project, costs associated with Contract administration, and use of temporary facilities. The liquidated damages amount is not a penalty, but a reasonable estimate of the amount of losses the Owner will suffer. The Owner may deduct such liquidated damages as are payable under this Section 11 from money due or to become due to the Contractor, or pursue any other legal remedy to collect such liquidated damages from the Contractor and/or its Surety.

If the Contractor fails to achieve Substantial Completion of the entire Work by the Substantial Completion Date identified in Section 4, the Contractor shall pay the Owner as liquidated damages the amount of **$1,100 for each day** occurring after the expiration of the date for Substantial Completion until the Contractor achieves Substantial Completion of the entire Work.

6. Change Order Authorization.
Throughout the performance of the Work under this Agreement, the Owner's Authorized Representative is hereby granted the authority to verbally authorize change orders in the field for an amount up to $10,000. As soon as possible following the authorization, the Owner's Authorized Representative shall complete the change order form provided by Clackamas County Procurement ("Procurement"), obtain the signature of Owner's Director or other authorized signatory, and submit the form to Procurement for processing. As soon as the Director signs off on the change order form, the Authorized Representative may then authorize another change order in the future for up to $10,000 following the same procedure above. Each change order should include the cumulative cost of the entire change and may not be artificially broken up into multiple change orders to fall under the dollar threshold listed above. The authority granted to the Authorized Representative is limited by the Director's authorization to amend the Agreement under Clackamas County's Local Contract

Review Board Rules and is subject to the discretion of the Director, who may suspend or restrict the Authorized Representative's ability to authorize change orders at any time for any reason.

7. Insurance Certificates.
In accordance with Section G.3.5 of the General Conditions, Contractor shall furnish proof of the required insurance naming Clackamas County and Water Environment Services as additional insureds. Insurance certificates may be returned with the signed Contract or may emailed to Procurement@clackamas.us.

8. Tax Compliance.
The Contractor shall comply with all federal, state and local laws, regulation, executive orders and ordinances applicable to this Contract. Contractor represents and warrants that it has complied, and will continue to comply throughout the duration of this Contract and any extensions, with all tax laws of this state or any political subdivision of this state, including but not limited to ORS 305.620 and ORS chapters 316, 317, and 318. Any violation of this section shall constitute a material breach of this Contract and shall entitle County to terminate this Contract, to pursue and recover any and all damages that arise from the breach and the termination of this Contract, and to pursue any or all of the remedies available under this Contract or applicable law.

9. Confidential Information.
Contractor acknowledges that it and its employees or agents may, in the course of performing their responsibilities under this Contract, be exposed to or acquire information that is confidential to Owner. Any and all information of any form obtained by Contractor or its employees or agents in the performance of this Contract shall be deemed confidential information of Owner ("Confidential Information"). Contractor agrees to hold Confidential Information in strict confidence, using at least the same degree of care that Contractor uses in maintaining the confidentiality of its own confidential information, and not to copy, reproduce, sell, assign, license, market, transfer or otherwise dispose of, give, or disclose Confidential Information to third parties or use Confidential Information for any purpose unless specifically authorized in writing under this Contract.

10. Counterparts.
This Contract may be executed in several counterparts, all of which when taken together shall constitute an agreement binding on all Parties, notwithstanding that all Parties are not signatories to the same counterpart. Each copy of the Contract so executed shall constitute an original.

11. Integration.
All provisions of state law required to be part of this Contract, whether listed in the General or Special Conditions or otherwise, are hereby integrated and adopted herein. Contractor acknowledges the obligations thereunder and that failure to comply with such terms is a material breach of this Contract.

The Contract Documents constitute the entire agreement between the parties. There are no other understandings, agreements or representations, oral or written, not specified herein regarding this Contract. Contractor, by the signature below of its authorized representative, hereby acknowledges that it has read this Contract, understands it, and agrees to be bound by its terms and conditions.

12. Compliance with Applicable Law. Contractor shall comply with all federal, state, county, and local laws, ordinances, and regulations applicable to the Work to be done under this Contract including, but not limited to, compliance with the prohibitions set forth in ORS 652.220, compliance of which is a material element of this Contract and failure to comply is a material breach that entitles County to exercise any rights and remedies available under this Contract including, but not limited to, termination for default.

13. Responsibility for Taxes. Contractor is solely responsible for payment of any federal, state, or local taxes required as a result of the Contract or the Work including, but not limited, to payment of the corporate activity

tax imposed under enrolled HB 3427 (2019 Oregon regular legislative session). Contractor may not include its federal, state, or local tax obligations as part of the cost to perform the Work.

In witness whereof, Owner executes this Contract and the Contractor does execute the same as of the day and year first above written.

Contractor DATA:
Michels Trenchless, Inc
817 Main Street
Brownsville, WI 53006

Contractor CCB # 241523 Expiration Date: 8/4/2024
Oregon Business Registry # 1881098-97 Entity Type: FBC State of Formation: Delaware

Payment information will be reported to the IRS under the name and taxpayer ID# provided by the Contractor. Information must be provided prior to contract approval. Information not matching IRS records could subject Contractor to 28 percent backup withholding.

Michels Trenchless, Inc.	Water Environment Services
10/11/23	
Signature Date	Chair Date
Steven Kenny Sr Manager - Business Admin	
Name / Title Printed	Recording Secretary
	APPROVED AS TO FORM
	10/12/23
	County Counsel Date

CLACKAMAS COUNTY
PUBLIC IMPROVEMENT CONTRACT OPPORTUNITY

Table of Contents

CLACKAMAS COUNTY
NOTICE OF PUBLIC IMPROVEMENT CONTRACT OPPORTUNITY

INVITATION TO BID #2023-66
2023 Collection System Rehab Project
August 10, 2023

Clackamas County ("County") on behalf of Water Environment Services through their Board of County Commissioners is accepting sealed bids for the **2023 Collection System Rehab Project** until **September 7, 2023, 2:00 PM,** Pacific Time, ("Bid Closing") at the following location:

Bidding Documents can be downloaded from the state of Oregon procurement website ("OregonBuys") at the following address: https://oregonbuys.gov/bso/view/login/login.xhtml, Document No.S-C01010-00007817.
Prospective Bidders will need to sign in to download the information and that information will be accumulated for a Plan Holder's List. Prospective Bidders are responsible for obtaining any Addenda from Website listed above.

Submitting Proposals: Bid Locker
Proposals will only be accepted electronically thru a secure online bid submission service, **Bid Locker**.
Email submissions to Clackamas County email addresses will no longer be accepted.

A. Completed proposal documents must arrive electronically via Bid Locker located at https://bidlocker.us/a/clackamascounty/BidLocker.
B. Bid Locker will electronically document the date and time of all submissions. Completed documents must arrive by the deadline indicated in Section 1 or as modified by Addendum. LATE PROPOSALS WILL NOT BE ACCEPTED.
C. Proposers must register and create a profile for their business with Bid Locker in order to submit for this project. It is free to register for Bid Locker.
D. Proposers with further questions concerning Bid Locker may review the Vendor's Guide located at https://www.clackamas.us/how-to-bid-on-county-projects .

Engineers Estimate: $1,050,000.00

Contact Information
Procurement Process and Technical Questions: Tralee Whitley at TWhitley@clackamas.us .

Prevailing Wage
Prevailing Wage Rates requirements apply to this Project because the maximum compensation for all Owner-contracted Work is more than $50,000. Contractor and all subcontractors shall comply with the provisions of ORS 279C.800 through 279C.870, relative to Prevailing Wage Rates. The Bureau of Labor and Industries (BOLI) wage rates and requirements set forth in the following BOLI booklet (and any listed amendments to that booklet), which are incorporated herein by reference, apply to the Work authorized under this Agreement:

PREVAILING WAGE RATES for Public Works Contracts in Oregon, July 5, 2023, which can be downloaded at the following web address: http://www.oregon.gov/boli/WHD/PWR/Pages/pwr_state.aspx
The Work will take place in Clackamas County, Oregon.

Clackamas County encourages bids from Minority, Women, and Emerging Small Businesses.

CLACKAMAS COUNTY
PUBLIC IMPROVEMENT CONTRACT

INSTRUCTIONS TO BIDDERS

Clackamas County Local Contract Review Board Rules ("LCRB Rules") govern this procurement process. LCRB Rules may be found at: http://www.clackamas.us/code/documents/appendixc.pdf. The Instructions to Bidders is applicable to the procurement process for Clackamas County, or any component unit thereof identified on the Notice of Public Improvement Contract Opportunity, herein after referred to as the "Owner."

Article 1. Scope of Work

The work contemplated under this contract with the Owner, includes all labor, materials, transportation, equipment and services necessary for, and reasonably incidental to, the completion of all construction work in connection with the project described in the Project Manual which includes, but is not necessarily limited to, the Notice of Public Improvement Contract Opportunity, Instructions to Bidders, Supplemental Instructions to Bidders, Bid Form, Bid Bond, Public Improvement Contract Form, Performance Bond, Payment Bond, Clackamas County General Conditions for Public Improvement Contracts (10/13/2021), Supplemental General Conditions, and Plans, Specifications and Drawings.

Article 2. Examination of Site and Conditions

Before making a Bid, the Bidder shall examine the site of the work and ascertain all the physical conditions in relation thereto. The Bidder shall also make a careful examination of the Project Manual including the plans, specifications, and drawings and other contract documents, and shall be fully informed as to the quality and quantity of materials and the sources of supply of the materials. Failure to take these steps will not release the successful Bidder from entering into the contract nor excuse the Bidder from performing the work in strict accordance with the terms of the contract at the price established by the Bid.

The Owner will not be responsible for any loss or for any unanticipated costs, which may be suffered by the successful Bidder, as a result of such Bidder's failure to be fully informed in advance with regard to all conditions pertaining to the work and the character of the work required, including site conditions. No statement made by an elected official, officer, agent, or employee of the Owner in relation to the physical or other conditions pertaining to the site of the work will be binding on the Owner, unless covered by the Project Manual or an Addendum.

Article 3. Interpretation of Project Manual and Approval of Materials Equal to Those Provided in the Specifications

If any Bidder contemplating submitting a Bid for the proposed contract is in doubt as to the true meaning of any part of the plans, specifications or forms of contract documents, or detects discrepancies or omissions, such Bidder may submit to the Architect (read "Engineer" throughout in lieu of Architect as appropriate) a written request for an interpretation thereof at least ten (10) calendar days prior to the date set for the Bid Closing.

When a prospective Bidder seeks approval of a particular manufacturer's material, process or item of equal value, utility or merit other than that designated by the Architect in the Project Manual, the Bidder may submit to the Architect a written request for approval of such substitute at least ten (10) calendar days prior to the date set for the Bid Closing. The prospective Bidder submitting the request will be responsible for its prompt delivery.

Requests of approval for a substitution from that specified shall be accompanied by samples, records of performance, certified copies of tests by

impartial and recognized laboratories, and such other information as the Architect may request.

To establish a basis of quality, certain processes, types of machinery and equipment or kinds of materials may be specified in the Project Manual either by description of process or by designating a manufacturer by name and referring to a brand or product designation or by specifying a kind of material. Whenever a process is designated or a manufacturer's name, brand or item designation is given, or whenever a process or material covered by patent is designated or described, it shall be understood that the words "or approved equal" follow such name, designation or description, whether in fact they do so or not.

Any interpretation of the Project Manual or approval of manufacturer's material will be made only by an Addendum duly issued. All Addenda will be posted to the OregonBuys listing and will become a part of the Project Manual. The Owner will not be responsible for any other explanation or interpretation of the Project Manual nor for any other approval of a particular manufacturer's process or item for any Bidder.

When the Architect approves a substitution by Addendum, it is with the understanding that the Contractor guarantees the substituted article or material to be equal or better than the one specified.

Article 4. Security to Be Furnished by Each Bidder

Each Bid must be accompanied by either 1) a cashier's check or a certified check drawn on a bank authorized to do business in the State of Oregon, or 2) a Bid bond described hereinafter, executed in favor of the Owner, for an amount equal to ten percent (10%) of the total amount Bid as a guarantee that, if awarded the contract, the Bidder will execute the contract and provide a performance bond and payment bond as required. The successful Bidder's check or Bid bond will be retained until the Bidder has entered into a contract satisfactory to Owner and furnished a one hundred percent (100%) performance bond and one hundred percent (100%) payment bond. The Owner reserves the right to hold the Bid security as described in Article 10 hereof. Should the successful Bidder fail to execute and deliver the contract as provided for in Article 12 hereof, including a satisfactory performance bond and payment bond within twenty (20) calendar days after the Bid has been accepted by the Owner, then the contract award made to such Bidder may be considered canceled and the Bid security may be forfeited as liquidated damages at the option of the Owner. The date of the acceptance of the Bid and the award of the contract as contemplated by the Project Manual shall mean the date of acceptance specified in the Notice of Intent to Award.

Article 5. Execution of Bid Bond

Should the Bidder elect to utilize a Bid bond as described in Article 4 in order to satisfy the Bid security requirements, such form must be completed in the following manner:

A. Bid bonds must be executed on the County forms, which will be provided to all prospective Bidders by the Owner.

B. The Bid bond shall be executed on behalf of a bonding company licensed to do business in the State of Oregon.

C. In the case of a sole individual, the bond need only be executed as principal by the sole individual. In the case of a partnership, the bond must be executed by at least one of the partners. In the case of a corporation, the bond must be executed by stating the official name of the corporation under which is placed the signature of an officer authorized to sign on behalf of the corporation followed by such person's official capacity, such as president, etc. The corporation seal should then be affixed to the bond.

D. The name of the surety must be stated in the execution over the signature of its duly authorized attorney-in-fact and accompanied by the seal of the surety corporation.

Article 6. Execution of the Bid Form

Each Bid shall be made in accordance with: (i) the sample Bid Form accompanying these instructions; (ii) the appropriate signatures for a sole individual, partnership, corporation or limited liability corporation shall be added as noted in Article 5C above; (iii) numbers pertaining to base Bids shall be stated both in writing and in figures; and (iv) the Bidder's address shall be typed or printed.

The Bid Form relates to Bids on a specific Project Manual. Only the amounts and information asked for on the Bid Form furnished will be considered as the Bid. Each Bidder shall Bid upon the work exactly as specified and provided in the Bid Form. The Bidder shall include in the Bid a sum to cover the cost of all items contemplated by the Contract. The Bidder shall Bid upon all alternates that may be indicated on the Bid Form. When Bidding on an alternate for which there is no charge, the Bidder shall write the words "No Charge" in the space provided on the Bid Form. If one or more alternates are shown on the Bid Form, the Bidder shall indicate whether each is "add" or "deduct."

Article 7. Prohibition of Alterations to Bid

Bids that are incomplete, or contain ambiguities or have differing conditions required by the Bidder, including requested changes or exceptions to the Public Improvement Contract form or other portions of the Project Manual, may be rejected in Owner's sole and absolute discretion.

Article 8. Submission of Bid

Each Bid shall be sealed in an envelope, properly addressed to the Owner, showing on the outside of the envelope the name of the Bidder and the name of the project. Bids will be received at the time and place stated in the Notice of Public Improvement Contract Opportunity.

Article 9. Bid Closing and Opening of Bids

All Bids must be received by the Owner at the place and time set for the Bid Closing. Any Bids received after the scheduled Bid Closing time for receipt of Bids will be rejected.

At the time of opening and reading of Bids, each Bid received will be publicly opened and read aloud, irrespective of any irregularities or informalities in such Bids.

Generally, Bid results will be posted to the OregonBuys Website within a couple hours of the opening.

Article 10. Acceptance or Rejection of Bids by Owner

Unless all Bids are rejected, the Owner will award a contract based on the lowest responsive Bid from a responsible Bidder. If that Bidder does not execute the contract, it will be awarded to the next lowest responsible Bidder or Bidders in succession.

The Owner reserves the right to reject all Bids and to waive minor informalities. The procedures for contract awards shall be in compliance with the provisions of the LCRB Rules in effect at that time.

The Owner reserves the right to hold the Bid and Bid security of the three lowest Bidders for a period of thirty (30) calendar days from and after the time of Bid opening pending award of the contract. Following award of the contract the Bid security of the three lowest Bidders may be held twenty (20) calendar days pending execution of the contract. All other Bids will be rejected and Bid security will be returned.

In determining the lowest Bidder, the Owner reserves the right to take into consideration any or all authorized base Bids as well as alternates or combinations indicated in the Bid Form.

If no Bid has been accepted within thirty (30) calendar days after the opening of the Bids, each of the three lowest Bidders may withdraw the Bid submitted and request the return of the Bid security.

Article 11. Withdrawal of Bid

At any time prior to the Bid Closing, a Bidder may withdraw its Bid. This will not preclude the

submission of another Bid by such Bidder prior to the time set for the Bid Closing.

After the time set for the Bid Closing, no Bidder will be permitted to withdraw its Bid within the time frames specified in Article 10 for award and execution, except as provided for in that Article.

Article 12. Execution of Contract, Performance Bond and Payment Bond

The Owner will provide the successful Bidder with contract forms within seven (7) calendar days after the completion of the award protest period. The Bidder is required to execute the contract forms as provided, including a performance bond and a payment bond from a surety company licensed to do surety business in the State of Oregon, within seven (7) calendar days after receipt of the contract forms. The contract forms shall be delivered to the Owner in the number called for and to the location as instructed by the Owner.

Article 13. Recyclable Products

Contractors will use recyclable products to the maximum extent economically feasible in the performance of the Contract.

Article 14. Clarification or Protest of the Solicitation Document or Specifications

Any request for clarification or protest of the solicitation document or specifications must be submitted in the manner provided for in the applicable section of the LCRB Rules to the Procurement Representative referenced in the Notice of Public Improvement Contract Opportunity.

A protest of the Solicitation Document must be received within seven (7) business days of the issuance of the Bid or within three (3) business days of issuance of an addendum.

Requests for clarification may be submitted no less than five (5) business days prior to the Bid Closing Date.

Article 15. Protest of Intent to Award

Owner will name the apparent successful Bidder in a "Notice of Intent to Award" letter. Identification of the apparent successful Bidder is procedural only and creates no right in the named Bidder to the award of the contract. Competing Bidders will be notified by publication of the Notice of Intent to Award on the OregonBuys Website of the selection of the apparent successful Bidder(s) and Bidders shall be given seven (7) calendar days from the date on the "Notice of Intent to Award" letter to review the file at the Procurement Division office and file a written protest of award, pursuant to C-049-0450. Any award protest must be in writing and must be delivered by email, hand delivery, or mail to the Procurement Division Director at: Procurement Division, 2051 Kaen Road, Oregon City, OR 97045.

Article 16. Disclosure of First-Tier Subcontractors

Within two (2) working hours after the Bid Closing, all Bidders shall submit to the County a disclosure form identifying any first-tier subcontractors (those entities that would be contracting directly with the prime contractor) that will be furnishing labor and materials on the contract, if awarded, whose subcontract value would be equal to or greater than: (a) Five percent (5%) of the total contract price, but at least $15,000; or (b) $350,000, regardless of the percentage of the total contract price.

Disclosures may be submitted with the Bid or may be hand delivered to the Bid Closing address or emailed to the Contract Information Analyst listed on the Notice of Contract Opportunity.

CLACKAMAS COUNTY
PUBLIC IMPROVEMENT CONTRACT

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

Project Name BID#2023-66 2023 Collection System Rehab Project

The following modify the Clackamas County "Instructions to Bidders" for this Project. Where a portion of the Instructions to Bidders has been modified by these Supplemental Instructions to Bidders, the unaltered portions shall remain in effect.

1. **Electronic Submissions:** The County is requiring all bids for this project be electronically submitted. Complete Bids (including all attachments) will only be accepted electronically thru a secure online bid submission service, Bid Locker. Email submissions to Clackamas County email addresses will no longer be accepted. https://bidlocker.us/a/clackamascounty/BidLocker.

Bids will be publicly read aloud via the computer application, Zoom. Bidders will be allowed to video conference or listen by phone to the bid results. The projects Zoom meeting can be accessed via the information below:

ZOOM LINKS
Join Zoom Meeting
https://clackamascounty.zoom.us/j/85112742428

Meeting ID: 851 1274 2428

One tap mobile
+12532050468,,85112742428# US
+12532158782,,85112742428# US (Tacoma)

Dial by your location
• +1 253 205 0468 US
• +1 253 215 8782 US (Tacoma)
• +1 346 248 7799 US (Houston)
• +1 408 638 0968 US (San Jose)
• +1 669 444 9171 US
• +1 669 900 6833 US (San Jose)
• +1 719 359 4580 US
• +1 305 224 1968 US
• +1 309 205 3325 US
• +1 312 626 6799 US (Chicago)
• +1 360 209 5623 US
• +1 386 347 5053 US
• +1 507 473 4847 US
• +1 564 217 2000 US
• +1 646 876 9923 US (New York)
• +1 646 931 3860 US

• +1 689 278 1000 US
• +1 301 715 8592 US (Washington DC)

Meeting ID: 851 1274 2428

Find your local number: https://clackamascounty.zoom.us/u/kepIhdBz1Q

**The Apparent Low bid results will be posted to the projects OregonBuys listing as soon as possible following the bid opening.

2. **Good Faith Effort:** Clackamas County encourages participation in contracts by Historically Underrepresented Businesses. "Historically Underrepresented Businesses" are State of Oregon-certified and self-identified minority, women and emerging small business as well as firms that are certified federally or by another state or entity with substantially similar requirements as the State of Oregon.

   Bidders must perform Good Faith Effort (defined below) and submit **Form 1 and Form 2** for the Bidders Bid to be considered responsive. **Form 1 and Form 2** must be submitted within **two (2) hours** after the Closing Date and Time. Form 1 and Form 2 may be submitted to either the Contact Information Analyst listed on Notice of Contract Opportunity or via the https://bidlocker.us/a/clackamascounty/BidLocker listing.

   "Good Faith Effort" is a requirement of a prime contractor to reach out to at least three Historically Underrepresented Business Subcontractors for each division of work that will be subcontracted out and to complete the required forms. If fewer than three Historically Underrepresented Business Subcontractors are reasonably available for a particular division of work, the Bidder must specifically note the reason for there being fewer than three contacts. The outreach should be performed with sufficient time to give the subcontractors at least 5 calendar days to respond to the opportunity. Form 3, which documents the actual amount of subcontractors on the project, must be submitted with the project final pay application. Compliance with the Good Faith Effort and submission of Forms 1, 2 and 3 is a contractual requirement for final payment.

   The sufficiency of the documentation or the performance of Good Faith Effort shall be in the sole and absolute determination of Clackamas County. Only those Bidders that Clackamas County has determined have not sufficiently performed Good Faith Effort shall have protest rights of the determination for such Bidder. No Bidder shall have protest rights of the sufficiency of any other Bidder completing Good Faith Effort.

CLACKAMAS COUNTY
GOOD FAITH EFFORT
SUBCONTRACTOR AND SELF-PERFORMED WORK LIST
(FORM 1)

Prime Contractor Name: Michels Trenchless, Inc. **Total Contract Amount:** $ 1,174,349.00

Project Name: #2023-66 2023 Collection System Rehab Project

PRIME SELF-PERFORMING: Identify below **ALL** GFE Divisions of Work (DOW) to be self-performed. Good Faith Efforts are otherwise required.

DOW BIDDER WILL SELF-PERFORM *(GFE not required)*	
Cured-in-place lining	
Bypass pumping	

PRIME CONTRACTOR SHALL DISCLOSE AND LIST ALL SUBCONTRACTORS, including those Minority-owned, Woman-owned, and Emerging Small Businesses ("M/W/ESB") that you intend to use on the project. Delivery via bid locker https://bidlocker.us/a/clackamascounty/BidLocker within 2 hours of the BID/Quote Closing Date/Time.

LIST ALL SUBCONTRACTORS BELOW Use **correct legal name** of Subcontractor (No Assumed Business Names)	**Division of Work** (Painting, electrical, landscaping, etc.) List **ALL** DOW performed by Subcontractors	**DOLLAR AMOUNT OF SUBCONTRACT**	If Certified or self-reporting MBE/WBE/ESB Subcontractor Check box		
			MBE	WBE	ESB
Name Olson Brothers Pro Vac LLC **Address** 2411 Inter Avenue **City/St/Zip** Puyallup, WA 98372 **Phone#** 888-565-5665 **OCCB#** 196073	Grouting	$ 170,933.00	☐	☐	☐
Name D&H Flagging **Address** 1621 SE Pardee St **City/St/Zip** Portland, OR 97202 **Phone#** 503-232-2488 **OCCB#** 216371	Traffic Control	$ 71,400.00	☐	☒	☐
Name Black Rock Underground **Address** PO Box 5999 **City/St/Zip** Beaverton, OR 97006 **Phone#** 503-747-9312 **OCCB#** 125507	Excavation	$ 74,000.00	☐	☐	☐
Name **Address** **City/St/Zip** **Phone#** **OCCB#**			☐	☐	☐

GFE SUBCONTRACTOR AND SELF-PERFORMED WORK LIST (FORM 1) cont'd

Prime Contractor Name: Michels Trenchless, Inc. **Total Contract Amount:** $1,174,349.00

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LIST ALL SUBCONTRACTORS BELOW Use **correct legal name** of Subcontractor (No Assumed Business Names)	**Division of Work** (Painting, electrical, landscaping, etc.) List **ALL** DOW performed by Subcontractors	**DOLLAR AMOUNT OF SUBCONTRACT**	If Certified or self-reporting MBE/WBE/ESB Subcontractor Check box ☑		
			MBE	WBE	ESB
Name **Address** **City/St/Zip** **Phone#** **OCCB#**			☐	☐	☐
Name **Address** **City/St/Zip** **Phone#** **OCCB#**			☐	☐	☐
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Name **Address** **City/St/Zip** **Phone#** **OCCB#**			☐	☐	☐

CLACKAMAS COUNTY
GOOD FAITH EFFORT
M/W/ESB CONTACT / BIDS RECEIVED LOG
(FORM 2)

Prime Contractor: Michels Trenchless, Inc.
Project: 2023-66 2023 Collection System Rehab Project

Prime Contractor must contact or endeavor to contact at least 3 M/W/ESB Subcontractors for each Division of Work. Prime Contractor shall record its contacts with M/W/ESB Subcontractors through use of this log (or equivalent) entering all required information. All columns shall be completed where applicable. Additional forms may be copied if needed.

NAME OF M/W/ESB SUBCONTRACTOR	Divisions of Work (Painting, electrical, landscaping, etc.)	Date Solicitation Letter / Fax Sent	PHONE CONTACT		BID ACTIVITY Check Yes or No			REJECTED BIDS (if bid received & not used)		Notes
			Date of Call	Person Receiving Call	Will Bid	Bid Received	Bid Used	Bid Amount	Reason Not Used (Price, Scope or Other. If Other, explain in Notes>>)	
D&H Flagging	Traffic Control	8/23/23	8/29/23	Shannon Bowden	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	$71,400.00		
Please see attached	Call Log for solicitations and additional			GFE Activity.	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			
					☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			
					☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			
					☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			
					☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			
					☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			

COBID Certified Firms Directory
As of 8/23/2023 9:46:07 AM
Results filtered by search parameters

The information provided in this file is not to be used for unsolicited advertising, spam, or any other unauthorized use.

Email Sent	Response/ Follow Up	Phone	Company Name	Email	Owner First	Owner Last	Location	Agency	Certification Type	Ethnicity	Gender	Capability	County	General Location	OR Cert ID	ESB Tier Level	Commodity Codes
8/23/2023	8/29 - BIDDING	503-875-1625	A&D Flagging, LLC	adflagging@gmail.com	Ashley	Glass	Portland, OR	Oregon	ESB	African American (Black)	Female	Traffic Control-Flagging Services, pilot car ser	Multnomah	Willamette Valley	11138	Tier 2	561990 - Flagging (i.e., traffic control) service
8/23/2023	8/29 - Will review email	503-749-2211	A+ Flagging, Inc.	aflagging.meadow@gmail.com	Christine	Busche	AUMSVILLE, OR	Oregon	MBE, WBE	Hispanic	Female	Set up traffic control work zone, flagging and	Marion	Willamette Valley	5705	Tier 1	237310 - Highway, Street, and Bridge Constru
8/23/2023	8/29 - Left voicemail	503-443-5143	ALAMO PAVING CO.	Contact@alamopaving.com	Carly	Bykoski	Clackamas, OR	Oregon	WBE	Caucasian (White)	Female	Crack sealing paving fabric seal coating, excav	Clackamas	Willamette Valley	2160		237310 - Highway, Street, and Bridge Constru
8/23/2023	8/23, email bounce back	503-393-4604	All City Paving, LLC	julie@alcitypaving.com	Julie	Lange	Salem, OR	Oregon	WBE	Caucasian (White)	Female	Paving stone patios, retaining walls, walkway	Marion	Willamette Valley	9104	Tier 2	238990 - Asphalt coating and sealing, residen
8/23/2023	8/29 - Resent email	541-998-2062	Andersons Erosion Control Inc	kevin@andersonsec.com	Clara	Anderson	JUNCTION CITY, OR	Oregon	WBE	Caucasian (White)	Female	Topsoil for landscape projects; hydro-seedin	Lane	Willamette Valley	193		484220 - Top-soil hauling, local; 561730 - Hyd
8/23/2023	8/29 - Resent email	503-576-9719	B&B Excavating LLC	Budmassey@bbexcavatingllc.com	Brett	Katlog	Mill City, OR	Oregon	ESB	Asian Pacific	Male	Excavation, underground utilities, site prepa	Linn	Willamette Valley	12262	Tier 1	238910 - Backfilling, construction; 238910 - E
8/23/2023	8/29 - Resent email	503-761-3961	Bedrock Commercial Concrete Cutting	Iano@bedrock.works	Ian	Osborne	Portland, OR	Oregon	ESB	Caucasian (White)	Male	Bedrock Concrete Cutting, Inc. provides the f	Multnomah	Willamette Valley	11242	Tier 1	238910 - Boring, for building construction; 23
8/23/2023	8/29 - Left voicemail	503-586-6150	BENCHMARK CONCRETE CUTTING INC.	andy@benchmarkconcretecutting.com	William	Leach	SALEM, OR	Oregon	ESB	Caucasian (White)	Male	Commercial General Contractor Level 2 and	Marion	Willamette Valley	10598	Tier 1	236220 - Commercial and Institutional Buildi
8/23/2023	8/29 - Left voicemail	971-533-0011	C & C Flagging LLC	candcflagging@gmail.com	Candice	Pierce	Clackamas, OR	Oregon	ESB, MBE, WBE	African American (Black)	Female	Traffic Control services, with pilot car & signs	Multnomah	Willamette Valley	11036	Tier 1	339950 - Signs and signboards (except paper,
8/23/2023	8/29 - Left voicemail	503-467-6386	Chick of All Trades LLC	info@coatflagging.com	Valerie J	Solorzano	Portland, OR	Oregon	MBE	Hispanic	Female	General contractor for new and remodel for	Multnomah	Willamette Valley	4546		236118 - Residential Remodelers; 236220 - C
8/23/2023	8/29 - Not bidding	541-267-3560	Clean Rivers Erosion Control, Inc	heather@cleanriverserosioncontrol.com	Heather	Clausen	North Bend, OR	Oregon	WBE	Caucasian (White)	Female	Hydroseeding services (e.g., decorative, eros	Coos	Coastal	4770		561730 - Hydroseeding services (e.g., decora
8/23/2023	8/29 - Left voicemail	503-232-2488	D & H Flagging, Inc.	nancy.mack@d-hflagging.com	Shannon	Bowden	Portland, OR	Oregon	WBE	Caucasian (White)	Female	*Construction Flagging Only*, no Highway or	Multnomah	Willamette Valley	478		561990 - Flagging (i.e., traffic control) service
8/23/2023	8/29 - Left voicemail	541-601-9704	GAGE IT CONSTRUCTION LLC	christyg@gageit.org	Christina	Gage	WHITE CITY, OR	Oregon	WBE, ESB	Caucasian (White)	Female	Construction management for guardrail insta	Jackson	Southern	2463	Tier 2	237310 - Construction management, highwa
8/23/2023	8/29 - Not bidding	541-948-4498	GLW Erosion Control Inc	glw.ec.inc@me.com	Gail	Woodward	PRINEVILLE, OR	Oregon	ESB	Caucasian (White)	Female	General contractor; hydro seeding and mulch	Crook	Central	9739	Tier 2	238990 - All Other Specialty Trade Contracto
8/23/2023	8/29 - Left voicemail	503-648-6484	Grading Unlimited Inc	John@Gradingunlimited.com	Julie	Gillett	Hillsboro, OR	Oregon	WBE, MBE	Hispanic	Female	Site preparation, excavation and grading ser	Washington	Western	644		238910 - Backfilling, construction; 238910 - E
8/23/2023	8/29 - Left voicemail	971-218-5929	Greenline Concrete Sawing LLC	Greenlinesawing@gmail.com	Nicholas	Riddell	Keizer, OR	Oregon	ESB	Caucasian (White)	Male	Commercial Specialty Contractor Level 2 and	Marion	Willamette Valley	11364	Tier 1	236220 - Commercial and Institutional Buildi
8/23/2023	8/29 - Left voicemail	541-582-3617	Hayes Construction Services Inc.	jason@hayescsi.com	Jason E.	Hayes	Grants Pass, OR	Oregon	ESB	Caucasian (White)	Male	Commercial General Contractor Level 2, road	Jackson	Willamette Valley	10402	Tier 2	237120 - Pipeline construction on oil and gas
8/23/2023	8/29 - Voicemail full	971-331-5089	IMN TRAFFIC SPECIALTIES LLC	imntrafficspecialties@gmail.com	Maile	Wagner	Troutdale, OR	Oregon	ESB, MBE, WBE	African American (Black)	Female	Traffic control services, flagging and pilot car	Multnomah	Willamette Valley	10722	Tier 1	488490 - Pilot car services (i.e., wide load wa
8/23/2023	8/29 - Not bidding	503-780-7124	IRON HORSE EXCAVATION, L.L.C.	june@oxbow-construction.com	June	Kalkhoven	TROUTDALE, OR	Oregon	WBE	Caucasian (White)	Female	Commercial General Contractor Level 2 and	Multnomah	Willamette Valley	7618		237110 - Sanitary sewer construction; 23711
8/23/2023	8/29 - Left voicemail	541-602-9166	K & B Quality Excavating, LLC	wewilldigitforyou@yahoo.com	Kevin	Rariden	Blodgett, OR	Oregon	ESB, MBE	Native American (Indian)	Male	Grading, materials transportation, dump tru	Lincoln	Willamette Valley	9326	Tier 2	238910 - Backfilling, construction; 238910 - B
8/23/2023	8/29 - No voicemail	541-664-1272	LaDuke Construction, LLC	ladukejessica730@outlook.com	Robert	LaDuke	Central Point, OR	Oregon	MBE	Hispanic	Male	Commercial General Contractor Level 2, exca	Jackson	Southern	7824		237110 - Distribution line, sewer and water,
8/23/2023	8/29 - Not bidding	503-777-4902	LORD & ASSOCIATES, INC.	karen@lordandassoc.com	Kimberly	Lord	MILWAUKIE, OR	Oregon	WBE	Caucasian (White)	Female	SET UP, PLACE, AND TEAR DOWN OF UTILITY	Clackamas	Willamette Valley	884		561990 - Flagging (i.e., traffic control) service
8/23/2023	8/29 - Not bidding	503-800-1746	Mid Valley Excavation, LLC	mnelson@midvalleyexcavation.com	Michael	Nelson	SUBLIMITY, OR	Oregon	ESB	Caucasian (White)	Male	Residential Specialty Contractor and Comme	Marion	Willamette Valley	6694	Tier 2	115310 - Support Activities for Forestry; 238
8/23/2023	8/29 - Left voicemail	503-623-4392	Northwest Soil Stabilization Inc.	Admin@nwsoil.com	Robert	Slyh	Dallas, OR	Oregon	ESB	Caucasian (White)	Male	Commercial General Contractor Level 2, Resi	Polk	Willamette Valley	10745	Tier 2	238910 - Backfilling, construction; 238910 - B
8/23/2023	8/29 - Not bidding	503-262-6500	NW Traffic Control, Inc.	curtis@nwtci.com	Patricia	Marti	PORTLAND, OR	Oregon	WBE	Caucasian (White)	Female	Certified flagging services, provide traffic saf	Multnomah	Willamette Valley	1025		561990 - Flagging (i.e., traffic control) service
8/23/2023	8/29 - Not bidding	503-249-4461	Ortiz and Associates, Inc..	ortizassocinc@aol.com	Baltazar	Ortiz	Sandy, OR	Oregon	MBE	Hispanic	Male	Asphalt grinding and resurfacing services. Bu	Clackamas	Northern	1968		237110 - Water and Sewer Line and Related S
8/23/2023	8/23, not bidding	503-982-5084	Pac Green Landscape	annie@pac-green.com	Glenda (Annie)	Mock	WOODBURN, OR	Oregon	WBE	Caucasian (White)	Female	Landscape service and construction, mainter	Marion	Willamette Valley	10003	Tier 2	561730 - Garden maintenance services; 5617
8/23/2023	8/29 - Not bidding	503-387-1831	R & J Traffic Control Services Inc.	Jhoward@allstartcspilotcar.com	Jessica	Howard	PORTLAND, OR	Oregon	ESB, MBE,WBE	African American (Black)	Male	R&J provides pilot car services and flagging.	Washington	Northern	12963	Tier 1	561990 - Flagging (i.e., traffic control) service
8/23/2023	8/29 - Left voicemail	503-333-7838	Renne Construction Inc.	rennecnst@msn.com	Tabitha	Renne	Newberg, OR	Oregon	ESB	Caucasian (White)	Female	excavation, site utility contractor that specia	Yamhill	Willamette Valley	12610	Tier 1	237110 - Sanitary sewer construction; 23891
8/23/2023	8/24, Not Bidding	541-254-0154	Road Ready Flagging LLC	elainedavisrrf@hotmail.com	Elaine	Rea	Grants Pass, OR	Oregon	ESB, WBE	Caucasian (White)	Female	Specializing in traffic control services, road a	Josephine	Southern	11788	Tier 1	561990 - Flagging (i.e., traffic control) service
8/23/2023	8/29 - Left voicemail	971-284-5492	Settje Sons Paving llc	Richard@settjesonspaving.com	James	Settje	Estacada, OR	Oregon	ESB	Caucasian (White)	Male	General paving and asphalt firm.	Clackamas	Willamette Valley	13828	Tier 1	237310 - Asphalt paving (i.e., highway, road,
8/23/2023	8/29 - Left voicemail	541-297-1129	South Coast Flagging	tammyboyer@aol.com	Tammy	Boyer	Coos Bay, OR	Oregon	ESB, WBE	Caucasian (White)	Female	Flagging and pilot car services for constructio	Coos	Coastal	10816	Tier 2	488490 - Pilot car services (i.e., wide load wa
8/23/2023	8/29 - Left voicemail	503-710-0636	T Edge Construction	Jen@tedgeconstruction.com	Tammy	Edgerly	Damascus, OR	Oregon	ESB, WBE	Caucasian (White)	Female	GRADING, EXCAVATION; CONCRETE CURBS,	Clackamas	Willamette Valley	8864	Tier 2	237310 - Parkway construction; 237310 - Sid
8/23/2023	8/29 - Resent email	503-709-5387	T-Olsen Contracting	tia@tolsenco.com	Tia	Olsen	Portland, OR	Oregon	ESB, WBE	Caucasian (White)	Female	Site Preparation, Excavation, Backfilling, Digg	Clackamas	Northern	13461	Tier 1	238910 - Backfilling, construction; 238910 - S
8/23/2023	8/29 - Not bidding	541-779-3565	Taylor Site Development Inc	tsdmedford@gmail.com	Mark	Taylor	Jacksonville, OR	Oregon	ESB	Caucasian (White)	Male	Commercial, industrial, institutional site dev	Jackson	Southern	6950	Tier 2	236220 - Commercial building construction; 2
8/23/2023	8/23, will review	541-970-4079	V. Bates Traffic Control LLC	vbatestraffic@gmail.com	Virgil	Bates	Pendleton, OR	Oregon	ESB, MBE	Native American (Indian)	Male	Provide traffic control services	Umatilla	Eastern	13796	Tier 1	561990 - Flagging (i.e., traffic control) service
8/23/2023	8/29 - Left voicemail	541-852-1101	Wakeview Construction, LLC	jd.george@wakeviewconstruction.com	Steve	George	VENETA, OR	Oregon	ESB, MBE	Native American (Indian)	Male	Asphalting, residential and commercial drive	Lane	Willamette Valley	12676	Tier 1	237310 - Asphalt paving (i.e., highway, road,

CLACKAMAS WATER ENVIRONMENT SERVICES

PUBLIC IMPROVEMENT CONTRACT

BID BOND

Project Name: # 2023-66 2023 Collection System Rehab Project

We, Michels Trenchless, Inc., as "Principal,"
(Name of Principal)

and Liberty Mutual Insurance Company, an MA Corporation,
(Name of Surety)

authorized to transact Surety business in Oregon, as "Surety," hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns to pay unto Water Environment Services ("Obligee") the sum of ($ 10%)

Ten Percent of Amount Bid dollars.

WHEREAS, the condition of the obligation of this bond is that Principal has submitted its proposal or bid to an agency of the Obligee in response to Obligee's procurement document (No.) for the project identified above which proposal or bid is made a part of this bond by reference, and Principal is required to furnish bid security in an amount equal to ten (10%) percent of the total amount of the bid pursuant to the procurement document.

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, we have caused this instrument to be executed and sealed by our duly authorized legal representatives this 7th day of September, 20 23.

Principal: Michels Trenchless, Inc.

By: _____
Signature

SENIOR VICE PRESIDENT
Official Capacity

Attest: _____
Asst. Secretary - Corporation Secretary

MICHELS TRENCHLESS, INC. CORPORATE SEAL STATE OF DELAWARE

Surety: Liberty Mutual Insurance Company

By: Attorney-In-Fact

Heather R. Goedtel
Name

8400 Normandale Lake Blvd., Suite 1700
Address

Bloomington, MN 55437
City State Zip

763-302-7159 Phone

763-302-7200 Fax

LIBERTY MUTUAL INSURANCE COMPANY INCORPORATED 1912 MASSACHUSETTS

Surety Acknowledgment

State of Minnesota }
} ss.
County of Hennepin }

On this 7th day of September, 2023, before me personally came Heather R. Goedtel, to me known, who being by me duly sworn, did depose and say that she is the Attorney-in-Fact of Liberty Mutual Insurance Company described in and which executed the above instrument; that she/he knows the seal of said corporation; that the seal affixed to said instruments is such corporate seal, that it was so affixed by order of the Board of Directors of said corporation, and that she/he signed her/she/his name to it by like order.

Notary Public

BLAKE S. BOHLIG
Notary Public
State of Minnesota
My Commission Expires
January 31, 2026

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

Certificate No: **8209635-190003**

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Blake S. Bohlig; Brian D. Carpenter; Craig Olmstead; Erik T. Gunkel; Haley Pflug; Heather R. Goedtel; Jessica Hecker; Kelly Nicole Enghauser; Laurie Pflug; Michelle Halter; Michelle Ward; Nicole Langer

all of the city of Bloomington state of MN each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 20th day of March, 2023.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

By: _____
David M. Carey, Assistant Secretary

State of PENNSYLVANIA
County of MONTGOMERY ss

On this 20th day of March, 2023 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.

Commonwealth of Pennsylvania - Notary Seal
Teresa Pastella, Notary Public
Montgomery County
My commission expires March 28, 2025
Commission number 1126044
Member, Pennsylvania Association of Notaries

By: _____
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS: Section 12. Power of Attorney.
Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts: Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 7th day of September, 2023.

By: _____
Renee C. Llewellyn, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

For bond and/or Power of Attorney (POA) verification inquiries, please call 610-832-8240 or email HOSUR@libertymutual.com.

CLACKAMAS COUNTY
PUBLIC IMPROVEMENT CONTRACT

BID FORM

PROJECT: 2023 Collection System Rehab Project
BID CLOSING: September 7, 2023, 2:00 PM, Pacific Time
BID OPENING: September 7, 2023, 2:05 PM, Pacific Time

FROM: Michels Trenchless, Inc.
Bidder's Name (must be full legal name, not ABN/DBA)

TO: https://bidlocker.us/a/clackamascounty/BidLocker

1. Bidder is (*check one of the following and insert information requested*):

____a. An individual; or

____b. A partnership registered under the laws of the State of _____; or

__X__c. A corporation organized under the laws of the State of Delaware; or

____d. A limited liability corporation organized under the laws of the State of _____;

and authorized to do business in the State of Oregon hereby proposes to furnish all material and labor and perform all work hereinafter indicated for the above project in strict accordance with the Contract Documents for the Basic Bid as follows:

One million One Hundred Seventy Four Thousand Three Hundred Forty Nine Dollars ($ 1,174,349.00)

and the Undersigned agrees to be bound by the following documents:

- Notice of Public Improvement Contract Opportunity
- Instructions to Bidders
- Bid Bond
- Public Improvement Contract Form
- Clackamas County General Conditions
- Prevailing Wage Rates
- Plans, Specifications and Drawings
- Supplemental Instructions to Bidders
- Bid Form
- Performance Bond and Payment Bond
- Supplemental General Conditions
- Payroll and Certified Statement Form

- ADDENDA numbered 1 through 1, inclusive *(fill in blanks)*

2. The Undersigned proposes to add to or deduct from the Base Bid indicated above the items of work relating to the following Alternate(s) as designated in the Specifications: **N/A**

3. The Undersigned proposes to add to or deduct from the Base Bid indicated above the items or work relating to the following Unit Price(s) as designated in the Specifications, for which any adjustments in the Contract amount will be made in accordance with Section D of the Clackamas County General Conditions: **Provide attached bid schedule with Bid.**

4. The work shall be completed within the time stipulated and specified in the contract documents.

5. Accompanying herewith is Bid Security which is equal to ten percent (10%) of the total amount of the Basic Bid, plus the total sum of all Alternatives (if any).

6. The Undersigned agrees, if awarded the Contract, to execute and deliver to Clackamas County, within twenty (20) calendar days after receiving the Contract forms, a Contract Form, and a satisfactory Performance Bond and Payment Bond each in an amount equal to one hundred percent (100%) of the Contract sum, using forms provided by the Owner. The surety requested to issue the Performance Bond and Payment Bond will be:

Liberty Mutual Surety .

(name of surety company - not insurance agency)

The Undersigned hereby authorizes said surety company to disclose any information to the Owner concerning the Undersigned's ability to supply a Performance Bond and Payment Bond each in the amount of the Contract.

7. The Undersigned further agrees that the Bid Security accompanying the Bid is left in escrow with Clackamas County; that the amount thereof is the measure of liquidated damages which the Owner will sustain by the failure of the Undersigned to execute and deliver the above-named Contract Form, Performance Bond and Payment Bond, each as published, and that if the Undersigned defaults in either executing the Contract Form or providing the Performance Bond and Payment Bond within twenty (20) calendar days after receiving the Contract forms, then the Bid Security shall become the property of the Owner at the Owner's option; but if the Bid is not accepted within thirty (30) calendar days of the time set for the opening of the Bids, or if the Undersigned executes and timely delivers said Contract Form, Performance Bond and Payment Bond, the Bid Security shall be returned.

8. The Undersigned certifies that: (i) This Bid has been arrived at independently and is being submitted without collusion with and without any agreement, understanding, or planned common course of action with any other vendor of materials, supplies, equipment or services described in the invitation to bid designed to limit independent bidding or competition; and (ii) the contents of the Bid have not been communicated by the Undersigned or its employees or agents to any person not an employee or agent of the Undersigned or its surety on any Bond furnished with the Bid and will not be communicated to such person prior to the official opening of the Bid.

9. The undersigned ☒ **HAS,** ☐ **HAS NOT** (*check one*) paid unemployment or income taxes in Oregon within the past 12 months and ☒ **DOES,** ☐ **DOES NOT** (*check one*) a business address in Oregon. The undersigned acknowledges that, if the selected bidder, that the undersigned will have to pay all applicable taxes and register to do business in the State of Oregon before executing the Contract Form.

10. The Undersigned agrees, if awarded a contract, to comply with the provisions of ORS 279C.800 through 279C.870 pertaining to the payment of the prevailing rates of wage.

11. Contractor's CCB registration number is 241523. As a condition to submitting a bid, a Contractor must be registered with the Oregon Construction Contractors Board in accordance with ORS 701.035 to 701.055, and disclose the registration number. Failure to register and disclose the number will make the bid unresponsive and it will be rejected, unless contrary to federal law.

12. The successful Bidder hereby certifies that all subcontractors who will perform construction work as described in ORS 701.005(2) were registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 at the time the subcontractor(s) made a bid to work under the contract.

13. The successful Bidder hereby certifies that, in compliance with the Worker's Compensation Law of the State of Oregon, its Worker's Compensation Insurance provider is XL Insurance America Inc., Policy No. CWD740955106, and that Contractor shall submit Certificates of Insurance as required.

14. Contractor's Key Individuals for this project (supply information as applicable):
Project Executive: Scott Odell, Cell Phone: 503-559-2152,
Project Manager: Ryan McGraw, Cell Phone: 503-726-8914,
Job Superintendent: Nate Rodriguez, Cell Phone: 503-509-8327,
Project Engineer: Sam Zandofsky, Cell Phone: 503-508-9650.

15. The Undersigned certifies that it has not discriminated against minority, women, or emerging small businesses in obtaining any subcontracts for this project.

16. The Undersigned certifies that it has a drug testing program in accordance with ORS 279C.505.

REMINDER: Bidder must submit the below First-Tier Subcontractor Disclosure Form.

By signature below, Contractor agrees to be bound by this Bid.

NAME OF FIRM: Michels Trenchless, Inc.

ADDRESS: 817 Main Street, PO Box 128

Brownsville, WI 53006

TELEPHONE NO: 920-924-4300

EMAIL: jsmuelle@michels.us

SIGNATURE 1) _____
Sole Individual

or 2) _____
Partner

or 3) _____
Authorized Officer or Employee of Corporation
Jeffrey S. Mueller, Senior Vice President

***** *END OF BID* *****

2023 Collection System Rehab Project - Addendum 1
Bid Tab

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	Mobilization	LS	1	$ 58,555.00	$ 58,555.00
2	Traffic Control	LS	1	$ 92,472.00	$ 92,472.00
3	Erosion Control	LS	1	$ 1,272.00	$ 1,272.00
4	By-Pass Pumping	EA	36	$ 720.00	$ 25,920.00
5	Replace Manhole	EA	4	$ 13,393.00	$ 53,572.00
6	Grout Manhole	VF	377	$ 260.00	$ 98,020.00
7	CIPP Liner, 8-inch	LF	6,789	$ 70.00	$ 475,230.00
8	CIPP Liner, 10-inch	LF	1,906	$ 72.00	$ 137,232.00
9	CIPP Liner, 12-inch	LF	448	$ 73.00	$ 32,704.00
10	Lateral Reinstatement	EA	116	$ 127.00	$ 14,732.00
11	Lateral Connection Sealin	EA	116	$ 540.00	$ 62,640.00
12	Post-Installation Video	LF	9,143	$ 1.00	$ 9,143.00
13	Pavement Restoration	TONS	6	$ 1,650.00	$ 9,900.00
14	CIPP Liner, 12-inch Corrugated Metal Pipe	LF	438	$ 73.00	$ 31,974.00
15	CIPP Liner, 30-inch Corrugated Metal Pipe	LF	248	$ 283.00	$ 70,184.00
16	Reconstruct Manhole Channel	EA	1	$ 799.00	$ 799.00

TOTAL CONSTRUCTION COST IN $ 1,174,349.00

TOTAL PROJECT ESTIMATE (written): One Million One Hundred Seventy Four Thousand Three Hundred Forty Nine Dollars and Zero Cents

FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM
PROJECT: 2023-66 2023 Collection System Rehab Project

BID OPENING: September 7, 2023, 2:00 PM, Pacific Time

Failure to submit this Form by the disclosure deadline will result in a nonresponsive bid.

INSTRUCTIONS:
This First-Tier Subcontractor Disclosure Form ("Form") must be submitted and received at the location specified in the Notice of Public Improvement Contract Opportunity on the advertised Bid Closing, and within two working hours after the advertised Bid Closing Time.

Proposals will only be accepted electronically thru a secure online bid submission service, **Bid Locker**. *Email submissions to Clackamas County email addresses will no longer be accepted.*

A. Completed proposal documents must arrive electronically via Bid Locker located at https://bidlocker.us/a/clackamascounty/BidLocker.
B. Bid Locker will electronically document the date and time of all submissions. Completed documents must arrive by the deadline indicated in Section 1 or as modified by Addendum. LATE PROPOSALS WILL NOT BE ACCEPTED.
C. Proposers must register and create a profile for their business with Bid Locker in order to submit for this project. It is free to register for Bid Locker.
D. Proposers with further questions concerning Bid Locker may review the Vendor's Guide located at https://www.clackamas.us/how-to-bid-on-county-projects .

Subcontractor lists may be submitted with the bid in the same envelope or email at the Bid Closing date and time. Subcontractor lists **MUST** be submitted within **two (2) hours** of the Bid Closing date and time.

List below the name of each subcontractor that will be furnishing labor, or labor and materials, for which disclosure is required, the category of work that the subcontractor will be performing, and the dollar value of the subcontract. Enter **"NONE"** if the value of the project bid is less than $100,000 or there are no subcontractors that need to be disclosed. ATTACH ADDITIONAL SHEETS IF NECESSARY.

	SUBCONTRACTOR NAME	DOLLAR VALUE	CATEGORY OF WORK
1.	Olson Brothers Pro Vac	$ 170,933.00	Grouting
2.	D&H Flagging	$ 71,400.00	Traffic Control
3.	Black Rock Underground	$ 74,000.00	Excavation
4.			
5.			
6.			

The above listed first-tier subcontractor(s) are providing labor, or labor and material, with a Dollar Value equal to or greater than:

a) 5% of the total Contract Price, but at least $15,000. If the Dollar Value is less than $15,000 do not list the subcontractor above; or
b) $350,000 regardless of the percentage of the total Contract Price.

Firm Name: Michels Trenchless, Inc.

Bidder Signature: _____ Phone # 920-924-4300

CLACKAMAS COUNTY
PUBLIC IMPROVEMENT CONTRACT
SUPPLEMENTAL GENERAL CONDITIONS

Project: Fischer's Forest Park – Septic System Rehab Project

The following modifies the October 13, 2021 Clackamas County General Conditions for Public Improvement Contracts ("County General Conditions") for this Contract. Except as modified below, all other terms and conditions of the County General Conditions shall remain in effect.

The terms used in these Supplemental Conditions have the meanings stated in the Clackamas County General Conditions. Additional terms used in these Supplemental Conditions have the meanings stated below, which are applicable to both the singular and plural thereof. The address system used in these Supplemental Conditions is the same as the address system used in the Clackamas County General Conditions, with the prefix "SC" added thereto.

SC A.3.1(a)

Replace A.3.1 (a) through A.3.1 (e) with the following:

a) Permits from outside agencies;

b) Amendments to the Contract Documents and addenda, with those of later date having precedence over those of an earlier date;

c) The Contract including all exhibits;

d) Supplemental General Conditions;

e) Clackamas County General Conditions (11/01/2017);

f) Specifications – Division 01;

g) Specifications Division 02;

h) Construction Drawings (Construction Plans);

i) Bonds

Design Details: Figure dimensions and dimensions that can be computed, on plans shall take precedence over scale dimensions. The Drawings with the higher level of detail take precedence over less detailed Drawings.

SC B.4 PERMITS

The contents of Section B.4 - Permits are hereby deleted in it is entirety and replaced with the following:

> Contractor will be responsible for obtaining all required permits and maintaining compliance with those permits throughout the performance of the Work. Owner will pay the cost of obtaining all permits. The Contractor shall be responsible for any penalties or fines that result from Contractor's noncompliance with the terms of the permits. The Contractor will be responsible for compliance with the terms of all permits throughout the performance of the Work.

SC B.8 SUBCONTRACTS AND ASSIGNMENT

Add the following after B.8.3:

B.8.4 Good Faith Effort

> As a condition of Contractor being awarded a Contract for this Project, Contractor must complete Good Faith Effort outreach and documentation as described in the Supplemental Instructions to Bidders of the Solicitation Document.
>
> The Contractor may not change who is performing each Division of Work identified in Form 1 of the Good Faith Effort without the express written advance approval of Owner. This includes substituting identified subcontractors, self-performance of a Division of Work that was identified to be performed by a subcontractor, or the Contractor subcontracting a Division of Work that was identified to be self-performed by the Contractor.
>
> Contractor shall be required to submit the completed Form 3 with its final pay application as a condition of final payment.

SC D.2 DELAYS

Delete first sentence of D.2.2 and delete entries D.2.2(a) and D.2.2(b).

SC E.5.1.1

Delete everything after the first sentence.

SC F.2 PROTECTION OF WORKERS, PROPERTY AND THE PUBLIC

Add the following after Paragraph F.2.8:

F.2.9 The following notice is applicable to Contractors who perform excavation Work: ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0090. You may obtain copies of the rules by calling the center at (877) 668-4001.

F.2.10 Contractor shall be aware that permit-required confined spaces exist in or near the Project Site. Entry to these spaces must be accomplished in compliance with the requirements of OAR 166-150-0190 (29 CFR 1910.146). Examples of permit-required confined spaces include but are not limited to the following:

1. Open tanks beyond the handrails including clarifiers, aeration basins, channels, etc.
2. Manholes.
3. Flow control structures which have the potential to contain sewage.
4. Enclosed tanks including digesters, clarifiers, grit basins, chemical tanks, etc.
5. Wet well and dry wells of pump stations.
6. Headworks channels.
7. Electrical vaults.

The hazards associated with these confined spaces may include but are not limited to:

1. Oxygen deficiency.
2. Combustible vapors including methane.
3. Slip hazards.
4. Fall/retrieval hazard.
5. Engulfment hazard.
6. Lockout required of mechanical and electrical devices.
7. Toxic or hazardous chemicals including hydrogen sulfide and process chemicals.
8. Traffic hazards.
9. Hot work and ignition sources.

10. Potential for rapid changes in working conditions.

11. Painting or coating application activities often pose temporary hazards.

Prior to beginning Work in permit-required confined spaces, Contractor shall provide Owner with a copy of Contractor's permit-required confined space entry plan/program including a copy of the permit forms that will be used by Contractor. Upon request by Contractor, Owner will review with Contractor, Owner's permit-required confined space program and specific procedures Owner would incorporate in spaces entered. Owner will coordinate any of its entries into the same spaces with Contractor. When the permit-required confined space Work is completed, Contractor shall inform Owner, in writing, of any hazards encountered or changes made resulting in different hazards within the space.

SC H.1 CONTRACT PERIOD

Add the following after Paragraph H.1.5:

H.1.6 As indicated in H.1.1, time is of the essence in the performance of this Contract. If Contractor fails to complete the Work within the Contract time, the actual damage to Owner for the delay will be substantial, but will be difficult or impractical to determine. It is therefore agreed, that Contractor will pay to Owner, not as a penalty, but as liquidated damages, the amount of $1,100 each and every day that the date of final completion extends beyond the Contract Time.

Payment of liquidated damages shall not release Contractor from its obligation in respect to the complete performance of the Work, nor shall the payment of liquidated damages constitute a waiver of Owner's right to collect any additional damages that it may sustain by failure of Contractor to fully perform the Work, as it is the intent of the parties that the liquidated damages are a full and complete payment only for failure of Contractor to complete the Work on time. Owner expressly reserves the right to make claims for any and all other damages that Owner may incur due to contractor's failure to perform in strict accordance with this Contract.

SC K.3 COMPLETION NOTICES

Add the following after Paragraph K.3.2:

K.3.3 Contractor shall provide Owner completed Certificate of Compliance (attached) at the time of Final Completion and before final payment will be released.

WATER ENVIRONMENT SERVICES
CERTIFICATE OF COMPLIANCE

TO: Water Environment Services

PROJECT NO: 700220304 / #2023-

PROJECT NAME: FISCHER'S FOREST PARK LARGE ONSITE SEPTIC SYSTEM TREATMENT SYSTEM REHABILITATION

CONTRACT FOR: _____

CONTRACT DATE: _____

I (We) hereby certify that all work on this project has been performed and materials supplied in accordance with the Plans, Specifications, and Contract Documents agreed to by the parties, and that:

A. No less than prevailing rates of wages have been paid to laborers, workmen, and mechanics employed on this work.

B. There have been neither unauthorized substitutions of subcontractors nor have any subcontracts been entered into without the name of the subcontractors having been submitted to the Engineer prior to the start of such subcontractor work.

C. No subcontract was assigned or transferred or performed by any subcontractor other than the original subcontractor, without prior notice having been submitted to the Engineer together with the names of all subcontractors.

D. All claims for material and labor and other services performed in connection with these Specifications have been paid. No further claims will be made and all liens have been satisfied and lifted.

E. All monies due the State Industrial Accident Funds, the State Unemployment Compensation Trust Fund, the State Tax Commission, hospital associations, and/or others have been paid.

CERTIFIED BY:

_____ _____

CONTRACTOR DATE

_____

TITLE

Subscribed and sworn to before me this day of _____, 2018

_____

Notary Public for the State of _____

My Commission Expires _____

END OF SECTION

CLACKAMAS COUNTY GENERAL CONDITIONS FOR PUBLIC IMPROVEMENT CONTRACTS
October 13, 2021

INSTRUCTIONS: The attached **Clackamas County General Conditions for Public Improvement Contracts ("County General Conditions")** apply to all designated Public Improvement contracts. Changes to the County General Conditions (including any additions, deletions or substitutions) should only be made by attaching Public Improvement Supplemental General Conditions. The text of these County General Conditions should not otherwise be altered.

TABLE OF SECTIONS

CLACKAMAS COUNTY GENERAL CONDITIONS FOR PUBLIC IMPROVEMENT CONTRACTS ("County General Conditions")

SECTION A
GENERAL PROVISIONS

A.1 DEFINITION OF TERMS

In the Contract Documents the following terms shall be as defined below:

APPLICABLE LAWS, means all federal, state and local laws, codes, rules, regulations and ordinances, as amended applicable to the Work, to the Contract, or to the parties individually.

APPROVED BY CONTRACTING AGENCY, for purposes of ORS 279C.570(2), means the date a progress payment is approved by the Clackamas County Treasurer's office.

ARCHITECT/ENGINEER, means the Person appointed by the Owner to make drawings and specifications and, to provide contract administration of the Work contemplated by the Contract to the extent provided herein or by supplemental instruction of Owner (under which Owner may delegate responsibilities to the Architect/Engineer), in accordance with ORS Chapter 671 (Architects) or ORS Chapter 672 (Engineers) and administrative rules adopted thereunder.

AVOIDABLE DELAYS, mean any delays other than Unavoidable Delays, and include delays that otherwise would be considered Unavoidable Delays but that: (a) Could have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its Subcontractors; (b) Affect only a portion of the Work and do not necessarily prevent or delay the prosecution of other parts of the Work nor the completion of the whole Work within the Contract Time; (c) Do not impact activities on the accepted critical path schedule; and (d) Are associated with the reasonable interference of other contractors employed by the Owner that do not necessarily prevent the completion of the whole Work within the Contract Time.

BIDDER, means a bidder in connection with Instructions to Bidders or a proposer in connection with a Request for Proposals, or Solicitation Document. May also be referenced as "Offeror," "Quoter" or "Proposer" based on the type of Solicitation Document.

CHANGE ORDER, means a written order which, when fully executed by the Parties to the Contract, constitutes a change to the Contract Documents. Change Orders shall be issued in accordance with the changes provisions in Section D and, if applicable, establish a Contract Price or Contract Time adjustment. A Change Order shall not be effective until executed by both parties.

CLAIM, means a demand by Contractor pursuant to Section D.3 for review of the denial of Contractor's initial request for an adjustment of Contract terms, payment of money, extension of Contract Time or other relief, submitted in accordance with the requirements and within the time limits established for review of Claims in these County General Conditions.

CONTRACT, means the written agreement between the Owner and the Contractor comprised of the Contract Documents which describe the Work to be done and the obligations between the parties.

CONTRACT DOCUMENTS, means the Contract, County General Conditions, Supplemental General Conditions if any, Plans, Specifications, the accepted Offer, Solicitation Document and addenda thereto, Instructions to Offerors, and Supplemental Instructions to Offerors.

CONTRACT PERIOD, as set forth in the Contract Documents, means the total period of time beginning with the full execution of a Contract and, if applicable, the issuance of a Notice to Proceed and concluding upon Final Completion.

CONTRACT PRICE, means the total price reflected in the Contract.

CONTRACT TIME, means any incremental period of time allowed under the Contract to complete any portion of the Work as reflected in the Project schedule.

CONTRACTOR, means the Person awarded the Contract for the Work contemplated.

DAYS, are calendar days, including weekdays, weekends and holidays, unless otherwise specified.

DEFECTIVE WORK, means Work that is not completed in accordance with the Specifications or the requirements of the Contract.

DIRECT COSTS, means, unless otherwise provided in the Contract Documents: the cost of materials, including sales tax and the cost of delivery; cost of labor which shall only include the applicable prevailing wage and fringe benefit (if applicable, and if paid to or on behalf of the employee) rate plus a maximum of a twelve percent (12%) markup on the prevailing wage (but not the fringe benefit) to cover Contractor's labor burden including but not limited to social security, Medicare, unemployment insurance, workers' compensation insurance, sick leave pay; substantiated Project cost increases for specific insurance (including, without limitation, Builder's Risk Insurance and Builder's Risk Installation Floater) or bond premiums; rental cost of equipment, and machinery required for execution of the Work; and the additional costs of field personnel directly attributable to the Work; travel expense reimbursement only if specifically authorized and only to the extent allowable under the County Contractor Travel Reimbursement Policy, hereby incorporated by reference.

FINAL COMPLETION, means the final completion of all requirements under the Contract, including Contract Closeout as described in Section K but excluding Warranty Work as described in Section I.2, and the final payment and release of all retainage, if any.

FORCE MAJEURE, means an act, event or occurrence caused by fire, riot, war, acts of God, terrorism, nature, sovereign, or public enemy, strikes, freight embargoes or any other act, event or occurrence that is beyond the control of the party to the Contract who is asserting Force Majeure.

NOTICE TO PROCEED, means the official written notice from the Owner stating that the Contractor is to proceed with the Work defined in the Contract Documents.

OFFER, means a bid in connection with Instructions to Bidders or a proposal in connection with a Request for Proposals, or Solicitation Document to do the work stated in the Solicitation Document at the price quoted. May also be referenced as "Bid," "Quote," or "Proposal" based on the type of Solicitation Document.

OVERHEAD, means those items which may be included in the Contractor's markup (general and administrative expense and profit) and that shall not be charged as Direct Cost of the Work, including without limitation such Overhead expenses as wages or salary of personnel above the level of foreman (i.e., superintendents and project managers), labor rates and fringe benefits above the applicable prevailing wage and fringe benefit (if applicable, and if paid to or on behalf of the employee), Contractor's labor burden for fringe benefit if paid to the employee, expenses of Contractor's offices and supplies at the Project Site (e.g. job trailer) and at Contractor's principal place of business and including expenses of personnel staffing the Project Site office and Contractor's principal place of business, and Commercial General Liability Insurance and Automobile Liability Insurance.

OWNER, means, Clackamas County or any component unit thereof including Clackamas County Development Agency, Clackamas County Service District No. 1, Surface Water Management Agency of Clackamas County, Tri-City Service District, Water Environment Services, North Clackamas Parks and Recreation District, Clackamas County Extension & 4-H Service District, Library Service District of Clackamas County, Enhanced Law Enforcement District, and Clackamas County Service District No. 5. Owner may elect, by written notice to Contractor, to delegate certain duties to more than one agent, including without limitation, to an Architect/Engineer. However, nothing in these County General Conditions is intended to abrogate the separate design professional responsibilities of Architects under ORS Chapter 671 or of Engineers under ORS Chapter 672.

PERSON, means a natural person or entity doing business as a sole proprietorship, a partnership, a joint venture, a corporation, a limited liability company or partnership, a nonprofit, a trust, or any other entity possessing the legal capacity to contract.

PLANS, means the drawings which show the location, type, dimensions, and details of the Work to be done under the Contract.

PRODUCT DATA, means illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

PROJECT, means the total undertaking to be accomplished for Owner by architects/engineers, contractors, and other others, including planning, study, design, construction, testing, commissioning, start-up, of which the Work to be performed under the Contract Documents is a part.

PROJECT SITE, means the specific real property on which the Work is to be performed, including designated contiguous staging areas, that is identified in the Plans, Specifications and Drawings.

PUNCH LIST, means the list of Work yet to be completed or deficiencies which need to be corrected in order to achieve Final Completion of the Contract.

RECORD DOCUMENT, means the as-built Plans, Specifications, testing and inspection records, product data, samples, manufacturer and distributor/supplier warranties evidencing transfer of ownership to Owner, operational and maintenance manuals, shop drawings, correspondence, certificate(s) of occupancy, and other documents listed in Subsection B.9.1 of these County General Conditions, recording all Services performed.

SAMPLES, means physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

SHOP DRAWINGS, means drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor (including any subsubcontractor), manufacturer, supplier, or distributor to illustrate some portion of the Work.

SOLICITATION DOCUMENT, means an Invitation to Bid, Request for Proposals, Request for Quotes, or other written document issued by Owner that outlines the required Specifications necessary to submit an Offer.

SPECIFICATION, means any description of the physical or functional characteristics of the Work, or of the nature of a supply, service or construction item included in the Solicitation Document. Specifications may include a description of any requirement for inspecting, testing or preparing a supply, service or construction item for delivery and the quantities or qualities of materials to be furnished under the Contract. Specifications generally will state the results or products to be obtained and may, on occasion, describe the method and manner of doing the Work to be performed. Specifications may be incorporated by reference and/or may be attached to the Contract.

SUBCONTRACTOR, means a Person having a direct contract with the Contractor, or another Subcontractor of any tier, to perform one or more items of the Work.

SUBSTANTIAL COMPLETION, means the date when the Owner accepts in writing the construction, alteration or repair constituting the Work or any designated portion thereof as having reached that state of completion when it may be used or occupied for its intended purpose. Substantial Completion of facilities with operating systems occurs only after thirty (30) continuous Days of successful, trouble-free operation of the operating systems as provided in Section K.3.2.

SUBSTITUTIONS, means items that in function, performance, reliability, quality, and general configuration are the same or better than the product(s) specified. Substitutions also means the performance of the Work by a labor force other than what is submitted in the Offer.

SUPPLEMENTAL GENERAL CONDITIONS, means those conditions that remove from, add to, or modify these County General Conditions. Public Improvement Supplemental General Conditions may be included in the Solicitation Document or may be a separate attachment to the Contract.

UNAVOIDABLE DELAYS, mean delays other than Avoidable Delays that are: (a) to the extent caused by any actions of the Owner, or any other employee or agent of the Owner, or by a separate contractor employed by the Owner; (b) to the extent caused by any Project Site conditions which differ materially from the conditions that would normally be expected to exist and inherent to the construction activities defined in the Contract Documents; or (c) to the extent caused by Force Majeure acts, or events or occurrences.

WORK, means the furnishing of all materials, equipment, labor, transportation, services, incidentals, those permits and regulatory approvals not provided by the owner necessary to successfully complete any individual item or the entire Contract and the carrying out of duties and obligations imposed by the Contract Documents for the Project.

A.2 SCOPE OF WORK

The Work contemplated under the Contract includes all labor, materials, transportation, equipment and services for, and incidental to, the completion of all work in connection with the Project described in the Contract Documents. The Contractor shall perform all Work necessary so that the Project can be legally occupied and fully used for the intended use as set forth in the Contract Documents.

A.3 INTERPRETATION OF CONTRACT DOCUMENTS

A.3.1 Unless otherwise specifically defined in the Contract Documents, words which have well-known technical meanings or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Contract Documents are intended to be complementary. Whatever is called for in one, is interpreted to be called for in all. However, in the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following descending order of precedence:

(a) The Contract and any amendments thereto, including Change Orders, with those of later date having precedence over those of an earlier date;
(b) The Supplemental General Conditions;
(c) County General Conditions;
(d) Plans and Specifications;
(e) The Solicitation Document, and any addenda thereto.

A.3.2 In the case of an inconsistency between Plans and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Owner's interpretation in writing as determined in Owners sole discretion.

A.3.3 If the Contractor finds discrepancies in, or omissions from the Contract Documents, or if the Contractor is in doubt as to their meaning, the Contractor shall at once notify the Owner. Matters concerning and interpretation of requirements of the Contract Documents will be decided by the Owner in the Owner's sole discretion, who may delegate that duty in some instances to the Architect/Engineer. Responses to Contractor's requests for interpretation of Contract Documents will be made in writing by Owner (or the Architect/Engineer) within any time limits agreed upon or otherwise with reasonable promptness. Contractor shall not proceed without direction in writing from the Owner (or Architect/Engineer).

A.3.4 References to standard specifications, manuals, codes of any technical society, organization or association, to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, laws or regulations in effect in the jurisdiction where the Project Site is located on the first published date of the Solicitation Document, except as may be otherwise specifically stated.

A.4 EXAMINATION OF PLANS, SPECIFICATIONS, AND PROJECT SITE

A.4.1 It is understood that the Contractor, before submitting an Offer, has made a careful examination of the Contract Documents; has become fully informed as to the quality and quantity of materials and the character of the Work required; and has made a careful examination of the location and conditions of the Work and the sources of supply for materials. The Owner will in no case be responsible for any loss or for any unanticipated costs that may be suffered by the Contractor as a result of the Contractor's failure to acquire full information in advance in regard to all conditions pertaining to the Work. No oral agreement or conversation with any officer, agent, or personnel of the Owner, or with the Architect/Engineer either before or after the execution of the Contract, shall affect or modify any of the terms or obligations herein contained. Contractor shall at all times be responsible for all utility locates regardless of the ownership of such utility infrastructure or service.

A.4.2 Should the Plans or Specifications fail to particularly describe the materials, kind of goods, or details of construction of any aspect of the Work, Contractor shall have the duty to make inquiry of the Owner and Architect/Engineer as to what is required prior to performance of the Work. Absent Specifications to the contrary, the materials or processes that would normally be used to produce first quality finished Work shall be considered a part of the Contract requirements.

A.4.3 Any design errors or omissions noted by the Contractor shall be reported promptly to the Owner, including without limitation, any nonconformity with Applicable Laws.

A.4.4 If the Contractor believes that adjustments to cost or Contract Time are involved because of clarifications or instructions issued by the Owner (or Architect/Engineer) in response to the Contractor's notices or requests for information, the Contractor must submit a written request to the Owner, setting forth the nature and specific extent of the request, including all time and cost impacts against the Contract as soon as possible, but no later than thirty (30) Days after receipt by Contractor of the clarifications or instructions issued. If the Owner denies Contractor's request for additional compensation, additional Contract Time, or other relief that Contractor believes results from the clarifications or instructions, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process. If the Contractor fails to perform the obligations of Sections A.4.1 to A.4.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations.

A.4.5 If the Contractor believes that adjustments to cost or Contract Time are involved because of an Unavoidable Delay caused by differing Project Site conditions, the Contractor shall notify the Owner immediately of differing Project Site conditions before the area has been disturbed. The Owner will investigate the area and make a determination as to whether or not the conditions differ materially from either the conditions stated in the Contract Documents or those which could reasonably be expected in execution of this particular Contract. If Contractor and the Owner agrees that a differing Project Site condition exists, any adjustment to compensation or Contract Time will be determined based on the process set forth in Section D.2.2 for adjustments to or deletions from Work. If the Owner disagrees that a differing Project Site condition exists and denies Contractor's request for additional compensation or Contract Time, Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

A.5 INDEPENDENT CONTRACTOR STATUS

The service or services to be performed under the Contract are those of an independent contractor as defined in ORS 670.600. Contractor represents and warrants that it is not an officer, employee or agent of the Owner as those terms are used in ORS 30.265.

A.6 RETIREMENT SYSTEM STATUS AND TAXES

Contractor represents and warrants that it is not a contributing member of the Public Employees' Retirement System and will be responsible for any federal or state taxes applicable to payment received under the Contract. Contractor will not be eligible for any benefits from these Contract payments of federal Social Security, employment insurance, workers' compensation or the Public Employees' Retirement System, except as a self-employed individual. Unless the Contractor is subject to backup withholding, Owner will not withhold from such payments any amount(s) to cover Contractor's federal or state tax obligations.

A.7 GOVERNMENT EMPLOYMENT STATUS

A.7.1 If this payment is to be charged against federal funds, Contractor represents and warrants that it is not currently employed by the Federal Government. This does not preclude the Contractor from holding another contract with the Federal Government.

SECTION B
ADMINISTRATION OF THE CONTRACT

B.1 OWNER'S ADMINISTRATION OF THE CONTRACT

B.1.1 The Owner shall administer the Contract as described in the Contract Documents throughout the term of the Contract, including the one-year period for correction of Work. The Owner will act as provided in the Contract Documents, unless modified in writing in accordance with other provisions of the Contract. In performing these tasks, the Owner may rely on the Architect/Engineer or other agents to perform some or all of these tasks.

B.1.2 The Owner may visit the Project Site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. The Owner will not

make exhaustive or continuous on-Project Site inspections to check the quality or quantity of the Work. Unless otherwise required in a Change Order, the Owner will neither have control over or charge of, nor be responsible for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work.

B.1.3 Except as otherwise provided in the Contract Documents or when direct communications have been specifically authorized, the Owner and Contractor shall communicate with each other within a reasonable time frame about matters arising out of or relating to the Contract. Communications by and with the Architect/Engineer's consultants shall be through the Architect/Engineer. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

B.1.4 Based upon the Architect/Engineer's evaluations of the Contractor's Application for Payment, or unless otherwise stipulated by the Owner, the Architect/Engineer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

B.2 CONTRACTOR'S MEANS AND METHODS; MITIGATION OF IMPACTS

B.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the Project Site safety thereof and, except as stated below, shall be fully and solely responsible for the Project Site safety of such means, methods, techniques, sequences or procedures.

B.2.2 The Contractor is responsible to protect and maintain the Work during the course of construction and to mitigate any adverse impacts to the Project, including those caused by authorized changes, which may affect cost, schedule, or quality.

B.2.3 The Contractor is responsible for the actions of all its personnel, laborers, suppliers, agents, and Subcontractors on the Project. The Contractor shall enforce strict discipline and good order among Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of persons who are unfit or unskilled for the tasks assigned to them.

B.3 MATERIALS AND WORKMANSHIP

B.3.1 The intent of the Contract Documents is to provide for the construction and completion of every detail of the Work described. All Work shall be performed in a professional manner and, unless the means or methods of performing a task are specified elsewhere in the Contract Documents, Contractor shall employ methods that are generally accepted and used by the industry, in accordance with industry standards.

B.3.2 The Contractor is responsible to perform the Work as required by the Contract Documents. Defective Work shall be corrected at the Contractor's sole expense and within a reasonable time frame.

B.3.3 Work done and materials furnished may be subject to inspection and/or observation and testing by the Owner to determine if they conform to the Contract Documents. Inspection of the Work by the Owner does not relieve the Contractor of responsibility for the Work in accordance with the Contract Documents.

B.3.4 Contractor shall furnish adequate facilities, as required, for the Owner to have safe access to the Work including without limitation walkways, railings, ladders, tunnels, and platforms. Producers, suppliers, and fabricators shall also provide proper facilities and access to their facilities.

B.3.5 The Contractor shall furnish Samples of materials for testing by the Owner and include the cost of the Samples in the Contract Price.

B.4 PERMITS

Contractor shall obtain and pay for all necessary permits, licenses and fees, except for those specifically excluded in the Supplemental General Conditions, as required for the project. Contractor shall be responsible for all violations of the law. Contractor shall give all requisite notices to public authorities.

B.5 COMPLIANCE WITH GOVERNMENT REGULATIONS

B.5.1 Contractor shall comply with Applicable Laws, as amended pertaining to the Work and the Contract. Failure to comply with such requirements shall constitute a breach of Contract and shall be grounds for Contract termination. Without limiting the generality of the foregoing, Contractor expressly agrees to comply with the following, as applicable and as may be amended from time to time: (i) Title VI and VII of Civil Rights Act of 1964, as amended; (ii) Section 503 and 504 of the Rehabilitation Act of 1973, as amended; (iii) the Health Insurance Portability and Accountability Act of 1996; (iv) the Americans with Disabilities Act of 1990, as amended; (v) ORS Chapter 659A; as amended; (vi) all regulations and administrative rules established pursuant to any applicable laws; and (vii) all other applicable requirements of federal, state, county or other local government entity statutes, rules and regulations.

B.5.2 Contractor shall comply with all applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations, and

(a) Contractor shall not discriminate against Disadvantaged, Minority, Women or Emerging Small Business enterprises, as those terms are defined in ORS 200.005, or a business enterprise that is owned or controlled by or that employs a disabled veteran, as that term is defined in ORS 408.225, in the awarding of subcontracts.

(b) Contractor shall maintain, in current and valid form, all licenses and certificates required by Applicable Laws or the Contract when performing the Work.

B.5.3 Contractor shall certify that it shall not accept a bid from Subcontractors to perform Work unless such Subcontractors are registered with the Construction Contractors Board in accordance with ORS 701.021 at the time they submit their bids to the Contractor.

B.5.4 Contractor shall certify that each landscape contracting business, as defined in ORS 671.520(2), performing Work under the Contract holds a valid landscape construction professional license issued pursuant to ORS 671.560.

B.5.5 The following notice is applicable to Contractors who perform excavation Work. ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center at (877) 668-4001.

B.5.6 Failure to comply with any or all of the requirements of B.5.1 through B.5.5 shall be a material breach of Contract and constitute

grounds for Contract termination. Damages or costs resulting from such noncompliance shall be the responsibility of Contractor.

B.5.7 The Contractor shall include in each subcontract those provisions required under ORS 279C.580.

B.5.8 Contractor shall comply with ORS 652.220, compliance of which is a material element of this Contract and failure to comply is a material breach that entitles County to exercise any rights and remedies available under this Contract including, but not limited to, termination for default.

B.6 SUPERINTENDENCE

Contractor shall keep on the Project Site, during the progress of the Work, a competent superintendent and any necessary assistants who shall be satisfactory to the Owner and who shall represent the Contractor on the Project Site. Directions given to the superintendent by the Owner shall be confirmed in writing to the Contractor.

B.7 INSPECTION

B.7.1 Owner shall have access to the Work at all times.

B.7.2 Inspection of the Work will be made by the Owner at its discretion. The Owner will have authority to reject Work that does not conform to the Contract Documents in the Owner's sole discretion. Any Work found to be not in conformance with the Contract Documents, in the discretion of the Owner, shall be removed and replaced at the Contractor's expense.

B.7.3 Contractor shall make or obtain at the appropriate time all tests, inspections and approvals of portions of the Work required by the Contract Documents or by Applicable Laws or orders of public authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work. The Contractor shall give the Owner timely notice of when and where tests and inspections are to be made so that the Owner may be present for such procedures. Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Owner.

B.7.4 As required by the Contract Documents, Work done or material used without required inspection or testing and/or without providing timely notice to the Owner may be ordered removed at the Contractor's expense.

B.7.5 If directed to do so by Owner or other permitting authority any time before the Work is accepted, the Contractor shall uncover portions of the completed Work for inspection. After inspection, the Contractor shall restore such portions of Work to the standard required by the Contract. If the Work uncovered is unacceptable or was done without required testing or inspection or sufficient notice to the Owner, the uncovering and restoration shall be done at the Contractor's expense. If the Work uncovered is acceptable and was done with sufficient notice to the Owner, the uncovering and restoration will be paid for pursuant to a Change Order.

B.7.6 If any testing or inspection reveals failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Owner's and Architect/Engineer's services and expenses, shall be at the Contractor's expense.

B.7.7 In Owner's sole discretion, it may authorize other interested parties to inspect the Work affecting their interests or property. Their right to inspect shall not make them a party to the Contract and shall not interfere with the rights of the parties of the Contract. Instructions or orders of such parties shall be transmitted to the Contractor, through the Owner.

B.8 SUBCONTRACTS AND ASSIGNMENT

B.8.1 Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound by the terms and conditions of these General Conditions and Supplemental General Conditions, and to assume toward the Contractor all of the obligations and responsibilities which the Contractor assumes toward the Owner thereunder, unless (1) the same are clearly inapplicable to the subcontract at issue because of legal requirements or industry practices, or (2) specific exceptions are requested by Contractor and approved in writing by Owner. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with sub-subcontractors at any level.

B.8.2 At Owner's request, Contractor shall submit to Owner prior to their execution either Contractor's form of subcontract, or the subcontract to be executed with any particular Subcontractor. If Owner disapproves such form, Contractor shall not execute the form until the matters disapproved are resolved to Owner's satisfaction. Owner's review, comment upon or approval of any such form shall not relieve Contractor of its obligations under this Agreement or be deemed a waiver of such obligations of Contractor.

B.8.3 Contractor shall not assign, sell, or transfer its rights, or delegate its responsibilities under the Contract, in whole or in part, without the prior written approval of the Owner. No such written approval shall relieve Contractor of any obligations of the Contract, and any transferee shall be considered the agent of the Contractor and bound to perform in accordance with the Contract Documents. Contractor shall remain liable as between the original parties to the Contract as if no assignment had occurred.

B.9 OWNER'S RIGHT TO DO WORK

Owner reserves the right to perform other or additional work at or near the Project Site with other agents than those of the Contractor. If such work takes place within or next to the Project Site, Contractor shall coordinate work with the other contractors or agents, cooperate with all other contractors or forces, carry out the Work in a way that will minimize interference and delay for all agents involved, place and dispose of materials being used so as not to interfere with the operations of another, and join the Work with the work of the others in an acceptable manner and perform it in proper sequence to that of the others. The Owner will resolve any disagreements that may arise between or among Contractor and the other contractors over the method or order of doing all work (including the Work). In case of unavoidable interference, the Owner will establish work priority (including the Work) in the Owner's sole discretion.

B.10 OTHER CONTRACTS

In all cases and at any time, the Owner has the right to execute other contracts related to or unrelated to the Work of the Contract. The Contractor of the Contract shall fully cooperate with any and all other contractors without additional cost to the Owner in the manner described in Section B.13.

B.11 ALLOWANCES

B.11.1 The Contractor shall include in the Contract Price all allowances stated in the Contract Documents. Items covered by allowances

shall be supplied for such amounts and by such persons or entities as the Owner may direct.

B.11.2 Unless otherwise provided in the Contract Documents:

(a) when finally reconciled, allowances shall cover the cost of the Contractor's materials and equipment delivered at the Project Site and all required taxes, less applicable trade discounts;

(b) Contractor's costs for unloading and handling at the Project Site, labor, installation costs, Overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Price but not in the allowances;

(c) whenever costs are more than or less than allowances, the Contract Price shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (i) the difference between actual costs and the allowances under Section B.17.2(a) and (ii) changes in Contractor's costs under Section B.17.2(b);

(d) Unless Owner requests otherwise, Contractor shall provide to Owner a proposed fixed price for any allowance work prior to its performance.

B.12 SUBMITTALS, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

B.12.1 The Contractor shall prepare and keep current, for the Architect's/Engineer's approval (or for the approval of Owner if approval authority has not been delegated to the Architect/Engineer), a schedule and list of submittals which is coordinated with the Contractor's construction schedule and allows the Architect/Engineer reasonable time to review submittals. Owner reserves the right to finally approve the schedule and list of submittals. Submittals include, without limitation, Shop Drawings, Product Data, and Samples.

B.12.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review of submittals by the Architect/Engineer is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, or for approval of safety precautions or, unless otherwise specifically stated by the Architect/Engineer, of any construction means, methods, techniques, sequences or procedures, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect/Engineer's review of the Contractor's submittals shall not relieve the Contractor of its obligations under the Contract Documents. The Architect/Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component. Informational submittals upon which the Architect/Engineer is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect/Engineer without action.

B.12.3 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect/Engineer Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect/Engineer without action.

B.12.4 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

B.12.5 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect/Engineer.

B.12.6 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect/Engineer's review or approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect/Engineer in writing of such deviation at the time of submittal and (i) the Architect/Engineer has given written approval to the specific deviation as a minor change in the Work, or (ii) a Change Order has been executed by Owner authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect/Engineer's review or approval thereof.

B.12.7 In the event that Owner elects not to have the obligations and duties described under this Section B.18 performed by the Architect/Engineer, or in the event no Architect/Engineer is employed by Owner on the Project, all obligations and duties assigned to the Architect/Engineer hereunder shall be performed by the Owner.

B.13 SUBSTITUTIONS

The Contractor may make Substitutions only with the written consent of the Owner, after evaluation by the Owner and only in accordance with a Change Order. Substitutions shall be subject to the requirements of the Solicitation Document. By making requests for Substitutions, the Contractor represents that the Contractor has personally investigated the proposed substitute product; represents that the Contractor will provide the same warranty for the Substitution that the Contractor would for the product originally specified unless approved otherwise; certifies that the cost data presented is complete and includes all related costs under the Contract including redesign costs, and waives all claims for additional costs related to the Substitution which subsequently become apparent; and will coordinate the installation of the accepted Substitution, making such changes as may be required for the Work to be completed in all respects.

B.14 USE OF PLANS AND SPECIFICATIONS

Plans, Specifications and related Contract Documents furnished to Contractor by Owner or Owner's Architect/Engineer shall be used solely for the performance of the Work under the Contract. Contractor and its Subcontractors and suppliers are authorized to use and reproduce applicable portions of such documents appropriate to the execution of the Work, but shall not claim any ownership or other interest in them beyond the scope of the Contract, and no such interest shall attach. Unless otherwise indicated, all common law, statutory and other reserved rights, in addition to copyrights, are retained by Owner.

SECTION C
WAGES AND LABOR

C.1 PREVAILING WAGE RATES ON PUBLIC WORKS

Contractor shall comply fully with the provisions of ORS 279C.800 through 279C.870. Pursuant to ORS 279C.830(1)(d), Contractor shall pay workers at not less than the specified minimum hourly rate of wage, and shall include that requirement in all subcontracts. If the Work is subject to both the state prevailing wage rate law and the federal Davis-Bacon Act, Contractor shall pay the higher of the applicable state or federal prevailing rate of wage. Contractor shall provide written notice to all workers of the number of hours per day and days per week such workers may be required to work.

C.2 PAYROLL CERTIFICATION AND FEE REQUIREMENTS

C.2.1 In accordance with ORS 279C.845, the Contractor and every Subcontractor shall submit written certified statements to the Owner on the form prescribed by the Commissioner of the Bureau of Labor and Industries ("BOLI"), certifying the hourly rate of wage paid each worker which the Contractor or the Subcontractor has employed on the Project and further certifying that no worker employed on the Project has been paid less than the prevailing rate of wage or less than the minimum hourly rate of wage specified in the Contract, which certificate and statement shall be verified by the oath of the Contractor or the Subcontractor that the Contractor or Subcontractor has read the certified statement, that the Contractor or Subcontractor knows the contents of the certified statement, and, that to the Contractor's or Subcontractor's best knowledge and belief, the certified statement is true. The certified statements shall set out accurately and completely the payroll records for the prior week, including the name and address of each worker, the worker's correct classification, rate of pay, daily and weekly number of hours worked, deductions made, and actual wages paid. Certified statements for each week during which the Contractor or Subcontractor has employed a worker on the Project shall be submitted once a month, by the fifth (5^{th}) business day of the following month. The Contractor and Subcontractors shall preserve the certified statements for a period of ten (10) years from the date of completion of the Contract.

C.2.2 Pursuant to ORS 279C.845(7), the Owner shall retain 25 percent of any amount earned by the Contractor on the Project until the Contractor has filed the certified statements required by section C.2.1. The Owner shall pay to the Contractor the amount retained under this subsection within 14 days after the Contractor files the required certified statements, regardless of whether a Subcontractor has failed to file certified statements.

C.2.3 Pursuant to ORS 279C.845(8), the Contractor shall retain 25 percent of any amount earned by a first-tier Subcontractor on this Project until the first-tier Subcontractor has filed with the Owner the certified statements required by C.2.1. Before paying any amount retained under this subsection, the Contractor shall verify that the first-tier Subcontractor has filed the certified statement. Within 14 days after the first-tier Subcontractor files the required certified statement the Contractor shall pay the first-tier Subcontractor any amount retained under this subsection.

C.2.4 In accordance with statutory requirements and administrative rules promulgated by the Commissioner of the Bureau of Labor and Industries, the fee required by ORS 279C.825(1) will be paid by Owner to the Commissioner.

C.3 PROMPT PAYMENT AND CONTRACT CONDITIONS

C.3.1 As a condition to Owner's performance hereunder, the Contractor shall:

C.3.1.1 Make payment promptly, as due, to all persons supplying to Contractor labor or materials for the prosecution of the Work provided for in the Contract.

C.3.1.2 Pay all contributions or amounts due the State Industrial Accident Fund or successor program from such Contractor or Subcontractor incurred in the performance of the Contract.

C.3.1.3 Not permit any lien or claim to be filed or prosecuted against the Owner on account of any labor or material furnished. Contractor will not assign any claims that Contractor has against Owner, or assign any sums due by Owner, to Subcontractors, suppliers, or manufacturers, and will not make any agreement or act in any way to give Subcontractors a claim or standing to make a claim against the Owner.

C.3.1.4 Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

C.3.2 If Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to the Contractor of a Subcontractor by any person in connection with the Project as such claim becomes due, the proper officer(s) representing the Owner may pay the claim and charge the amount of the payment against funds due or to become due Contractor under the Contract. Payment of claims in this manner shall not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.

C.3.3 Contractor shall include in each subcontract for property or services entered into by the Contractor and a first-tier subcontractor, including a material supplier, for the purpose of performing a construction contract, a payment clause that obligates the Contractor to pay the first-tier Subcontractor for satisfactory performance under its subcontract within ten (10) Days out of such amounts as are paid to the Contractor by the Owner under such contract.

C.3.4 If the Contractor or a first-tier subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the Contract within 30 days after receiving payment from the contracting agency or a contractor, the Contractor or first-tier subcontractor owes the person the amount due plus interest charges that begin at the end of the 10-day period within which payment is due under ORS 279C.580 (4) and that end upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest on the amount due is nine percent per annum. The amount of interest may not be waived.

C.3.5 If the Contractor or a subcontractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with the Contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.

C.3.6 All employers, including Contractor, that employ subject workers who work under the Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its Subcontractors complies with these requirements.

C.3.7 In accordance with ORS 279C.570, for all subcontracts that exceed $500,000 that the Contractor withholds retainage, the Contractor shall place amounts deducted as retainage into an interest-bearing escrow account. Interest on the retainage amount accrues from the

date the payment request is approved until the date the retainage is paid to the Subcontractor to which it is due.

C.4 PAYMENT FOR MEDICAL CARE

As a condition to Owner's performance hereunder, Contractor shall promptly, as due, make payment to any person, co-partnership, association or corporation furnishing medical, surgical, and hospital care or other needed care and attention, incident to sickness or injury, to the employees of the Contractor, of all sums of which the Contractor agrees to pay for the services and all moneys and sums that the Contractor collected or deducted from the wages of employees under any law, contract or agreement for the purpose of providing or paying for the services.

C.5 HOURS OF LABOR

As a condition to Owner's performance hereunder, no person shall be employed to perform Work under the Contract for more than ten (10) hours in any one day or forty (40) hours in any one week, except in cases of necessity, emergency or where public policy absolutely requires it. In such instances, Contractor shall pay the employee at least time and a half pay:

(a) For all overtime in excess of eight (8) hours a day or forty (40) hours in any one week when the work week is five consecutive Days, Monday through Friday; or

(b) For all overtime in excess of ten (10) hours a day or forty (40) hours in any one week when the work week is four consecutive Days, Monday through Friday; and

(c) For all Work performed on Saturday and on any legal holiday specified in ORS 279C.540.

This Section C.5 will not apply to Contractor's Work under the Contract to the extent Contractor is currently a party to a collective bargaining agreement with any labor organization.

This Section C.5 shall not excuse Contractor from completion of the Work within the time required under the Contract.

SECTION D
CHANGES IN THE WORK

D.1 CHANGES IN WORK

D.1.1 The terms of the Contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever, without prior written agreement and then only after any necessary approvals have been obtained. A Change Order is required to modify the Contract, which shall not be effective until its execution by the parties to the Contract and all approvals required by public contracting laws have been obtained.

D.1.2 It is mutually agreed that changes in Plans, quantities, or details of construction may be necessary or desirable during the course of construction. Within the general scope of the Contract, the Owner may at any time, without notice to the sureties and without impairing the Contract, require changes it deems necessary or desirable within the scope of this Project and consistent with this Section D.1. All changes to the Work shall be documented and Change Orders shall be executed under the conditions of the Contract Documents. Such changes may include, but are not limited to:

(a) Modification of specifications and design.
(b) Increases or decreases in quantities.
(c) Increases or decreases to the amount of Work.
(d) Addition or elimination of any Work item.
(e) Change in the duration of the Project.
(f) Acceleration or delay in performance of Work.
(g) Deductive changes.

Deductive changes are those that reduce the scope of the Work, and shall be made by mutual agreement whenever feasible. In cases of suspension or partial termination under Section J, Owner reserves the right to unilaterally impose a deductive change and to self-perform such Work, for which the provisions of Section B.13 (Owner's Right to Do Work) shall then apply. Adjustments in compensation shall be made under Section D.1.3, in which costs for deductive changes shall be based upon a Direct Costs adjustment together with the related percentage markup specified for profit, Overhead and other indirect costs, unless otherwise agreed to by Owner.

D.1.3 The Owner and Contractor agree that adjustments to or deletions from the Work shall be administered and compensated according to the following:

(a) Unit Pricing: Unit pricing may be utilized at the Owner's option when unit prices or solicitation alternates were provided that established the cost for adjustments to Work, and a binding obligation exists under the Contract on the parties covering the terms and conditions of the adjustment to Work.

(b) Fixed Fee: If the Owner elects not to utilize unit pricing, or in the event that unit pricing is not available or appropriate, fixed pricing may be used for adjustments to or deletions from the Work. In fixed pricing, the basis of payments or total price shall be agreed upon in writing between the parties to the Contract, and shall be established before the Work is done whenever feasible. Notwithstanding the foregoing, the mark-ups set forth in Section D.1.3(c) shall be utilized in establishing fixed pricing, and such mark-ups shall not be exceeded. Cost and price data relating to adjustments to or deletions from the Work shall be supplied by Contractor to Owner upon request, but Owner shall be under no obligation to make such requests.

(c) Time and Material: In the event that unit pricing and fixed pricing are not utilized, then adjustments to or deletions from the Work shall be performed on a cost reimbursement basis for Direct Costs. Such Work shall be compensated on the basis of the actual, reasonable and allowable cost of labor, equipment, and material furnished on the Work performed. The Contractor or Subcontractor who performs the Work shall be allowed to add up to ten percent (10%) markup to the Direct Costs as full compensation for profit, Overhead and other indirect costs for Work performed with the Contractor's or Subcontractor's own agents

Each ascending tier Subcontractor or the Contractor that did not perform the Work, will be allowed to add up to five percent (5%) supplemental markup on the Direct Costs of the Work (but not the above allowable markups) covered by a Change Order. No additional markup shall be permitted for any third tier or greater descending Subcontractor.

Example: $20,000 of Direct Costs Work performed by a 2nd Tier Subcontractor

	Markup	Allowed Total Fee Plus Markup
General Contractor	5%	$1,000.00
1st Tier Sub Contractor	5%	$1,000.00
2nd Tier Sub Contractor	10%	$22,000.00

(d) Payments made to the Contractor shall be complete compensation for Overhead, profit, and all costs that were incurred by the Contractor or by other agents furnished by the Contractor, including Subcontractors, for adjustments to or deletions from the Work pursuant to a Change Order. Owner may establish a maximum cost for additional Work under this Section D.1.3, which shall not be exceeded for reimbursement without additional written

authorization from Owner in the form of a Change Order. Contractor shall not be required to complete such additional Work without additional authorization.

D.1.4 Any necessary adjustment of Contract Time that may be required as a result of adjustments to or deletions from the Work must be agreed upon by the parties before the start of the revised Work unless Owner authorizes Contractor to start the revised Work before agreement on Contract Time adjustment.

Contractor shall submit any request for additional compensation (and additional Contract Time if Contractor was authorized to start Work before an adjustment of Contract Time was approved) as soon as possible but no later than thirty (30) Days after receipt of Owner's request for additional Work . If Contractor's request for additional compensation or adjustment of Contract Time is not made within the thirty (30) Day time limit, Contractor's requests pertaining to that additional Work shall be barred. The thirty (30) Day time limit for making requests shall not be extended for any reason, including without limitation Contractor's claimed inability to determine the amount of additional compensation or adjustment of Contract Time, unless an extension is granted in writing by Owner. If the Owner denies Contractor's request for additional compensation or adjustment of Contract Time, Contractor may proceed to file a Claim under Section D.3, Claims Review Process. No other reimbursement, compensation, or payment will be made, except as provided in Section D.1.5 for impact claims.

D.1.5 If any adjustment to Work under Section D.1.3 causes an increase or decrease in the Contractor's cost of, or the Contract Time required for the performance of any other part of the Work under the Contract, Contractor shall submit a written request to the Owner, setting forth the nature and specific extent of the request, including all time and cost impacts against the Contract as soon as possible, but no later than thirty (30) Days after receipt of Owner's request for adjustments to or deletions from the Work by Contractor.

The thirty (30) Day time limit applies to claims of Subcontractors, suppliers, or manufacturers who may be affected by Owner's request for adjustments to or deletions from the Work and who request additional compensation or an extension of Contract Time to perform; Contractor has responsibility for contacting its Subcontractors, suppliers, or manufacturers within the thirty (30) Day time limit, and including their requests with Contractor's requests. If the request involves Work to be completed by Subcontractors, or materials to be furnished by suppliers or manufacturers, such requests shall be submitted to the Contractor in writing with full analysis and justification for the adjustments to compensation and Contract Time requested. The Contractor shall analyze and evaluate the merits of the requests submitted by Subcontractors, suppliers, and manufacturers to Contractor prior to including those requests and Contractor's analysis and evaluation of those requests with Contractor's requests for adjustments to compensation or Contract Time that Contractor submits to the Owner. Failure of Subcontractors, suppliers, manufacturers or others to submit their requests to Contractor for inclusion with Contractor's requests submitted to Owner within the time period and by the means described in this section shall constitute a waiver of these Subcontractor claims. The Owner will not consider direct requests or claims from Subcontractors, suppliers, manufacturers or others not a party to the Contract. The consideration of such requests and claims under this section does not give any Person, not a party to the Contract the right to bring a claim against Owner, whether in this claims process, in litigation, or in any dispute resolution process.

If the Owner denies the Contractor's request for adjustment to compensation or Contract Time, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

D.1.6 No request or Claim by the Contractor for additional costs or an adjustment of Contract Time shall be allowed if made after receipt of final payment application under the Contract. Final payment application must be made by Contractor within the time required under Section E.6.4.

D.1.7 It is understood that changes in the Work are inherent in construction of this type. The number of changes, the scope of those changes, and the effect they have on the progress of the original Work cannot be defined at this time. The Contractor agrees that it will work in good faith with Owner to undertake changes, when agreed upon by execution of a Change Order. Each change will be evaluated for extension of Contract Time and increase or decrease in compensation based on its own merit.

D.2 DELAYS

D.2.1 Contractor shall not be entitled to additional compensation or additional Contract Time for Avoidable Delays.

D.2.2 In the event of Unavoidable Delays, Contractor may be entitled to the following:

(a) Contractor may be entitled to additional compensation or additional Contract Time, or both, for Unavoidable Delays described in Section D.2.1.2 (a) and (b).

(b) Contractor may be entitled to additional Contract Time for Unavoidable Delays described in Section D.2.1.2(c) and (d).

In the event of any requests for additional compensation or additional Contract Time, or both, as applicable, arising under this Section D.2.2 for Unavoidable Delays, other than requests for additional compensation or additional Contract Time for differing Project Site conditions for which a review process is established under Section A.4.5, Contractor shall submit a written notification of the delay to the Owner within two (2) Days of the occurrence of the cause of the delay. This written notification shall state the cause of the potential delay, the Project components impacted by the delay, and the anticipated additional Contract Time extension or the additional compensation, or both, as applicable, resulting from the delay. Within seven (7) Days after the cause of the delay has been mitigated, or in no case more than thirty (30) Days after the initial written notification, the Contractor shall submit to the Owner, a complete and detailed request for additional compensation or additional Contract Time, or both, as applicable, resulting from the delay. If the Owner denies Contractor's request for additional compensation or adjustment of Contract Time, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

If Contractor does not timely submit the notices required under this Section D.2, Contractor's Claim shall be barred.

D.3 CLAIMS REVIEW PROCESS

D.3.1 All Contractor Claims shall be referred to the Owner for review. Contractor's Claims, including Claims for adjustments to compensation or Contract Time, shall be submitted in writing by Contractor to the Owner within five (5) Days after a denial of Contractor's initial request for an adjustment of Contract terms, payment of money, extension of Contract Time or other relief, provided that such initial request has been submitted in accordance with the requirements and within the time limits established in these County General Conditions. Within thirty (30) Days after the initial Claim, Owner shall receive from Contractor a complete and detailed description of the Claim (the "Detailed Notice") that includes all information required by Section D.3.2. Unless the Claim is made in accordance with these time requirements, it shall be barred.

D.3.2 The Detailed Notice of the Claim shall be submitted in writing by Contractor and shall include all information, records and documentation necessary for the Owner to properly and completely evaluate the claim, including, but not limited to a detailed, factual statement of the basis of the Claim, pertinent dates, Contract provisions which support or allow the Claim, reference to or copies of any documents which support the Claim, the dollar value of the Claim, and the Contract Time adjustment requested for the Claim. If the Claim involves Work to be completed by Subcontractors, the Contractor will analyze and evaluate the merits of the Subcontractor claim prior to forwarding it and that analysis and evaluation to the Owner. The Owner will not consider direct claims from Subcontractors, suppliers, manufacturers, or others not a party to the Contract. Contractor agrees that it will make no agreement, covenant, or assignment, nor will it commit any other act that will permit or assist any Subcontractor, supplier, manufacturer, or other to directly or indirectly make a claim against Owner.

D.3.3 The Owner, through the Architect/Engineer (or other employee or agent assigned by the Owner) will review all Claims and take one or more of the following preliminary actions within ten (10) Days of receipt of the Detailed Notice of a Claim: (1) request additional supporting information from the Contractor; (2) inform the Contractor and Owner in writing of the time required for adequate review and response; (3) reject the Claim in whole or in part and identify the reasons for rejection; (4) recommend approval of all or part of the Claim; (5) arrange a meeting with the Contractor for formal review of the Claim; or (6) propose an alternate resolution.

D.3.4 Once the Engineer or Project Manager determines the Owner is in receipt of a properly submitted claim, the Engineer or Project Manager may arrange a meeting, as agreed by the parties, with the Contractor in order to present the claim for formal review and discussion. A person authorized by the Contractor to execute Change Orders on behalf of the Contractor must be present and attend all claim meetings.

D.3.5 The Owner's decision, through the Architect/Engineer (or other employee or agent assigned by the Owner), shall be final and binding on the Contractor unless appealed by written notice to the Owner within fifteen (15) Days of receipt of the decision. The Contractor must present written documentation supporting the Claim within fifteen (15) Days of the notice of appeal. After receiving the appeal documentation, the Owner, through the appropriate department director, shall review the materials and render a decision within thirty (30) Days after receiving the appeal documents.

D.3.6 If, at any step in the claim decision or review process, the Contractor fails to promptly submit requested information or documentation that the Owner deems necessary to analyze the claim, the Contractor is deemed to have waived its right to further review, and the Claim will not be considered properly filed and preserved.

D.3.7 Both parties agree to exercise their best efforts in good faith to resolve all disputes within sixty (60) Days of the issuance of the appeal in Section D. 3.4 above. If the parties are unable to resolve their issues through mediation or otherwise, either party may seek redress through all available remedies in equity or in law.

D.3.8 Unless otherwise directed by Owner, Contractor shall proceed with the Work while any Claim, or mediation or litigation arising from a Claim, is pending. Regardless of the review period or the final decision of the Owner, the Contractor shall continue to diligently pursue the Work as identified in the Contract Documents. In no case is the Contractor justified or allowed to cease or delay Work, in whole or in part, without a written stop work order from the Owner.

SECTION E
PAYMENTS

E.1 SCHEDULE OF VALUES

The Contractor shall submit, by or before the pre-construction conference (as described in Section H.1.3), a schedule of values ("Schedule of Values") for the Contract Work. This schedule shall provide a breakdown of values for the Contract Work and will be the basis for progress payments. The breakdown shall demonstrate reasonable, identifiable, and measurable components of the Work. Unless objected to by the Owner, this schedule shall be used as the basis for reviewing Contractor's applications for payment. If objected to by Owner, Contractor shall revise the schedule of values and resubmit the same for approval of Owner.

E.2 APPLICATIONS FOR PAYMENT

E.2.1 Owner shall make progress payments on the Contract monthly as Work progresses, in accordance with the requirements of this Section E.2 and ORS 279C.570. Applications for payment shall be based upon estimates of Work completed and the Schedule of Values. As a condition precedent to Owner's obligation to pay, all applications for payment shall be approved by the Owner. A progress payment shall not be considered acceptance or approval of any Work or waiver of any defects therein. Owner shall pay to Contractor interest in accordance with ORS 279C.570 for overdue invoices, not including retainage, due the Contractor. Overdue invoices will be those that have not been paid within the earlier of:

(a) Thirty (30) days after receipt of the invoice; or

(b) Fifteen (15) days after the payment is approved by the County.

Notwithstanding the foregoing, in instances when an application for payment is filled out incorrectly, or when there is any defect or impropriety in any submitted application or when there is a good faith dispute, Owner shall so notify the Contractor within fifteen (15) Days stating the reason or reasons the application for payment is defective or improper or the reasons for the dispute. A defective or improper application for payment, if corrected by the Contractor within seven (7) Days of being notified by the Owner, shall not cause a payment to be made later than specified in this section unless interest is also paid. Payment of interest will be postponed when payment on the principal is delayed because of disagreement between the Owner and the Contractor.

Owner reserves the right, instead of requiring the Contractor to correct or resubmit a defective or improper application for payment, to reject the defective or improper portion of the application for payment and pay the remainder of the application for such amounts which are correct and proper.

Owner, upon written notice to the Contractor, may elect to make payments to the Contractor only by means of Electronic Funds Transfers ("EFT") through Automated Clearing House ("ACH") payments. If Owner makes this election, the Contractor shall arrange for receipt of the EFT/ACH payments.

E.2.2 Contractor shall submit to the Owner an application for each payment and, if required, receipts or other vouchers showing payments for materials and labor including payments to Subcontractors. Contractor shall include in its application for payment a schedule of the percentages of the various parts of the Work completed, based on the Schedule of Values which shall aggregate to the payment application total, and shall include, on the face of each copy thereof, a certificate in substantially the following form:

"I, the undersigned, hereby certify that the above bill is true and correct, and the payment therefore, has not been received.

Signed: _____
Dated: _____"

E.2.3 Generally, applications for payment will be accepted only for materials that have been installed. Under special conditions, applications for payment for stored materials will be accepted at Owner's sole discretion. Such a payment, if made, will be subject to the following conditions:

(a) The request for stored material shall be submitted at least thirty (30) Days in advance of the application for payment on which it appears. Applications for payment shall be entertained for major equipment, components or expenditures only.

(b) The Contractor shall submit applications for payment showing the quantity and cost of the material stored.

(c) The material shall be stored in a bonded warehouse and Owner shall be granted the right to access the material for the purpose of removal or inspection at any time during the Contract Period.

(d) The Contractor shall name the Owner as co-insured on the insurance policy covering the full value of the property while in the care and custody of the Contractor until it is installed. A certificate noting this coverage shall be issued to the Owner.

(e) Payments shall be made for materials and equipment only. The submitted amount in the application for payment shall be reduced by the cost of transportation from the storage site to the Project Site and for the cost of an inspector to verify delivery and condition of the goods at the storage site. The cost of storage and inspection shall be borne solely by the Contractor.

(f) Within sixty (60) Days of the application for payment, the Contractor shall submit evidence of payment covering the material and/or equipment stored and of payment for the storage site.

(g) Payment for stored materials and/or equipment shall in no way indicate acceptance of the materials and/or equipment or waive any rights under the Contract for the rejection of the Work or materials and/or equipment not in conformance with the Contract Documents.

(h) All required documentation shall be submitted with the respective application for payment.

E.2.4 The Owner reserves the right to withhold all or part of a payment, or may nullify in whole or part any payment previously made, to such extent as may be necessary in the Owner's opinion to protect the Owner from loss because of:

(a) Work that is defective and not remedied, or that has been demonstrated or identified as failing to conform with Applicable Laws or the Contract Documents;

(b) third party claims filed or evidence reasonably indicating that such claims will likely be filed unless security acceptable to the Owner is provided by the Contractor;

(c) failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment (in which case Owner may issue checks made payable jointly to Contractor and such unpaid persons under this provision, or directly to Subcontractors and suppliers at any level under Section C.3.2);

(d) reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Price;

(e) damage to the Work, Owner or Owner's agent;

(f) reasonable evidence that the Work will not be completed within the Contract Time required by the Contract, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;

(g) failure to carry out the Work in accordance with the Contract Documents; or

(h) assessment of liquidated damages, when withholding is made for offset purposes.

E.2.5 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

(a) Take that portion of the Contract Price properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Price allocated to that portion of the Work in the Schedule of Values, less retainage as provided in Section E.5. Pending final determination of cost to the Owner of changes in the Work, no amounts for changes in the Work can be included in applications for payment until the Contract Price has been adjusted by a Change Order;

(b) Add that portion of the Contract Price properly allocable to materials and equipment delivered and suitably stored at the Project Site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner pursuant to Section E.2.3, suitably stored off the Project Site at a location agreed upon in writing), less retainage as provided in Section E.5;

(c) Subtract the aggregate of previous payments made by the Owner; and

(d) Subtract any amounts for which the Owner has withheld or nullified payment as provided in the Contract Documents.

E.2.6 Contractor's applications for payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier.

E.2.7 The Contractor warrants to Owner that title to all Work covered by an application for payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an application for payment all Work for which payments are received from the Owner shall be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided financing, labor, materials and equipment relating to the Work.

E.2.8 If Contractor disputes any determination by Owner with regard to any application for payment, Contractor nevertheless shall continue to expeditiously perform the Work. No payment made hereunder shall be or be construed to be final acceptance or approval of that portion of the Work to which such partial payment relates or shall relieve Contractor of any of its obligations hereunder.

E.3 PAYROLL CERTIFICATION REQUIREMENT

Owner's receipt of payroll certification pursuant to Section C.2 of the Contract shall be a condition precedent to Owner's obligation to pay any progress payments or final payment otherwise due.

E.4 DUAL PAYMENT SOURCES

Contractor shall not be compensated for Work performed under the Contract from any state agency other than the agency that is a party to the Contract.

E.5 RETAINAGE

E.5.1 Retainage shall be withheld and released in accordance with the requirements set forth in Local Contract Review Board Rules or the applicable County standard.

E.5.1.1 Owner may reserve as retainage from any progress payment an amount not to exceed five percent of the payment. As Work progresses, Owner may reduce the amount of retainage on or may eliminate retainage on any remaining monthly Contract payments after fifty (50) percent of the Work under the Contract is completed if, in the Owner's discretion, such Work is progressing satisfactorily. Elimination or reduction of retainage shall be allowed only upon written application by the Contractor, which application shall include written approval of Contractor's surety; except that when the Work is ninety-seven and a half percent (97.5%) completed in Owner's estimation, the Owner may, at its discretion and without application by the Contractor, reduce the retained amount to hundred (100) percent of the value of the Work remaining to be done. Upon receipt of written application by the Contractor, Owner shall respond in writing within a reasonable time.

E.5.1.2 If retainage is withheld, unless the Contractor requests and the Owner accepts a form of retainage described in options (a) or (b) below, the Owner (except as otherwise provided below for a contract of $500,000 or less), will deposit the retainage in an interest-bearing escrow account as required by ORS 279C.570(2). The Contractor shall execute such documentation and instructions respecting the interest-bearing escrow account as the Owner may require to protect its interests, including but not limited to a provision that no funds may be paid from the account to anyone without the Owner's advance written authorization. For a Contract over $500,000, if the Contractor requests that the Owner deposit the retainage in an interest-bearing account under ORS 279C.560(5), the Owner will use an interest-bearing escrow account as stated above. For a Contract of $500,000 or less, if the Contractor requests that the Owner deposit the retainage in an interest-bearing account under ORS 279C.560(5), the Owner will use an interest-bearing account (in a bank, savings bank, trust company or savings association) as provided under ORS 279C.450(5).

In accordance with the provisions of ORS 279C.560, Local Contract Review Board Rules, or the applicable County standard, unless the Owner finds in writing that accepting bonds, securities or other instruments described in option (a) below or a security bond described in option (b) below poses an extraordinary risk that is not typically associated with the bond, security or instrument, the Owner will approve the Contractor's written request:

a. to be paid amounts which would otherwise have been retained from progress payments where Contractor has deposited acceptable bonds, securities or other instruments of equal value with Owner or in a custodial account or other mutually-agreed account satisfactory to Owner, with an approved bank or trust company to be held in lieu of the cash retainage for the benefit of Owner. Interest or earnings on the bonds, securities or other instruments shall accrue to the Contractor. The Contractor shall execute and provide such documentation and instructions respecting the bonds, securities and other instruments as the Owner may require to protect its interests. To be permissible, the bonds, securities and other instruments must be of a character approved by Owner; or

b. that the Contractor be allowed, with the approval of the Owner, Owner allow Contractor to deposit a surety bond for the benefit of Owner, in a form acceptable to Owner, in lieu of all or a portion of funds retained, or to be retained. Such bond and any proceeds therefrom shall be made subject to all claims and liens in the manner and priority as set forth for retainage under ORS 279C.550 to ORS 279C.625.

When the Owner has accepted the Contractor's election of option (a) or (b), Owner may recover from Contractor any additional costs incurred through such election by reducing Contractor's final payment. Where the Owner has agreed to Contractor's request for option (b), Contractor shall accept like bonds from Subcontractors and suppliers on the Project from which Contractor has required retainages.

E. 5.1.3 The retainage held by Owner shall be included in and paid to the Contractor as part of the final payment of the Contract Price. The Owner shall pay to Contractor interest at the rate of two thirds of one percent per month on the final payment due Contractor, interest to commence forty-five (45) Days after the date which Owner receives Contractor's final approved application for payment and Work under the Contract has been completed and accepted and to run until the date when final payment is tendered to Contractor. The Contractor shall notify Owner in writing when the Contractor considers the Work complete and deliver to Owner its final application for payment and Owner shall, within fifteen (15) Days after receiving the written notice and the application for payment, either accept the Work or notify the Contractor of Work yet to be performed on the Contract. If Owner does not within the time allowed notify the Contractor of Work yet to be performed to fulfill contractual obligations, the interest provided by this subsection shall commence to run forty-five (45) Days after the end of the fifteen (15) Day period.

E.5.1.4 Owner will reduce the amount of the retainage if the Contractor notifies the Owner that the Contractor has deposited in an escrow account with a bank or trust company, in a manner authorized by the Owner, bonds and securities of equal value of a kind approved by the Owner and such bonds and securities have in fact been deposited.

E.5.1.5 Contractor agrees that if Contractor elects to reserve a retainage from any progress payment due to any Subcontractor or supplier, such retainage shall not exceed five percent of the payment, and such retainage withheld from Subcontractors and suppliers shall be subject to the same terms and conditions stated in Subsection E.5 as apply to Owner's retainage from any progress payment due to Contractor.

E.5.1.6 The Contractor shall comply with all applicable legal requirements for withholding and releasing retainage and for prompt payments, including but not limited to those in ORS Chapters 279C and 701, and 49 CFR 26.29.

E.6 FINAL PAYMENT

E.6.1 Upon completion of all the Work under the Contract, the Contractor shall notify the Owner, in writing, that Contractor has completed Contractor's obligations under the Contract and shall prepare its application requesting final payment. The amount of final payment will be the difference between the total amount due the Contractor pursuant to the Contract Documents and the sum of all payments previously made. Upon receipt of such notice and application for payment, the Owner will inspect the Work, and, if acceptable, submit to Contractor a recommendation as to acceptance of the completed Work and the final estimate of the amount due the Contractor. If the Work is not acceptable, Owner will notify Contractor within fifteen (15) Days of Contractor's request for final payment. Upon approval of this final application for payment by the Owner and compliance by the Contractor with

provisions in Section K, and Contractor's satisfaction of other provisions of the Contract Documents as may be applicable, the Owner shall pay to the Contractor all monies due under the provisions of these Contract Documents.

E.6.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Owner (1) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least thirty (30) Days' prior written notice has been given to the Owner, (2) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (3) consent of surety, if any, to final payment and (4), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien.

E.6.3 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final application for payment.

E.6.4 Contractor agrees to submit its final payment application within ninety (90) Days after Substantial Completion, unless written extension is granted by Owner. Contractor shall not delay final payment application for any reason, including without limitation nonpayment of Subcontractors, suppliers, manufacturers or others not a party to the Contract, or lack of resolution of a dispute with Owner or any other person of matters arising out of or relating to the Contract. If Contractor fails to submit its final payment application within ninety (90) Days after Substantial Completion, and Contractor has not obtained written extension by Owner, all requests or Claims for additional costs or an extension of Contract Time shall be barred.

SECTION F
PROJECT SITE CONDITIONS

F.1 USE OF PREMISES

Contractor shall confine equipment, storage of materials and operation of Work to the limits indicated by Contract Documents, Applicable Laws, permits or directions of the Owner. Contractor shall follow the Owner's instructions regarding use of premises, if any.

F.2 PROTECTION OF WORKERS, PROPERTY AND THE PUBLIC

F.2.1 Contractor shall maintain continuous and adequate protection of all of the Work from damage and shall protect the Owner, workers and property from injury or loss arising in connection with the Contract. Contractor shall remedy acceptably to the Owner any damage, injury, or loss, except such as may be directly due to errors in the Contract Documents or caused by authorized representatives or personnel of the Owner. Contractor shall adequately protect adjacent property as provided by law and the Contract Documents.

F.2.2 Contractor shall take all necessary precautions for the safety of all personnel on the Project Site or otherwise engaged in the undertaking of the Work and shall comply with the Contract Documents, best practices and all applicable provisions of federal, state and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the Work is being performed. Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for protection of workers and the public against any hazards created by construction. Contractor shall designate a responsible employee or associate on the Project Site, whose duty shall be the prevention of accidents. The name and position of the person designated shall be reported to the Owner. The Owner has no responsibility for Project Site safety. Project Site safety shall be the responsibility of the Contractor.

F.2.3 Contractor shall not enter upon private property without first obtaining permission from the property owner or its duly authorized representative. Contractor shall be responsible for the preservation of all public and private property along and adjacent to the Work contemplated under the Contract and shall use every precaution necessary to prevent damage thereto. In the event the Contractor damages any property, the Contractor shall at once notify the property owner and make, or arrange to make, full restitution. Contractor shall, immediately and in writing, report to the Owner, all pertinent facts relating to such property damage and the ultimate disposition of the claim for damage.

F.2.4 Contractor shall be responsible for protection of adjacent work areas including impacts brought about by activities, equipment, labor, utilities, vehicles and materials on the Project Site.

F.2.5 Contractor shall at all times direct its activities in such a manner as to minimize adverse effects on the environment. Handling of all materials shall be conducted so no release will occur that may pollute or become hazardous.

F.2.6 In an emergency affecting the safety of life or limb or of the Work or of adjoining property, the Contractor, without special instruction or authorization from the Owner, shall act reasonably to prevent threatened loss or injury, and shall so act, without appeal, if instructed by the Owner. Any compensation claimed by the Contractor on account of emergency work shall be determined in accordance with section D.

F.2.7 Contractor shall comply with all Owner safety rules and regulations, if applicable. Prior to commencement of any Work, Contractor and Subcontractors shall be required to complete an Owner Contractor Safety Orientation and submit all Owner required safety plans.

F.2.8 Contractor shall demonstrate that an employee drug testing program is in place.

F.3 CUTTING AND PATCHING

F.3.1 If applicable, Contractor shall be responsible for coordinating all cutting, fitting, or patching of the Work to make its several parts come together properly and fit to receive or be received by work of other contractors or Subcontractors shown upon, or reasonably implied by, the Contract Documents.

F.3.2 If applicable, Contractor shall be responsible for restoring all cut, fitted, or patched surfaces to an original condition; provided, however, that if a different condition is specified in the Contract Documents, then Contractor shall be responsible for restoring such surfaces to the condition specified in the Contract Documents.

F.4 CLEANING UP

From time to time as may be prudent or ordered by the Owner and, in any event, immediately after completion of the Work, the Contractor shall, at its own expense, clean up and remove all refuse and unused materials of any kind resulting from the Work. If Contractor fails to do so within twenty-four (24) hours after notification by the Owner the work may be

done by others and the cost charged to the Contractor and deducted from payment due the Contractor.

F.5 ENVIRONMENTAL CONTAMINATION

F.5.1. Contractor shall be held responsible for and shall indemnify, defend (with counsel of Owner's choice), and hold harmless Owner from and against any costs, expenses, damages, claims, and causes of action, or any of them, resulting from all spills, releases, discharges, leaks and disposal of environmental pollution, including storage, transportation, and handling during the performance of the Work or Contractor's obligations under the Contract which occur as a result of, or are contributed by, the negligence or actions of Contractor or its personnel, agents, or Subcontractors or any failure to perform in accordance with the Contract Documents (except to the extent otherwise void under ORS 30.140). Nothing in this section F.5.1 shall limit Contractor's responsibility for obtaining insurance coverages required under Section G.3 of the Contract, and Contractor shall take no action that would void or impair such coverages.

F.5.1.1 Contractor agrees to promptly dispose of such spills, releases, discharge or leaks to the satisfaction of Owner and regulatory agencies having jurisdiction in a manner that complies with Applicable Laws. Cleanup shall be at no cost to the Owner and shall be performed by properly qualified and, if applicable, licensed personnel.

F.5.1.2 Unless otherwise approved in the Solicitation Document, Contractor shall obtain the Owner's written consent prior to bringing onto the Project Site any (i) environmental pollutants or (ii) hazardous substances or materials, as the same or reasonably similar terms are used in any Applicable Laws. In any event, Contractor shall provide prior written notice to Owner when hazardous materials are brought on to the Project Site. The Contractor, at all times, shall:

(a) properly handle, use and dispose of all environmental pollutants and hazardous substances or materials on the Project Site, in accordance with all Applicable Laws;

(b) be responsible for any and all spills, releases, discharges, or leaks of (or from) environmental pollutants or hazardous substances or materials which Contractor has brought onto the Project Site; and

(c) promptly clean up and remediate, without cost to the Owner, such spills, releases, discharges, or leaks to the Owner's satisfaction and in compliance with all Applicable Laws.

F.5.2 Contractor shall report all reportable quantity releases, as such releases are defined in Applicable Laws. Upon discovery, regardless of quantity, Contractor must verbally report all releases to the Owner in a prompt manner. A written follow-up report shall be submitted to Owner within 48 hours of the telephonic report. Such written report shall contain, as a minimum:

(a) Description of items released (identity, quantity, manifest numbers, and any and all other documentation required by law).

(b) Whether amount of items released is EPA/DEQ reportable, and, if so, when reported.

(c) Exact time and location of release, including a description of the area involved.

(d) Containment procedures initiated.

(e) Summary of communications about the release between Contractor and State, local or federal officials other than Owner. Any communication to the press will be done by Owner and Contractor will defer to Owner.

(f) Description of cleanup procedures employed or to be employed at the Project Site, including disposal location of spill residue.

(g) Personal injuries, if any, resulting from, or aggravated by, the release.

F.6 ENVIRONMENTAL CLEAN-UP

F.6.1 Unless disposition of environmental pollution is specifically a part of the Contract, or was caused by the Contractor (reference F.5 Environmental Contamination), Contractor shall immediately notify Owner of any hazardous substance(s) which Contractor discovers or encounters during performance of the Work required by the Contract. "Hazardous substance(s)" means any hazardous, toxic and radioactive materials and those substances defined as "hazardous substances," "hazardous materials," "hazardous wastes," "toxic substances," or other similar designations in any federal, state, or local law, regulation, or ordinance, including without limitation asbestos, polychlorinated biphenyl ("PCB"), or petroleum, and any substances, materials or wastes regulated by 40 CFR, Part 261 and defined as hazardous in 40 CFR S 261.3. In addition to notifying Owner of any hazardous substance(s) discovered or encountered, Contractor shall immediately cease working in any particular area of the Project where a hazardous substance(s) has been discovered or encountered if continued work in such area would present a risk or danger to the health or wellbeing of Contractor's or any Subcontractor's work force, property or the environment.

F.6.2 Upon being notified by Contractor of the presence of hazardous substance(s) on the Project Site, not brought on to the Project Site by Contactor, Owner shall arrange for the proper disposition of such hazardous substance(s).

F.7 DEMOLITION

F.7.1 For demolition tasks, if any, the Contractor shall salvage or recycle construction and demolition debris, if feasible and cost-effective.

SECTION G
INDEMNITY, BONDING, AND INSURANCE

G.1 RESPONSIBILITY FOR DAMAGES / INDEMNITY

G.1.1 Contractor shall be responsible for all damage to property, injury to persons, and loss, expense, inconvenience, and delay that may be caused by, or result from, the carrying out of the Work to be done under the Contract, or from any act, omission or neglect of the Contractor, its Subcontractors, employees, guests, visitors, invitees and agents.

G.1.2 To the fullest extent permitted by law, Contractor shall indemnify, defend (with counsel approved by Owner) and hold harmless the Owner and its elected officials, officers, directors, agents, and employees (collectively "Indemnitees") from and against all liabilities, damages, losses, claims, expenses, demands and actions of any nature whatsoever which arise out of, result from or are related to: (a) any damage, injury, loss, expense, inconvenience or delay described in this Section G.1; (b) any accident or occurrence which happens or is alleged to have happened in or about the Project Site or any place where the Work is being performed, or in the vicinity of either, at any time prior to the time the Work is fully completed in all respects; (c) any failure of the Contractor to

observe or perform any duty or obligation under the Contract Documents which is to be observed or performed by the Contractor, or any breach of any agreement, representation or warranty of the Contractor contained in the Contract Documents or in any subcontract; (d) the negligent acts or omissions of the Contractor, a Subcontractor or anyone directly or indirectly employed by them or any one of them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder (except to the extent otherwise void under ORS 30.140); and (e) any lien filed upon the Project or bond claim in connection with the Work. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section G.1.2.

G.1.3 In claims against any person or entity indemnified under Section G.1.2 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section G.1.2 shall not be limited on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

G.2 PERFORMANCE AND PAYMENT SECURITY; PUBLIC WORKS BOND

G.2.1 When the Contract Price is $50,000 or more, the Contractor shall furnish and maintain in effect at all times during the Contract Period a performance bond in a sum equal to the Contract Price and a separate payment bond also in a sum equal to the Contract Price. Contractor shall furnish such bonds even if the Contract Price is less than the above thresholds if otherwise required by the Contract Documents.

G.2.2 Bond forms furnished by the Owner and notarized by Contractor's surety company authorized to do business in Oregon are the only acceptable forms of performance and payment security, unless otherwise specified in the Contract Documents.

G.2.3 Before execution of the Contract, the Contractor shall file with the Construction Contractors Board, and maintain in full force and effect, the separate public works bond required by Oregon Revised Statutes, Chapter 279C.830 and 279C.836, unless otherwise exempt under those provisions. The Contractor shall also include in every subcontract a provision requiring the Subcontractor to have a public works bond filed with the Construction Contractors Board before starting Work, unless otherwise exempt, and shall verify that the Subcontractor has filed a public works bond before permitting any Subcontractor to start Work.

G.3 INSURANCE

G.3.1 Primary Coverage: Insurance carried by Contractor under the Contract shall be the primary coverage. The coverages indicated are minimums unless otherwise specified in the Contract Documents.

G.3.2 Workers' Compensation: All employers, including Contractor, that employ subject workers who work under the Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. This shall include Employer's Liability Insurance with coverage limits of not less than the minimum amount required by statute for each accident. Contractors who perform the Work without the assistance or labor of any employee need not obtain such coverage if the Contractor certifies so in writing. Contractor shall ensure that each of its Subcontractors complies with these requirements. The Contractor shall require proof of such Workers' Compensation coverage by receiving and keeping on file a certificate of insurance from each Subcontractor or anyone else directly employed by either the Contractor or its Subcontractors.

G.3.3 Builder's Risk Insurance:

G.3.3.1 Builder's Risk: During the term of the Contract, for new construction the Contractor shall obtain and keep in effect Builder's Risk insurance on an all risk forms, including earthquake and flood, for an amount equal to the full amount of the Contract, plus any changes in values due to modifications, Change Orders and loss of materials added. Such Builder's Risk shall include, in addition to earthquake and flood, theft, vandalism, mischief, collapse, transit, debris removal, and architect's fees "soft costs" associated with delay of Project due to insured peril. Any deductible shall not exceed $50,000 for each loss, except the earthquake and flood deductible which shall not exceed 2 percent of each loss or $50,000, whichever is greater. The deductible shall be paid by Contractor. The policy will include as loss payees Owner, the Contractor and its Subcontractors as their interests may appear.

G.3.3.2 Builder's Risk Installation Floater: For Work other than new construction, Contractor shall obtain and keep in effect during the term of the Contract, a Builder's Risk Installation Floater for coverage of the Contractor's labor, materials and equipment to be used for completion of the Work performed under the Contract. The minimum amount of coverage to be carried shall be equal to the full amount of the Contract. The policy will include as loss payees Owner, the Contractor and its Subcontractors as their interests may appear. Owner may waive this requirement at its sole and absolute discretion.

G.3.3.3 Such insurance shall be maintained until Owner has occupied the facility.

G.3.3.4 A loss insured under the Builder's Risk insurance shall be adjusted by the Owner and made payable to the Owner as loss payee. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner. The Owner shall have power to adjust and settle a loss with insurers.

G.3.4 General Liability Insurance:

G.3.4.1 Commercial General Liability: Upon execution of a Contract, Contractor shall obtain, and keep in effect at Contractor's expense for the term of the Contract, Commercial General Liability Insurance ("CGL") covering bodily injury and property damage in the amount of not less than $1,000,000 per claim and $2,000,000 per occurrence in a form satisfactory to Owner. This insurance shall include personal injury liability, products and completed operations, and contractual liability coverage for the indemnities provided under the Contract (to the extent contractual liability coverage for the indemnity is available in the marketplace), and shall be issued on an occurrence basis written on ISO Form GC 00 01 (12 04 or later) or an equivalent form approved in advance by Owner. The CGL shall provide separation of insured language. The policy or policies obtained by Contractor for purposes of fulfilling the requirements of this section shall be primary insurance with respect to the Owner. Any insurance or self-insurance maintained by the County shall be excess and shall not contribute to it.

G.3.4.2 Automobile Liability: Contractor shall obtain, at Contractor's expense, and keep in effect during the term of the Contract, Automobile Liability Insurance covering owned, and/or hired vehicles, as applicable. The coverage may be written in combination with the Commercial General Liability Insurance. Contractor shall provide proof of insurance of not less than $1,000,000 per claim and $2,000,000 per occurrence. Contractor

and its Subcontractors shall be responsible for ensuring that all non-owned vehicles maintain adequate Automobile Liability insurance while on Project Site.

G.3.4.3 Owner may adjust the insurance amounts required in Section G.3.4.1 and G.3.4.2 based upon institution specific risk assessments through the issuance of Supplemental General Conditions and a Contract.

G.3.4.4 To the extent that the Contract Documents require the Contractor to provide professional design services, design-build, or certifications related to systems, materials, or equipment, the Contractor shall (1) purchase and maintain professional liability/errors-and-omissions insurance with limits of not less than $1,000,000 for each claim and $2,000,000 general annual aggregate and (2) cause those Subcontractors (of any tier) who are providing professional design services including any design-build services to procure and maintain professional liability/errors-and-omissions insurance with limits of not less than $1,000,000 for each claim and $2,000,000 general annual aggregate. This policy shall be for the protection of the Owner, its elected officials, officers, agents and employees against liability for damages because of personal injury, bodily injury, death, or damage to property, including loss of use thereof, and damages because of negligent acts, errors and omissions in any way related to the Contract. The Owner, at its option, may require a complete copy of the above policy.

G.3.4.5 "Tail" Coverage: If any of the required liability insurance is arranged on a "claims made" basis, "tail" coverage will be required at the completion of the Contract for a duration of 36 months or the maximum time period available in the marketplace if less than 36 months. Contractor shall furnish certification of "tail" coverage as described or continuous "claims made" liability coverage for 36 months following Final Completion. Continuous "claims made" coverage will be acceptable in lieu of "tail" coverage, provided its retroactive date is on or before the effective date of the Contract. Owner's receipt of the policy endorsement evidencing such coverage shall be a condition precedent to Owner's obligation to make final payment and to Owner's final acceptance of Work or services and related warranty (if any).

G.3.4.6 Umbrella Liability (if required by Owner through issuance of Supplemental General Conditions): Contractor shall obtain, at Contractor's expense, and keep in effect during the term of the Contract, Umbrella liability Insurance over and above the general liability, automobile liability and workers' compensation coverage if required by Owner in specified limits at time of requirement.

G.3.4.7 Pollution Liability may be required by Owner through issuance of Supplemental General Conditions.

G.3.5 Additional Insured: The general liability insurance coverage, automobile liability, umbrella, and pollution liability if required, shall include the Owner as additional insureds but only with respect to the Contractor's activities to be performed under the Contract. The additional-insured endorsement for CGL insurance must be written on ISO Form CG 20 10 (10 01) and CG 20 37 (10 01), or their equivalent, but shall not use either of the following forms: CG 20 10 (10 93) or CG 20 10 (03 94). Proof of insurance must include a copy of the endorsement showing "Clackamas County, its elected officials, agents, officers, and employees" as scheduled insureds.

If Contractor cannot obtain an insurer to name the Owner as additional insureds, Contractor shall obtain at Contractor's expense, and keep in effect during the term of the Contract, Owners and Contractors Protective Liability Insurance, naming the Owner as additional insureds with not less than a $2,000,000 limit per occurrence. This policy must be kept in effect for 36 months following Final Completion. As evidence of coverage, Contractor shall furnish the actual policy to Owner prior to execution of the Contract.

G.3.6 Notice of Cancellation or Change: If the Contractor receives a non-renewal or cancellation notice from an insurance carrier affording coverage required herein, or receives notice that coverage no longer complies with the insurance requirements herein, Contractor agrees to notify Owner by fax within five (5) business days with a copy of the non-renewal or cancellation notice, or written specifics as to which coverage is no longer in compliance. When notified by Owner, the Contractor agrees to stop Work pursuant to the Contract at Contractor's expense, unless all required insurance remain in effect. Any failure to comply with the reporting provisions of this insurance, except for the potential exhaustion of aggregate limits, shall not affect the coverages provided to the Owner and its institutions, divisions, officers, and employees.

Owner shall have the right, but not the obligation, of prohibiting Contractor from entering the Project Site until a new certificate(s) of insurance is provided to Owner evidencing the replacement coverage. The Contractor agrees that Owner reserves the right to withhold payment to Contractor until evidence of reinstated or replacement coverage is provided to Owner.

G.3.7 Certificate(s) of Insurance/Insurance Carrier Qualification: As evidence of the insurance coverage required by the Contract, the Contractor shall furnish certificate(s) of insurance to the Owner prior to execution of the Contract. The certificate(s) will specify all of the parties who are additional insureds or loss payees for the Contract. A renewal certificate shall be sent to Owner at least 10 days prior to coverage expiration. Insurance coverage required under the Contract shall be obtained from insurance companies or entities acceptable to the Owner and that are eligible to provide such insurance under Oregon law. Eligible insurers include admitted insurers that have been issued a certificate of authority from the Oregon Department of Consumer and Business Services authorizing them to conduct an insurance business and issue policies of insurance in the state of Oregon, and certain non-admitted surplus lines insurers that satisfy the requirements of applicable Oregon law and which are subject to approval by the Owner. The Contractor shall be financially responsible for all deductibles, self-insured retentions and/or self-insurance included hereunder. Any deductible, self-insured retention and/or self-insurance in excess of $50,000 shall be subject to approval by the Owner in writing and shall be a condition precedent to the effectiveness of any Contract.

SECTION H
SCHEDULE OF WORK

H.1 CONTRACT PERIOD

H.1.1 Time is of the essence. The Contractor shall at all times carry on the Work diligently, without delay and punctually fulfill all requirements herein.

H.1.2 Notice to Proceed. Unless otherwise directed in the Contract Documents, Contractor shall commence Work on the Project Site within fifteen (15) Days of the Notice to Proceed. Notwithstanding the Notice to Proceed, Contractor shall not be authorized to proceed with the Work until all initial Contract requirements, including the Contract, performance bond and payment bond, and certificates of insurance, have been fully executed and submitted in a form acceptable to Owner.

H.1.3 Unless otherwise not required in the Construction Documents, Contractor shall participate in a pre-construction conference with the Owner's representative and designated design team. The

purpose of this pre-construction conference is to review the Contractor's proposed Schedule of Values and to review any other Project logistics to be coordinated between the parties.

H.1.4 Unless specifically extended by a Change Order, all Work shall be complete by the date contained in the Contract Documents. The Owner shall have the right to accelerate the completion date of the Work, which may require the use of overtime. Such accelerated Work schedule shall be an acceleration in performance of Work under Section D.1.2(f) and shall be subject to the provisions of Section D.1.

H.1.5 The Owner shall not waive any rights under the Contract by permitting the Contractor to continue or complete in whole or in part the Work after the date described in Section H.1.2 above.

H.2 SCHEDULE

H.2.1 Contractor shall provide, by or before the pre-construction conference, the initial as-planned schedule for review and acceptance by the Owner. The submitted schedule must illustrate Work by Project components, labor trades, and long lead items broken down by building and/or floor where applicable. If Owner shall so elect, Contractor shall provide the schedule in CPM format showing the graphical network of planned activities, including i) a reasonably detailed list of all activities required to complete the Work; ii) the time and duration that each activity will take to completion; and iii) the dependencies between the activities. Schedules lacking adequate detail, or unreasonably detailed, will be rejected. The schedule shall include the following: Notice to Proceed or the date the Work commences, if no Notice to Proceed is issued by Owner, Substantial Completion, and Final Completion. Schedules shall be updated monthly, unless otherwise required by the Contract Documents, and submitted with the monthly application for payment. Acceptance of the Schedule by the Owner does not constitute agreement by the Owner as to the Contractor's sequencing, means, methods, or durations. Any positive difference between the Contractor's scheduled completion and the Contract completion date is float owned by the Owner. Owner reserves the right to negotiate the float if it is deemed to be in Owner's best interest to do so. In no case shall the Contractor make a claim for delays if the Work is completed within the Contract Time but after Contractor's scheduled completion.

H.2.2 All Work shall be completed during normal weekdays (Monday through Friday) between the hours of 7:00 a.m. and 5:00 p.m. unless otherwise specified in the Contract Documents. Unless otherwise specified in the Contract Documents, no Work shall be performed during the following holidays:

- New Year's Day
- Martin Luther King Day
- Memorial Day
- Independence Day
- Labor Day
- Veterans Day
- Thanksgiving Day
- Christmas Day
- President's Day

When a holiday falls on a Sunday, the following Monday shall be recognized as a legal holiday. When a holiday falls on Saturday, the preceding Friday shall be recognized as a legal holiday.

H.3 PARTIAL OCCUPANCY OR USE

The Owner may occupy or use any completed or partially completed portion of the Work at any stage, provided such occupancy or use is consented to by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have reasonably accepted in writing the responsibilities assigned to each of them. Approval by the Contractor to partial occupancy or use shall not be unreasonably withheld. Immediately prior to such partial occupancy or use, the Owner and Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work. Partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

SECTION I
CORRECTION OF WORK

I.1 CORRECTION OF WORK BEFORE FINAL PAYMENT

The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects, and that the Work will conform to the requirements of the Contract Documents. Work failing to conform to these requirements shall be deemed defective. Contractor shall promptly remove from the premises and replace all defective materials and equipment as determined by the Owner, whether incorporated in the Work or not. Removal and replacement shall be without loss or expense to the Owner, and Contractor shall bear the cost of repairing all Work destroyed or damaged by such removal or replacement. Contractor shall be allowed a period of no longer than thirty (30) Days after Substantial Completion for completion of defective (Punch List) work. At the end of the thirty-day period, or earlier if requested by the Contractor, Owner shall arrange for inspection of the Work by the Architect/Engineer. Should the work not be complete, and all corrections made, the costs for all subsequent reinspections shall be borne by the Contractor. If Contractor fails to complete the Punch List work within the thirty (30) Day period, Owner may perform such work and Contractor shall reimburse Owner all costs of the same within ten (10) Days after demand without affecting Contractor's obligations.

I.2 WARRANTY WORK

I.2.1 Neither the final certificate of payment nor any provision of the Contract Documents shall relieve the Contractor from responsibility for Defective Work and, unless a longer period is specified, Contractor shall correct all defects that appear in the Work within a period of one year from the date of issuance of the written notice of Substantial Completion by the Owner except for latent defects which will be remedied by the Contractor at any time they become apparent. The Owner shall give Contractor notice of defects with reasonable promptness. Contractor shall perform such warranty work within a reasonable time after Owner's demand and at Contractors sole expense. If Contractor fails to complete the warranty work within such period as Owner determines reasonable, or at any time in the event of warranty work consisting of emergency repairs, Owner may perform such work and Contractor shall reimburse Owner all costs of the same within ten (10) Days after demand, without affecting Contractor's obligations. The Contractor shall perform the warranty Work by correcting defects within twenty-four (24) hours of notification by Owner, unless otherwise specified in the Contract Documents. Should the Contractor fail to respond within the specified response time, the Owner may, at its option, complete the necessary repairs using another contractor or its agents. If Owner completes the repairs using Owner's agent, Contractor shall pay Owner at the rate of one and one-half (1½) times the standard hourly rate of Owner's agent, plus related overhead and any direct non-salary costs. If Owner completes the repairs using another contractor, Contractor shall pay Owner the amount of Owner's direct costs billed by the other contractor for the work, plus the direct salary costs and related overhead and direct non-salary expenses of Owner's agents who

are required to monitor that contractor's work. Work performed by Owner using Owner's own agents or those of another contractor shall not affect the Contractor's contractual duties under these provisions, including warranty provisions.

I.2.2 Nothing in this Section I.2 provision shall negate guarantees or warranties for periods longer than one year including without limitation, such guarantees or warranties required by other sections of the Contract Documents for specific installations, materials, processes, equipment or fixtures.

I.2.3 In addition to Contractor's warranty, manufacturer's warranties shall pass to the Owner and shall not take effect until such portion of the Work covered by the applicable warranty has been accepted in writing by the Owner.

I.2.4 The one-year period for correction of Work shall be extended with respect to portions of Work performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work, and shall be extended by corrective Work performed by the Contractor pursuant to this Section, as to the Work corrected. The Contractor shall remove from the Project Site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

I.2.5 Nothing contained in this Section I.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the period for correction of Work as described in this Section I.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

I.2.6 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Price will be reduced as appropriate and equitable as determined by Owner. Such adjustment shall be effected whether or not final payment has been made.

SECTION J
SUSPENSION AND/OR TERMINATION OF THE WORK

J.1 OWNER'S RIGHT TO SUSPEND THE WORK

J.1.1 The Owner has the authority to suspend portions or all of the Work due to the following causes:

(a) Failure of the Contractor to correct unsafe conditions;

(b) Failure of the Contractor to carry out any provision of the Contract;

(c) Failure of the Contractor to carry out orders;

(d) Conditions, in the opinion of the Owner, which are unsuitable for performing the Work;

(e) Time required to investigate differing Project Site conditions; or

(f) Any reason considered to be in the public interest.

J.1.2 The Owner shall notify Contractor and the Contractor's Surety in writing of the effective date and time of the suspension, and Owner shall notify Contractor and Contractor's surety in writing to resume Work.

J.2 CONTRACTOR'S RESPONSIBILITIES

J.2.1 During the period of the suspension, Contractor is responsible to continue maintenance at the Project just as if the Work were in progress. This includes, but is not limited to, protection of completed Work, maintenance of access, protection of stored materials, temporary facilities, and clean-up.

J.2.2 When the Work is recommenced after the suspension, the Contractor shall replace or renew any Work damaged during the suspension, remove any materials or facilities used as part of temporary maintenance, and complete the Work in every respect as though its prosecution had been continuous and without suspension.

J.3 COMPENSATION FOR SUSPENSION

Depending on the reason for suspension of the Work, the Contractor or the Owner may be due compensation by the other party. If the suspension was required due to acts or omissions of Contractor, the Owner may assess the Contractor actual costs of the suspension in terms of administration, remedial work by the Owner's agents or another contractor to correct the problem associated with the suspension, rent of temporary facilities, and other actual costs related to the suspension, and any liquidated damages arising from the delay. If the suspension was caused by acts or omissions of the Owner, the Contractor may be due compensation which shall be defined using Section D, Changes in Work. If the suspension was required through no fault of the Contractor or the Owner, neither party shall owe the other for the impact.

J.4 OWNER'S RIGHT TO TERMINATE CONTRACT

J.4.1 The Owner may, without prejudice to any other right or remedy, and after giving Contractor seven (7) Days' written notice and an opportunity to cure, terminate the Contract in whole or in part under the following conditions:

(a) If Contractor should, voluntarily or involuntarily, seek protection under the United States Bankruptcy Code and Contractor as debtor-in-possession or the Trustee for the estate fails to assume the Contract within a reasonable time;

(b) If Contractor should make a general assignment for the benefit of Contractor's creditors;

(c) If a receiver should be appointed on account of Contractor's insolvency;

(d) If Contractor should repeatedly refuse or fail to supply an adequate number of skilled workers or proper materials to carry on the Work as required by the Contract Documents, or otherwise fail to perform the Work in a timely manner;

(e) If Contractor should repeatedly fail to make prompt payment to Subcontractors or for material or labor, or should disregard laws, ordinances or the instructions of the Owner;

(f) If Contractor is otherwise in breach of any part of the Contract; or

(g) If Contractor is in violation of Applicable Laws, either in the conduct of its business or in its performance of the Work.

J.4.2 At any time that any of the above occurs, Owner may exercise all rights and remedies available to Owner at law or in equity, and, in addition, Owner may take possession of the premises and of all materials and appliances and finish the Work by whatever method it may deem expedient. In such case, the Contractor shall not be entitled to receive further payment until the Work is completed. If

the Owner's cost of finishing the Work exceeds the unpaid balance of the Contract Price, Contractor shall pay the difference to the Owner.

J.5 TERMINATION FOR CONVENIENCE, NON-APPROPRIATION OF FUNDS, OR FORCE MAJEURE

J.5.1 Owner may terminate the Contract in whole or in part whenever Owner determines: (a) that termination of the Contract is in the best interest of Owner or the public; (b) that the Owner failed to receive funding, appropriations, allocations or other expenditure authority as contemplated by Owner's budget and Owner determines, in its sole determination, and its assessment and ranking of the policy objectives explicit or implicit in Owner's budget, Owner may determine it is necessary to and may terminate the Contract.; or (c) in the event of Force Majeure.

J.5.2 The Owner shall provide the Contractor with seven (7) Days prior written notice of a termination for Owner's or for public convenience. After such notice, the Contractor shall provide the Owner with immediate and peaceful possession of the premises and materials located on and off the premises for which the Contractor received progress payment under Section E. Compensation for Work terminated by the Owner under this provision will be according to Section E. In no circumstance shall Contractor be entitled to lost profits for Work not performed due to termination. If the Contract is terminated for public convenience, neither the Contractor not its Surety shall be relieved of liability for damages or losses suffered by the Owner as a result of defective, unacceptable or unauthorized Work completed or performed.

J.6 ACTION UPON TERMINATION

J.6.1 Upon receiving a notice of termination, and except as directed otherwise by the Owner, Contractor shall immediately cease placing further subcontracts or orders for materials, services, or facilities. In addition, Contractor shall terminate all subcontracts or orders to the extent they relate to the Work terminated and, with the prior written approval of the Owner, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts and orders.

J.6.2 As directed by the Owner, Contractor shall, upon termination, transfer title and deliver to the Owner all Record Documents, information, and other property that, if the Contract had been completed, would have been required to be furnished to the Owner.

J.6.3 Upon Owner's notice of termination pursuant to either Section J.4 or J.5, if Owner shall so elect, Contractor shall assign to the Owner such subcontracts and orders as Owner shall specify. In the event Owner elects to take assignment of any such subcontract or order, Contractor shall take such action and shall execute such documents as Owner shall reasonably require for the effectiveness of such assignment and Contractor shall ensure that no contractual arrangement between it and its subcontractors or suppliers of any tier or sub-tier shall prevent such assignment.

SECTION K
CONTRACT CLOSE OUT

K.1 RECORD DOCUMENTS

As a condition of final payment (refer also to section E.6), Contractor shall comply with the following: Contractor shall provide Record Documents for the entire Project to Owner. Record Documents shall depict the Project as constructed and shall reflect each and every change, modification, and deletion made during the construction. Record Documents are part of the Work and shall be provided prior to the Owner's issuance of final payment. Record Documents include all modifications to the Contract Documents unless otherwise directed.

K.2 OPERATION AND MAINTENANCE MANUALS

As part of the Work, Contractor shall submit two completed operation and maintenance manuals ("O & M Manuals") for review by the Owner prior to submission of any pay request for more than 75% of the Work. Owner's receipt of the O & M Manuals shall be a condition precedent to any payment thereafter due. The O & M Manuals shall contain a complete set of all submittals, all product data as required by the specifications, training information, telephone list and contact information for all consultants, manufacturers, installer and suppliers, manufacturer's printed data, record and shop drawings, schematic diagrams of systems, appropriate equipment indices, warranties and bonds. The Owner shall review and return one O & M Manual for any modifications or adjustments required. Prior to submission of its final pay request, Contractor shall deliver two (2) complete and approved sets of O & M Manuals in paper form and one (1) complete and approved set in electronic form to the Owner and Owner's receipt of the O & M Manuals shall be a condition precedent to Owner's obligation to make final payment.

K.3 COMPLETION NOTICES

K.3.1 Contractor shall provide Owner written notice of both Substantial and Final Completion. The certificate of Substantial Completion shall state the date of Substantial Completion, the responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and the time within which the Contractor shall finish all items on the Punch List accompanying the Certificate. Both completion notices must be signed and notarized by the Contractor and signed by the Architect/Engineer (if applicable) and Owner to be valid. The Owner shall provide the final signature on the notices. The notices shall take effect on the date they are signed by the Owner.

K.3.2 Substantial Completion of a facility with operating systems (e.g., mechanical, electrical, HVAC) shall be that degree of completion that has provided a minimum of thirty (30) continuous Days of successful, trouble-free operation, which period shall begin after all performance and acceptance testing has been successfully demonstrated to the Owner. All equipment contained in the Work, plus all other components necessary to enable the Owner to operate the facility in the manner that was intended, shall be complete on the Substantial Completion date. The Contractor may request that a Punch List be prepared by the Owner with submission of the request for the Substantial Completion notice.

K.4 TRAINING

As part of the Work, and prior to submission of the final application for payment, the Contractor shall schedule with the Owner training sessions for all equipment and systems as required by the Contract Documents. Contractor shall schedule training sessions at least two weeks in advance of the date of training to allow Owner to provide its personnel with adequate notice. If assignments arise because of termination under Section J.4, then such assignments shall not relieve Contractor of liability hereunder. The O & M Manual shall be used as a basis for training. In addition to any off-Project Site training required by the Contract Documents, training shall include a formal session conducted at the Project Site after the equipment and/or system is completely installed and operational in its normal operating environment.

K.5 EXTRA MATERIALS

As part of the Work, Contractor shall provide spare parts, extra maintenance materials, and other materials or products in the quantities specified in the Contract Documents prior to final payment. Delivery point for extra materials shall be designated by the Owner.

K.6 ENVIRONMENTAL CLEAN-UP

As part of the Final Completion notice, or as a separate written notice submitted with or before the notice of Final Completion, the Contractor shall notify the Owner that all environmental and pollution clean-up, remediation and closure have been completed in accordance with all Applicable Laws and pursuant to the authority of all agencies having jurisdiction, and Contractor shall provide Owner with any and all documentation related to the same, including but not limited to directives, orders, letters, certificates and permits related to or arising from such environmental pollution. The notice shall reaffirm the indemnification given under Section F.5.1 above. Contractor's completion of its obligations under this Section K.6 and Owner's receipt of documents evidencing such completion shall be a condition precedent to Owner's obligation to make final payment.

K.7 CERTIFICATE OF OCCUPANCY

Owner's receipt of an unconditioned certificate of occupancy from the appropriate state and/or local building officials shall be a condition precedent to Owner's obligation to make final payment, except to the extent failure to obtain an unconditional certificate of occupancy is due to the fault or neglect of Owner.

K.8 OTHER CONTRACTOR RESPONSIBILITIES

The Contractor shall be responsible for returning to the Owner all property of Owner issued to Contractor during construction such as keys, security passes, Project Site admittance badges, and all other pertinent items. Upon notice from Owner, Contractor shall be responsible for notifying the appropriate utility companies to transfer utility charges from the Contractor to the Owner. The utility transfer date shall not be before Substantial Completion and may not be until Final Completion, if the Owner does not take beneficial use of the facility and the Contractor's agents continue with the Work.

The Owner's property is drug free and weapons free areas and the use of tobacco products is only allowed in designated areas. Contractor shall be required to ensure that its employees, Subcontractors and agents shall comply with these requirements.

SECTION L
GENERAL PROVISIONS

L.1 NO THIRD PARTY BENEFICIARIES

Owner and Contractor are the only parties to the Contract and are the only parties entitled to enforce its terms. Nothing in the Contract gives, is intended to give, or shall be construed to give or provide any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of the Contract.

L.2 SEVERABILITY

If any provision of the Contract is declared by a court to be unenforceable, illegal, or in conflict with any law, the validity of the remaining terms and provisions shall not be affected and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular provision held to be invalid.

L.3 ACCESS TO RECORDS

L.3.1 Contractor shall keep, at all times on the Project Site, one record copy of the complete Contract Documents, including the Plans, Specifications, addenda, and Change Orders (if any) in good order and marked currently to record field changes and selections made during construction, and one record copy of Shop Drawings, Product Data, Samples and similar submittals, and shall at all times give the Owner access thereto.

L.3.2 Contractor shall retain and the Owner and its duly authorized representatives shall have access, for a period not less than ten (10) years, to all Record Documents, financial and accounting records, and other books, documents, papers and records of Contractor which are pertinent to the Contract, including records pertaining to Overhead and indirect costs, for the purpose of making audit, examination, excerpts and transcripts. If for any reason, any part of the Work or the Contract shall be subject to litigation, Contractor shall retain all such records until all litigation is resolved and Contractor shall continue to provide Owner and/or its agents with full access to such records until such time as all litigation is complete and all periods for appeal have expired and full and final satisfaction of any judgment, order or decree is recorded and Owner receives a record copy of documentation from Contractor.

L.4 WAIVER

Failure of the Owner to enforce any provision of the Contract shall not constitute a waiver or relinquishment by the Owner of the right to such performance in the future nor of the right to enforce any other provision of the Contract.

L.5 SUCCESSORS IN INTEREST

The provisions of the Contract shall be binding upon and shall accrue to the benefit of the parties to the Contract and their respective permitted successors and assigns.

L.6 GOVERNING LAW

The Contract shall be governed by and construed in accordance with the laws of the State of Oregon without giving effect to the conflict of law provisions thereof.

L.7 APPLICABLE LAW

Contractor hereto agrees to comply in all ways with applicable local, state and federal ordinances, statutes, laws and regulations.

L.8 NON-EXCLUSIVE RIGHTS AND REMEDIES

Except as otherwise expressly provided herein, the rights and remedies expressly afforded under the provisions of the Contract shall not be deemed exclusive, and shall be in addition to and cumulative with any and all rights and remedies otherwise available at law or in equity. The exercise by either Party of any one or more of such remedies shall not preclude the exercise by it, at the same or different times, of any other remedies for the same default or breach, or for any other default or breach, by the other Party.

L.9 INTERPRETATION

The titles of the sections of the Contract are inserted for convenience of reference only and shall be disregarded in construing or interpreting any of its provisions.

L.10 DEBT LIMITATION

The Contract is expressly subject to the debt limitation of Oregon counties set forth in Article XI, Section 10, of the Oregon Constitution, and is contingent upon funds being appropriated therefore. Any provisions herein which would conflict with law are deemed inoperative to that extent.

L.11 LITIGATION

Any Claim between Owner and Contractor that arises from or relates to the Contract and that is not resolved through the Claims Review Process in Section D.3 shall be brought and conducted solely and exclusively within the Circuit Court of Clackamas County for the State of Oregon; provided, however, if a Claim must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. In no event shall this section be construed as a waiver by the County of any form of defense or

immunity, whether sovereign immunity, governmental immunity, immunity based on the Eleventh Amendment to the Constitution of the United States or otherwise, from any claim or from the jurisdiction of any court. CONTRACTOR, BY EXECUTION OF THE CONTRACT, HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF THE COURTS REFERENCED IN THIS SECTION.

L. 12 SURVIVAL

All warranty, indemnification, and record retention provisions of the Contract, and all of Contractor's other obligations under the Contract that are not fully performed by the time of Final Completion or termination, and all other rights and obligations which by their context are intended to survive, shall survive Final Completion or any termination of the Contract.

L.13 ACCESS TO RECORDS

L.13.1. Contractor shall keep, at all times on the Work site, one record copy of the complete Contract Documents, including the Plans, Specifications, Construction Change Directives and addenda, in good order and marked currently to record field changes and selections made during construction, and one copy of Shop Drawings, Project Data, Samples and similar submittals, and shall at all times give the Owner access thereto.

L.13.2 Contractor shall retain and the Owner and its duly authorized representatives shall have access, for a period not less than ten (10) years, to all Record Documents, financial and accounting records, and other books, documents, papers and records of Contractor which are pertinent to the Contract, including records pertaining to Overhead and indirect costs, for the purpose of making audit, examination, excerpts and transcripts. If for any reason, any part of the Work or this Contract shall be subject to litigation, Contractor shall retain all such records until all litigation is resolved and Contractor shall continue to provide Owner and/or its agents with full access to such records until such time as all litigation is complete and all periods for appeal have expired and full and final satisfaction of any judgment, order or decree is recorded and Owner receives a record copy of documentation from Contractor.

L.14 WAIVER

Failure of the Owner to enforce any provision of this Contract shall not constitute a waiver or relinquishment by the Owner of the right to such performance in the future nor of the right to enforce any other provision of this Contract.

L. 15 NO ATTORNEY FEES.

In the event any arbitration, action or proceeding, including any bankruptcy proceeding, is instituted to enforce any term of this Contract, each party shall be responsible for its own attorneys' fees and expenses.

CLACKAMAS WATER ENVIRONMENT SERVICES

WATER ENVIRONMENT SERVICES
PUBLIC IMPROVEMENT CONTRACT

PERFORMANCE BOND

Bond No.: 190054347/30196536
Solicitation: #2023-66
Project Name: 2023 Collection System Rehab Project

Liberty Mutual Insurance Company	(Surety #1)	Bond Amount No. 1:	$ 587,174.50
Continental Casualty	(Surety #2)*	Bond Amount No. 2:*	$ 587,174.50
* *If using multiple sureties*		Total Penal Sum of Bond:	$ 1,174,349.00
**Company			

We, Michels Trenchless, Inc. as Principal, and the above identified Surety(ies), authorized to transact surety business in Oregon, as Surety, hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto Water Environment Services ("District"), the sum of (Total Penal Sum of Bond) $ One Million One Hundred Seventy Four Thousand*** (Provided, that we the Sureties bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety); and ***Three Hundred Forty Nine & 00/100 Dollars ($1,174,349.00)

WHEREAS, the Principal has entered into a contract with the District, along with the plans, specifications, terms and conditions of which are contained in the above-referenced Project Contract Documents; and

WHEREAS, the terms and conditions of the contract, together with applicable plans, standard specifications, special provisions, schedule of performance, and schedule of contract prices, are made a part of this Performance Bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans and specifications, and all authorized modifications of the Contract which increase the amount of the work, the amount of the Contract, or constitute an authorized extension of the time for performance, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal herein shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things undertaken by Contractor to be performed under the Contract, upon the terms set forth therein, and within the time prescribed therein, or as extended as provided in the Contract, with or without notice to the Sureties, and shall defend, indemnify, and save harmless the District and Clackamas County and their elected officials, officers, employees and agents, against any direct or indirect damages or claim of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Principal or its subcontractors, and shall in all respects perform said contract according to law, then this obligation is to be void; otherwise, it shall remain in full force and effect for so long as any term of the Contract remains in effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the District, be obligated for the payment of any premiums.

This bond is given and received under authority of Oregon Revised Statutes Chapter 279C and the Clackamas County Local Contractor Review Board Rules, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES.

Dated this 11th day of October, 2023.

PRINCIPAL: Michels Trenchless, Inc.

By: _____
Signature

Snr Manager - Business Admin
Official Capacity

Attest: _____
Assistant Corporation Secretary

SURETY: Liberty Mutual Insurance Company & Continental Casualty Company
[Add signatures for each if using multiple bonds]

BY ATTORNEY-IN-FACT:
[Power-of-Attorney must accompany each bond]

Heather R. Goedtel, Attorney-in-Fact
Name

_____
Signature

8400 Normandale Lake Blvd., Suite 1700
Address

Bloomington, MN 55437
City State Zip

763.302.7159 763.302.7200
Phone Fax

WATER ENVIRONMENT SERVICES
PUBLIC IMPROVEMENT CONTRACT

PAYMENT BOND

Bond No.: 190054347/30196536
Solicitation: #2023-66
Project Name: 2023 Collection System Rehab Project

Liberty Mutual Insurance Company	(Surety #1)	Bond Amount No. 1:	$ 587,174.50
Continental Casualty	(Surety #2)*	Bond Amount No. 2:*	$ 587,174.50
* *If using multiple sureties*		Total Penal Sum of Bond:	$ 1,174,349.00
**Company			

We, Michels Trenchless, Inc., as Principal, and the above identified Surety(ies), authorized to transact surety business in Oregon, as Surety, hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto Water Environment Services ("District"), the sum of (Total Penal Sum of Bond) One Million One Hundred Seventy Four Thousand Three Hundred Forty*** (Provided, that we the Sureties bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety); and
***Nine & 00/100 Dollars ($1,174,349.00)

WHEREAS, the Principal has entered into a contract with the District, along with the plans, specifications, terms and conditions of which are contained in above-referenced Project Contract Documents; and

WHEREAS, the terms and conditions of the contract, together with applicable plans, standard specifications, special provisions, schedule of performance, and schedule of contract prices, are made a part of this Payment Bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans and specifications, and schedule of contract prices which are set forth in the Contract and any attachments, and all authorized modifications of the Contract which increase the amount of the work, or the cost of the Contract, or constitute authorized extensions of time for performance of the Contract, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things by it undertaken to be performed under said Contract and any duly authorized modifications that are made, upon the terms set forth therein, and within the time prescribed therein, or as extended therein as provided in the Contract, with or without notice to the Sureties, and shall defend, indemnify, and save harmless the District and Clackamas County and their elected officials, officers, employees and agents, against any claim for direct or indirect damages of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Contractor or its subcontractors, and shall promptly pay all persons supplying labor, materials or both to the Principal or its subcontractors for prosecution of the work provided in the Contract; and shall promptly pay all contributions due the State Industrial Accident Fund and the State Unemployment Compensation Fund from the Principal or its subcontractors in connection with the performance of the Contract; and shall pay over to the Oregon Department of Revenue all sums required to be deducted and retained from the wages of employees of the Principal and its subcontractors pursuant to ORS 316.167, and shall permit no lien nor claim to be filed or prosecuted against the District on account of any labor or materials furnished; and shall do all things required of

the Principal by the laws of this State, then this obligation shall be void; otherwise, it shall remain in full force and effect for so long as any term of the Contract remains in effect.
Nonpayment of the bond premium will not invalidate this bond nor shall the District be obligated for the payment of any premiums.

This bond is given and received under authority of Oregon Revised Statutes Chapter 279C and the Clackamas County Local Contractor Review Board Rules, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES:

Dated this 11th day of October, 2023.

PRINCIPAL: Michels Trenchless, Inc.

By: _____
Signature

Snr Manager - Business Admin
Official Capacity

Attest: _____
Assistant Corporation Secretary

SURETY: Liberty Mutual Insurance Company & Continental Casualty Company
[Add signatures for each if using multiple bonds]

BY ATTORNEY-IN-FACT:
[Power-of-Attorney must accompany each bond]

Heather R. Goedtel, Attorney-in-Fact
Name

_____
Signature

8400 Normandale Lake Blvd., Suite 1700
Address

Bloomington, MN 55437
City State Zip

763.302.7159 763.302.7200
Phone Fax

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

Certificate No: 8209239-190003

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Blake S. Bohlig; Brian D. Carpenter; Craig Olmstead; Erik T. Gunkel; Haley Pflug; Heather R. Goedtel; Jessica Hoff; Kelly Nicole Enghauser; Laurie Pflug; Michelle Halter; Michelle Ward; Nicole Langer

all of the city of Bloomington state of MN each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 12th day of January, 2023.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

By: _____
David M. Carey, Assistant Secretary

State of PENNSYLVANIA
County of MONTGOMERY ss

On this 12th day of January, 2023 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.

Commonwealth of Pennsylvania - Notary Seal
Teresa Pastella, Notary Public
Montgomery County
My commission expires March 28, 2025
Commission number 1126044
Member, Pennsylvania Association of Notaries

By: _____
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS: Section 12. Power of Attorney.
Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts: Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this _____ day of _____, _____.

By: _____
Renee C. Llewellyn, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

For bond and/or Power of Attorney (POA) verification inquiries, please call 610-832-8240 or email HOSUR@libertymutual.com.

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That Continental Casualty Company, an Illinois insurance company, National Fire Insurance Company of Hartford, an Illinois insurance company, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania insurance company (herein called "the CNA Companies"), are duly organized and existing insurance companies having their principal offices in the City of Chicago, and State of Illinois, and that they do by virtue of the signatures and seals herein affixed hereby make, constitute and appoint

Laurie Pflug, Brian D. Carpenter, Nicole Langer, Craig Olmstead, Jessica Hoff, Heather R. Goedtel, Michelle Halter, Kelly Nicole Enghauser, Blake S. Bohlig, Trisha Kasper, Haley Pflug, Individually

of Bloomington, MN, their true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on their behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind them thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of their insurance companies and all the acts of said Attorney, pursuant to the authority hereby given is hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Laws and Resolutions, printed on the reverse hereof, duly adopted, as indicated, by the Boards of Directors of the insurance companies.

In Witness Whereof, the CNA Companies have caused these presents to be signed by their Assistant Vice President and their corporate seals to be hereto affixed on this 11th day of April, 2023.

Continental Casualty Company
National Fire Insurance Company of Hartford
American Casualty Company of Reading, Pennsylvania

Larry Kasten — Assistant Vice President

State of South Dakota, County of Minnehaha, ss:

On this 11th day of April, 2023, before me personally came Larry Kasten to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is an Assistant Vice President of Continental Casualty Company, an Illinois insurance company, National Fire Insurance Company of Hartford, an Illinois insurance company, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania insurance company described in and which executed the above instrument; that he knows the seals of said insurance companies; that the seals affixed to the said instrument are such corporate seals; that they were so affixed pursuant to authority given by the Boards of Directors of said insurance companies and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said insurance companies.

M. BENT NOTARY PUBLIC SOUTH DAKOTA

My Commission Expires March 2, 2026

M. Bent — Notary Public

CERTIFICATE

I, D. Johnson, Assistant Secretary of Continental Casualty Company, an Illinois insurance company, National Fire Insurance Company of Hartford, an Illinois insurance company, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania insurance company do hereby certify that the Power of Attorney herein above set forth is still in force, and further certify that the By-Laws and Resolutions of the Board of Directors of the insurance companies printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said insurance companies this day of , .

Continental Casualty Company
National Fire Insurance Company of Hartford
American Casualty Company of Reading, Pennsylvania

D. Johnson — Assistant Secretary

Form F6853-4-2023

Go to www.cnasurety.com > Owner / Obligee Services > Validate Bond Coverage, if you want to verify bond authenticity.

Authorizing By-Laws and Resolutions

This Power of Attorney is signed by Larry Kasten, Assistant Vice President of each of the CNA Companies (as defined in the Power of Attorney), who has been authorized pursuant to the below Bylaws and Resolutions to execute power of attorneys on behalf of each of the CNA Companies.

ADOPTED BY THE BOARD OF DIRECTORS OF CONTINENTAL CASUALTY COMPANY:

This Power of Attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the Board of Directors of the Company at a meeting held on May 12, 1995:

"RESOLVED: That any Senior or Group Vice President may authorize an officer to sign specific documents, agreements and instruments on behalf of the Company provided that the name of such authorized officer and a description of the documents, agreements or instruments that such officer may sign will be provided in writing by the Senior or Group Vice President to the Secretary of the Company prior to such execution becoming effective."

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Company by unanimous written consent dated the 25th day of April, 2012:

"Whereas, the bylaws of the Company or specific resolution of the Board of Directors has authorized various officers (the "Authorized Officers") to execute various policies, bonds, undertakings and other obligatory instruments of like nature, and

Whereas, from time to time, the signature of the Authorized Officers, in addition to being provided in original, hard copy format, may be provided via facsimile or otherwise in an electronic format (collectively, "Electronic Signatures"); Now therefore be it resolved: that the Electronic Signature of any Authorized Officer shall be valid and binding on the Company."

This Power of Attorney may be signed by digital signature and sealed by a digital or otherwise electronic-formatted corporate seal under and by the authority of the following Resolution adopted by the Board of Directors of the Company by unanimous written consent dated the 27th day of April, 2022:

"RESOLVED: That it is in the best interest of the Company to periodically ratify and confirm any corporate documents signed by digital signatures and to ratify and confirm the use of a digital or otherwise electronic-formatted corporate seal, each to be considered the act and deed of the Company."

ADOPTED BY THE BOARD OF DIRECTORS OF NATIONAL FIRE INSURANCE COMPANY OF HARTFORD:

This Power of Attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the Board of Directors of the Company by unanimous written consent dated May 10, 1995:

"RESOLVED: That any Senior or Group Vice President may authorize an officer to sign specific documents, agreements and instruments on behalf of the Company provided that the name of such authorized officer and a description of the documents, agreements or instruments that such officer may sign will be provided in writing by the Senior or Group Vice President to the Secretary of the Company prior to such execution becoming effective."

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Company by unanimous written consent dated the 25th day of April, 2012:

"Whereas, the bylaws of the Company or specific resolution of the Board of Directors has authorized various officers (the "Authorized Officers") to execute various policies, bonds, undertakings and other obligatory instruments of like nature; and

Whereas, from time to time, the signature of the Authorized Officers, in addition to being provided in original, hard copy format, may be provided via facsimile or otherwise in an electronic format (collectively, "Electronic Signatures"); Now therefore be it resolved: that the Electronic Signature of any Authorized Officer shall be valid and binding on the Company."

This Power of Attorney may be signed by digital signature and sealed by a digital or otherwise electronic-formatted corporate seal under and by the authority of the following Resolution adopted by the Board of Directors of the Company by unanimous written consent dated the 27th day of April, 2022:

"RESOLVED: That it is in the best interest of the Company to periodically ratify and confirm any corporate documents signed by digital signatures and to ratify and confirm the use of a digital or otherwise electronic-formatted corporate seal, each to be considered the act and deed of the Company."

ADOPTED BY THE BOARD OF DIRECTORS OF AMERICAN CASUALTY COMPANY OF READING, PENNSYLVANIA:

This Power of Attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the Board of Directors of the Company by unanimous written consent dated May 10, 1995:

"RESOLVED: That any Senior or Group Vice President may authorize an officer to sign specific documents, agreements and instruments on behalf of the Company provided that the name of such authorized officer and a description of the documents, agreements or instruments that such officer may sign will be provided in writing by the Senior or Group Vice President to the Secretary of the Company prior to such execution becoming effective."

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Company by unanimous written consent dated the 25th day of April, 2012:

"Whereas, the bylaws of the Company or specific resolution of the Board of Directors has authorized various officers (the "Authorized Officers") to execute various policies, bonds, undertakings and other obligatory instruments of like nature, and

Whereas, from time to time, the signature of the Authorized Officers, in addition to being provided in original, hard copy format, may be provided via facsimile or otherwise in an electronic format (collectively, "Electronic Signatures"); Now therefore be it resolved: that the Electronic Signature of any Authorized Officer shall be valid and binding on the Company."

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CLACKAMAS COUNTY
PUBLIC IMPROVEMENT CONTRACT
PROJECT INFORMATION, PLANS, SPECIFICATIONS AND DRAWINGS

PROJECT: 2023-66 2023 Collection System Rehab Project

Project Scope: Project Scope:
Water Environment Services ("WES") operates and maintains over 350 miles of pipes and 8800 sewer manholes. Like all structures, pipes and manholes deteriorate as they age and develop a variety of defects that need to be corrected to ensure long-term functionality. WES has an annual budget allotted to perform routine maintenance and repair work on such defects in an effort to minimize emergency repair work or catastrophic failures.

This project includes installation of approximately 6,800 lineal feet of 8" Cured in Place Pipe ("CIPP"), 1,900 LF of 10" CIPP, 450 lf of 12" CIPP, as well as, lateral reconnection, lateral sealing, 4 manhole replacements, and manhole rehabilitation with injection grouting.

The project sites include work in Milwaukie, Happy Valley, and other parts of Clackamas County. The work environments include but are not limited to; state highways, arterial roads, neighborhood streets, landscaped area and unimproved natural areas. Due to the variety in types of repairs, work will needs to encompass both the dry and rainy seasons.

Engineers Estimate: $1,050,000.00

Key Dates:
All Basic Bid Work may begin as soon as the Notice to Proceed ("NTP") is issued
Substantial Completion: 210 days from issuance of NTP
Final Completion: 240 days from issuance of NTP

The Scope further includes the following Plans, Specifications and Drawings:

- 2023 Collection System Rehab Specifications (87 pages)
- Site Specific Safety Plan Certification
- Manhole/Pipeline Testing Forms
- Construction Drawings

These items can be found at the attached link:
https://acrobat.adobe.com/link/track?uri=urn:aaid:scds:US:2e430779-bc2c-439b-8b2c-fef727f1923d

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. This contract consists of installation of approximately 6,800 lf of 8" Cured in Place Pipe (CIPP), 1,900 lf of 10" CIPP, 450 lf of 12" CIPP, as well as, lateral reconnection, lateral sealing, 4 manhole replacements, and manhole rehab with injection grouting.

B. The accomplishment of all of the above work, if awarded, shall meet the scheduled sequence, milestones, limitations and the final completion dates specified.

1.02 WORK OF THIS CONTRACT

A. The work generally consists of furnishing and installing the following:

1. 6,800 LF of 8" CIPP
2. 1,900 LF of 10" CIPP
3. 450 LF of 12" CIPP
4. Replace 4 48-inch standard precast manhole
5. Manhole rehabilitation with injection grouting
6. Bypass Pumping
7. Erosion and Sedimentation Control
8. Traffic control
9. All other ancillary work necessary to complete the sanitary sewer and comply with all easement and permit conditions.

B. Contractor Duties

1. Provide and pay for labor, materials, tools, equipment, superintendence, temporary facilities and services necessary for proper execution and completion of Work.
2. Maintain ready access for business adjacent to the Work.
3. Comply with ordinances and regulation of public authorities having jurisdiction, including, but not limited to following:

a. Clackamas County
b. City of Happy Valley
c. City of Milwaukie
d. State of Oregon Department of Environmental Quality

e. State of Oregon Department of Transportation

1.03 EXISTING UTILITIES

A. In general, the locations of existing major utilities, whether aboveground or underground, are indicated on the Drawings. This information has been obtained from utility maps and field surveys. Owner does not guarantee the accuracy or completeness of this information, and it is to be understood that other aboveground or underground facilities not shown on the Drawings may be encountered during the course of the work. In any case, most minor lines such as individual services for water, gas and sprinkler irrigation lines are not indicated.

B. Existing utilities, whether shown on the Drawings or not, shall be maintained, relocated, rerouted, removed and restored as may be necessary by the Contractor in a manner satisfactory to owners and operators of the utilities and to Owner in accordance with the provisions and to the satisfaction of the affected utility or local agency.

1.05 SURVEY INFORMATION

A. Contractor will be responsible for staking all manhole locations, pipeline alignment with cut and fill to invert.

1.06 SPECIFICATION LANGUAGE

A. Portions of the Specifications are written in imperative and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" shall be included by inference where a colon (:) is used within sentences or phrases. Example: Aggregate: ASTM C33.

Where the Bidding Documents define methods, materials, or equipment by specifying a trade name, manufacturer and model or catalog number, the intent is not to limit competition but to establish a standard of quality, features, workmanship, reliability, serviceability, compatibility, performance, etc. Unless the specification description expressly states that no substitutions or "equals" will be allowed, the words "or equal" shall be deemed inserted in each such instance.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 DESCRIPTION

A. Measurement is described under each proposal item in Paragraph 01025-1.02.

B. Payment for the various items on the Proposal, as further specified herein, shall be based on measurements of completed work in accordance with United States Standard Measures and shall include all compensation to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the work all in accordance with the requirements of the Contract Documents, including all appurtenances thereto and including all costs of compliance with the regulations of public agencies having jurisdiction, including safety and health requirements of the Occupational Safety and Health Act of the U.S. Department of Labor (OSHA) and Oregon State Department of Labor and Industries, also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work until the final acceptance by the Owner. No separate payment will be made for any item that is not specifically set forth in the Proposal Schedule, and all costs therefor shall be included in the prices named in the Proposal Schedule for the various appurtenant items of work. ***Note that all work shall be completed within the project limits during varying times including either 7 am to 7 pm or 10 pm to 7 am depending upon specific locations***

C. Quantities listed in the Proposal do not govern final payment. Payments to the Contractor will be made only for actual quantities of Contract items performed in accordance with terms of the Contract and for items of work actually performed under Change Orders.

D. Indirect costs, such as supervision and overheads, profit, the general conditions specified in the Contract, all shall be allocated to each proposal item as applicable for work defined in the proposal item. No separate payment will be made to the Contractor for these items.

1.02 PROPOSAL ITEM MEASUREMENT AND PAYMENT

A. Item 1 - Mobilization: Payment for Mobilization will be made on a lump sum basis. The amount to be allowed for Mobilization in the partial payment to be made under the Contract will be as follows:

1. When 5% of the total original contract amount is earned from other proposal items, not including advances on materials, 50% of the amount bid for Mobilization, or 2.5% of the original contract amount, whichever is the least, less normal retainage, will be paid.

2. When 10% of the total original contract amount is earned from other proposal items, not including advances on materials, 100% of the amount bid for mobilization, or 5% of the original contract amount, whichever is the least, less normal retainage, will be paid.

3. Upon completion of all work on the project, payment of any amount bid for Mobilization in excess of 5% of the total original contract amount will be paid.

4. The above schedule of progress payments for Mobilization shall not limit or preclude progress payments otherwise provided by the Contract.

B. Item 2 - Traffic Control: Measurement and payment for traffic control shall be made on a lump sum basis. The lump sum price shall include all costs for materials, equipment and labor for: furnishing, erecting and maintaining temporary barricades, signs and other traffic control devices; detours, and other safeguards necessary for orderly flow of traffic; preparing and updating the Traffic Control Plan for approval by the Owner; notification schedules and notifying property owners and businesses at least 7 days in advance of beginning work; and providing all flagging identified in the approved Traffic Control Plan.

C. Item 3 - Erosion Control: All erosion control measures including materials, equipment and labor
unless identified as part of other individual bid items shall be measured and paid on a lump sum basis.

D. Item 4 - By-pass Pumping: Measurement and payment for sanitary sewer bypass pumping shall be made on a per each basis. The per each price shall include all costs for materials, equipment and labor to provide the appropriately sized flow diversion and piping during all elements of construction for CIPP installation, point repairs and manhole improvements.

E. Item 5 - Replace Manhole: Measurement and payment for replacing manholes shall be made on a per each basis. The per each price shall include all costs for materials, equipment and labor to remove the existing manhole and install a new manhole. This will include, but is not limited to, the disposal of the existing manhole, the new manhole, pipe connections, excavation, backfill, compaction and testing. If pavement restoration is required, pavement will be paid for as a separate item.

F. Item 6 - Grout Manhole: Measurement and payment for grouting manholes shall be made on a vertical foot basis as measured from the invert of the manhole to the rim of the manhole and rounded to the nearest ½ foot measurement. The vertical foot price shall include all costs for materials, equipment and labor to grout the manhole.

G. Item 7, 8, & 9 - CIPP Liner, 8-inch, 10-inch and 12-inch: Measurement shall be per linear foot of main line rehabilitation as measured from center of manhole to center of manhole (or end cap). Payment shall include complete compensation for all work, labor, materials, equipment and incidentals necessary to provide CIPP in place and approved for use. This will include, but is not limited to pre-installation video inspection, cleaning, injection grouting of active infiltration, cutting of protruding taps, or root removal necessary to install the liner. No separate or additional payment will be made for additional testing, cleaning and video inspection required as a result of correction of unsatisfactory work. Internal reinstatement of laterals and lateral sealing of existing active service laterals agreed to be connected are paid under a separate bid item. Point repairs to clear the line of obstructions or collapsed pipe that prevent liner installation which require open cut excavation and replacement of the existing short section are not considered part of this bid item and shall be paid under a separate item.

H. Item 10 - Lateral Reinstatement: Measurement shall be on a per each basis for each lateral that is internally reconnected. Payment shall include full compensation for providing all

labor, materials, equipment, tools and incidentals for all aspects of cutting the hole to the specified diameter.

I. Item 11 - Lateral Connection Sealing: Measurement shall be on a per each basis for each lateral connection injected with a chemical grout to seal the interface between lateral and the sewer pipe. This will also include grouting any visible defects to the satisfaction of Engineer from the mainline connection extending approximately two feet up the lateral. Payment shall include full compensation for providing all labor materials, equipment, tools and incidentals for all aspects of packer injection grouting to form a watertight seal between the CIPP liner and the host pipe along with approximately two feet of the lateral to seal defects with a non-shrink, watertight chemical grout compatible with the liner system. Additional efforts include pressure testing of each connection and removal of all residual grout from the sewer main and lateral as approved by the Engineer to prevent blockage of sewage flow.

J. Item 12 - Post-installation Video Inspection: Measurement for post-installation video inspection will be measured on the length basis to the neared foot. The length will be measured, with no deduction for structures or fittings, along the pipe flow line from center of manholes or the ends of pipe. Payment shall include compensation for all labor, materials, equipment and incidentals necessary to complete the work as specified. Provide Owner with a copy of the video inspection.

K. Item 13 - Pavement Restoration: Measurement and payment for pavement restoration shall be made on a per ton basis. The per ton price shall include all costs for materials, equipment and labor to do the required pavement restoration.

END OF SECTION

SECTION 01040

COORDINATION AND PROJECT REQUIREMENTS

PART 1 GENERAL

1.01 PROJECT COORDINATION

A. Coordinate scheduling, submittals and work of various Sections of the Specifications and subcontractors to assure efficient and orderly sequence of interdependent construction.

1.02 UNDERGROUND UTILITIES, CONDUITS, OR PROCESS PIPING

A. Obtain best available current information on location, identification and marking of existing utilities, piping and conduits and other underground facilities before beginning any excavation. Contact Oregon Utility Notification center at 503-246-6699 for information at least 48 hours in advance of beginning work. Give Engineer 48 hours notice before beginning work.

B. The location of existing utilities and underground facilities known to the Engineer are shown in their approximate location based on information available at the time of preparing the Drawings. The actual location, size type and number of utilities and underground facilities may differ from that shown and utilities or underground facilities may be present that are not shown.

C. Use extreme care when excavating or working in areas that may contain existing utilities, process piping, conduits or other underground facilities. Use careful potholing, hand digging and probing to determine the exact location of underground installation. Some locations contain multiple pipes or conduits. Prior to performing any subsurface work, investigate, determine and prepare a plan to turn off or disconnect each utility believed to be within 100 feet of the subsurface work in the event of an accidental breach of a utility conduit.

D. Where connections to existing utilities or other underground facilities is required or where new piping or conduits may cross or interfere with existing utilities or underground facilities carefully excavate and uncover existing installations to a point 1 foot below the pipe or conduit to determine the actual elevation and alignment. Call the Engineer's attention to differing existing conditions that may require a clarification or change.

1.03 PRECONSTRUCTION MEETINGS

A. Prior to beginning the Work, the Contractor and its key personnel and Subcontractors including the Contractor's Superintendent and Project Manager shall attend a meeting with the Owner and the Engineer to discuss the following:

1. Name, Authority, and Responsibilities of Parties Involved

2. Project Procedures:

    a. Progress meetings

    b. Correspondence

c. Notification

d. Submittal of Shop Drawings

e. Requests for Information

f. Response to Requests for Information

g. Work Directive Change

h. Contractor Reporting requirements

i. Change Orders

3. Temporary Schedule and Contractor's Construction Schedule

4. Temporary Facilities and Control

5. Testing During Construction

6. Contractors Coordination

7. Maintenance of Record Drawings

8. Punch Lists and Project Closeout Procedures

9. Final Deliverables including Record Drawings

1.04 PROGRESS MEETINGS

A. Contractor's Superintendent and Project Manager shall attend weekly meetings, held on site to discuss plans for the following week and to evaluate project progress. Contractor will provide a two-week look ahead schedule for review during the meeting. Items to be discussed shall include a review of critical items/action list, review work progress, review of submittal status, delivery dates, coordination problems, and any items of concern.

1.05 MATERIALS

A. General:

1. Verify that products delivered meet requirements of Contract Documents and the requirements of Favorably Reviewed submittals.

B. Transportation and Handling:

1. Transport and handle products in accordance with manufacturer's instructions.

2. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

3. Provide equipment and personnel to handle products by methods to prevent

soiling, disfigurement, or damage.

C. Storage and Protection:

1. Store and protect products in accordance with manufacturer's instructions. Seals and labels shall be intact and legible.

2. Provide offsite storage and protection including insurance coverage when site does not permit onsite storage or protection.

3. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

1.06 SAFETY

A. In accordance with generally accepted construction practice, applicable law and the General Conditions, the Contractor shall be solely and exclusively responsible for:

1. Construction means and methods.

2. Safety of employees engaged in the work while on and off the site.

3. Safety of the Owner, the Engineer, the Design Engineer, and others who may visit or be affected by the work.

4. Safety of the work itself including material and equipment to be incorporated therein.

5. Safety of other property at the site or adjacent thereto.

6. Safety programs, equipment and protective devices required to assure the safety of persons and property for whom/which the Contractor is responsible.

B. The duties of the Engineer in conducting review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's work methods, equipment, bracing, scaffolding or safety measures in, on, or near the construction site.

C. The Contractor is hereby informed that work on this project could be hazardous. The Contractor shall carefully instruct all personnel working in potentially hazardous work areas as to potential dangers and shall provide such necessary safety equipment and instructions as required to prevent injury to personnel and damage to property, and to comply with all applicable laws and regulations including State OSHA, Federal OSHA, and other regulations referenced in these Contract Documents.

D. The Contractor shall, at all times, maintain the job in a condition that is safe for the Owner, the Engineer and their Consultants to make site visits and to conduct construction reviews. If the Owner or the Engineer cannot allow personnel to visit the job because it is not safe, the Contractor is not providing required safe access to the Work as required by General Conditions.

E. The Contractor shall prepare a Safety Plan meeting the requirements of applicable regulations. As a minimum, the Contractors Safety Plan shall set forth definite

procedures for informing workers about safety, for instructing workers in safe practices, for assuring that workers are using appropriate safety equipment and safe work practices and for reporting accidents.

F. The Contractor shall submit a completed Site Specific Safety Plan Certification Form (Appendix A).

1.07 CONTRACTOR'S QUALITY CONTROL

A. The Contractor shall be fully responsible for inspecting the work of its suppliers and Subcontractors to assure that the work when completed will comply with the standards for materials and workmanship required by the Contract Documents.

B. Inspections, periodic observations and testing performed by the Owner or the Engineer are for the Owner's benefit and information only and shall not be construed as partial or incremental acceptance of the work and shall not be deemed to establish any duty on the part of the Owner or the Engineer to the Contractor, its subcontractors or suppliers.

C. The Contractor shall:

1. Monitor quality control over suppliers, manufacturer, products, services, site conditions, and workmanship, to produce work of specified quality.

2. Comply fully with manufacturer's installation instructions, including performing each step in sequence as recommended by the manufacturer.

3. Submit a Request for Information to Engineer before proceeding with work when manufacturers' instructions or reference standards conflict with Contract Documents.

4. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

5. Perform work by persons specializing in the specific trade and class of work required and qualified to produce workmanship of specified quality.

D. The Contractor shall provide assistance required by the Engineer to adequately inspect the Work including ladders, scaffolding, shoring, lighting, ventilation and other aids to facilitate access and provide a safe working environment.

1.08 TESTING LABORATORY SERVICES AND CERTIFIED LABORATORY REPORTS

A. Provide certified testing service in accordance with specific requirements contained in each technical specification section. Submit Certified Laboratory Reports required by technical specification sections as soon as they are available.

B. District retains authority to identify location where required onsite testing is to take place. Any failing tests will require two additional tests to have passing results, after corrective actions have taken place and at retesting locations as identified by District, at no additional cost to the Owner.

END OF SECTION

SECTION 01060

PERMITS AND EASEMENTS

PART 1 GENERAL

1.01 PERMITS

A. Owner will obtained Utility Permit for Clackamas County and the City of Happy Valley. Contractor shall sign and meet all of the conditions set forth in the permit.

1.02 RESTORATION OF PROPERTY/MISCELLANEOUS

A. Comply with property restriction and restoration requirements contained in all permits. It is expected that additional items requiring protection and/or replacement will be encountered as a general construction practice and the Contractor shall assume responsibility thereof at no additional cost.

END OF SECTION

SECTION 01300

SUBMITTALS PROCEDURE

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section specifies procedures for Contractor submittals. Where required by the Specifications, submit descriptive information that will enable the Engineer to assess whether the Contractor's proposed materials, equipment or methods of work are in general conformance to the design concept and in compliance with the Drawings and Specifications. The information to be submitted shall consist of drawings, specifications, descriptive data, certificates, samples, test results and such other information, all as specifically required in the Specifications.

PART 2 PRODUCTS

2.01 CONTRACTOR RESPONSIBILITIES

A. Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall ensure that the material, equipment or method of work shall be as described in the submittal. Verify that the material and equipment described in each submittal conforms to the requirements of the Specifications and Drawings prior to transmittal to the Engineer. Ensure that there is no conflict with other submittals and notify the Engineer in each case where such submittal may affect the work of another contractor or Owner.

B. If the Contractor's review determines that the information shows deviations from the Specifications or Drawings, submit items that will conform or request consideration of a substitution.

PART 3 EXECUTION

3.01 TRANSMITTAL PROCEDURE

A. General:

1. Submittals regarding material and equipment shall be accompanied by Submittal/Transmittal Form. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate, discrete sections for which the submittal is required. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.

2. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: "XXX"; where "XXX" is the sequential number assigned by the Contractor. Resubmittals shall have the following format: "XXX-Y"; where "XXX" is the originally assigned submittal number and "Y" is a sequential letter assigned for resubmittals, i.e., A, B or C being the 1st, 2nd and 3rd resubmittals,

respectively. Submittal 25B, for example, is the second resubmittal of Submittal 25.

B. Deviation from Contract: Submit a request for substitution for deviations from the Specifications or Drawings. Include the reason for the deviation and cost differential for the deviation. Deviations from the Contract shall be authorized by Owner's written approval only.

C. Submittal Completeness: Submittals which do not have all the information required to be submitted are not acceptable and will be returned without review.

D. Submit to the Engineer the following items for review:

1. Construction Schedule

2. Detailed Schedule of the first two weeks of work

3. List of employees to be contacted in an emergency with their home phone numbers and cell numbers (available 24 hrs/day)

4. List of subcontractors that will work on the project

5. Erosion control plan

6. Site Specific Safety Plan Certification

7. Sanitary Sewer Bypass Plan

8. CIPP Material

9. Injection grout material

10. Traffic Control Plans

11. Final Utility Permits

12. Shoring Plan

13. Imported granular materials: supplier and location of pit, gradation

14. Manholes and connections to pipe

15. Castings

16. Manhole steps

17. PVC pipe and PVC fittings: Manufacturer and certificates of compliance

The Engineer reserves the right to ask for additional SUBMITTALS that are not included on the above list. Review by the Engineer shall not relieve the Contractor from responsi-

bility for error of omission. Obtain the Engineer's approval prior to beginning any fabrication or other work. No deviation from the reviewed drawings shall be allowed without written approval from the Owner or Engineer.

3.02 REVIEW PROCEDURE

A. For each required submittal, submit one (1) digital copy of all the submitted information.

B. Unless otherwise specified, within 14 days after receipt of the submittal/resubmittal, the Engineer will review and return it to the Contractor. The returned material will consist of one (1) marked-up copy of the submittal. The returned submittal will indicate one of the following actions:

1. If the review indicates that the material, equipment or work method is in general conformance with the Contract Drawings/Specifications, the submittal copies shall be marked "Approved." In this event, the Contractor may begin to incorporate the material/equipment/work method covered in the submittal.

2. If the review indicates that the submittal is insufficient or that limited corrections are required, the submittal copies may be marked "Approved as Noted." The Contractor may begin to implement the work method or incorporate materials/comments covered in the submittal in accordance with the corrections/comments noted.

3. If the review reveals the submittal is insufficient or contains incorrect data and the comments require revision and resubmittal, the submittal copies shall be marked "Not Approved, Resubmit." In this case, the Contractor shall not then undertake work covered by this submittal until the submittal has been revised, resubmitted and returned to the Contractor with a marking of "Approved" or "Approved as Noted."

4. If the review indicates that the submittal is incomplete or that additional information is required, the submittal copies may be marked "Submit Specified Item". In this case the Contractor shall not undertake work covered by this item until the submittal has been revised resubmitted and returned to the Contractor with a marking of "Approved" or "Approved as Noted."

5. If the review reveals the material, equipment, or work does not require submittal, then the submitted copies shall be marked "Review Not Required Per Contract Documents." In this event, the Contractors may begin to incorporate the material/equipment/work covered by the submittal and no further action is required.

3.03 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

A. Review of drawings, methods of work or information regarding materials or equipment the Contractor proposes to provide shall not relieve the Contractor of his responsibility for errors therein, nor shall it be regarded as an assumption of risks or liability by the Engineer on behalf of Owner, or by any officer or employee of Owner. The Contractor shall have no claim under the Contract on account of the failure, or partial failure, of the method of work, material or equipment so reviewed. A mark of "Approved" or "Approved as Noted" shall mean the Owner has no objection to the Contractor, upon the Contractor's own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULE

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section specifies requirements and procedures for the Contractor in preparing a construction schedule. The purpose of the schedule shall be to ensure adequate planning of the work by the Contractor, to establish the standard against which satisfactory completion of the project shall be judged, to assist the Engineer in monitoring progress, and to assess a change proposal's impact on the construction schedule.

1.02 SUBMITTALS

A. Before starting work, the Contractor shall submit to the Engineer an overall contract construction schedule showing the proposed order of work and indicate the time required for completion of the major items and sub-items of work. The schedule shall also show the critical path to accomplish all of the work. The format for the schedule shall be as a minimum a Gantt Chart format showing start and completion dates for the various work activities.

B. Prior to each Weekly Progress Meeting, Contractor shall submit a two-week look ahead schedule. The two week schedule need not include the overall project schedule. The two-week schedule shall include all major activities and a descriptor of where on the site the activity will occur. If work is being completed at multiple sites, the site of the work shall be specified for each activity. The two week schedules may be a Gantt Chart, Bar Chart, or equivalent as approved by the Owner or Engineer. Two-week schedules will not receive formal review by the Owner or Engineer.

PART 2 PRODUCTS

2.01 CONSTRUCTION SCHEDULES

A. Gantt Chart, Bar Chart, or equivalent as approved by the Owner or Engineer.

PART 3 EXECUTION

3.01 SUBMISSION AND APPROVAL

A. The schedule shall be realistic and definitive as to the amount of work which is to be accomplished within the time indicated and shall be updated monthly to reflect actual work progress. The schedule shall breakdown the project into activities corresponding to the plan sheets and will include major tasks to complete all phases of work. It will be used as an indication of the sequence of the major construction operations and as a check on the progress of the work and may, at the sole discretion of the Engineer, be employed by the Engineer in determining delays and time extensions.

B. If the Contractor wishes to make changes in the construction schedule, then to the maximum extent possible provide two (2) weeks notice to the Engineer, or secure the approval of the Engineer prior to performing such changes. Such schedule changes shall

be strictly in accordance with the other requirements of this specification, and shall show the interrelationship between the original schedule and the proposed changes to the schedule.

C. The Engineer's review of the original schedule shall not constitute a warranty or representation by the Owner that the Contractor can perform the work according to such schedule.

D. Submission of a full updated schedule may not be required with each monthly progress payment invoice, if the two week look ahead schedule has been kept up to date to the satisfaction of the Engineer.

END OF SECTION

SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

PART 1 GENERAL

1.01 DESCRIPTION

A. This section specifies the furnishing, maintaining, and removing of construction facilities and temporary controls, including temporary utilities, construction aids, barriers and enclosures, security and removal after construction.

1.02 TEMPORARY UTILITIES

A. Temporary sanitary facilities:

1. Provide suitable and adequate sanitary facilities that are in compliance with applicable Laws and Regulations.

2. At completion of the Work, remove sanitary facilities and leave site in neat and sanitary condition.

1.03 CONSTRUCTION AIDS

A. Provide railings, kick plates, enclosures, safety devices, and controls required by Laws and Regulations and as required for adequate protection of life and property.

B. Accident prevention:

1. Exercise precautions throughout construction for protection of persons and property.

2. Observe safety provisions of applicable Laws and Regulations.

3. Guard machinery and equipment, and eliminate other hazards.

4. Make reports required by authorities having jurisdiction, and permit safety inspections of the Work.

5. Before commencing construction work, take necessary action to comply with provisions for safety and accident prevention.

C. Warning devices and barricades: Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers:

1. Devices shall conform to minimum requirements of OSHA and State agencies which administers OSHA regulations where Project is located.

1.04 TEMPORARY CONTROLS

A. Noise control:

1. In inhabited areas, particularly residential, perform operations in manner to minimize noise.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01530

PROTECTION AND MAINTENANCE OF WORK AND PROPERTY

PART 1 GENERAL

1.01 DESCRIPTION

A. This section specifies the protection and maintenance of work and property as they are affected by the work.

1.02 PUBLIC AND PRIVATE PROPERTY

A. Protect all public and private property, insofar as it may be endangered by Contractors' operations and take every reasonable precaution to avoid damage to such property.

B. Restore and bear the cost of any public or private improvement facility, structure or land and landscaping, which is damaged or injured directly or indirectly by or on account of an act, omission, or neglect in the execution of the Work. Restore to a condition substantially equivalent to that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise affecting restoration thereof, or if this is not feasible, make a suitable settlement with the owner of the damaged property.

C. Give reasonable notice to occupants of buildings on property adjacent to the Work to permit the occupants to remove vehicles, trailers and other possessions as well as salvage or relocate plants, trees, fences, sprinkler systems, or other improvements in the Right-of-Way or easements which are designated for removal or which might be destroyed or damaged by work operations.

1.03 LOCATION OF EXISTING FACILITIES

A. Pothole existing utilities well ahead of pipeline construction to verify locations, so as not to affect pipeline installation.

B. In general, the locations of existing major utilities are indicated on the Drawings. This information has been obtained from utility maps and field surveys. Owner does not guarantee the accuracy or completeness of this information, and *it is to be understood that other aboveground or underground utilities not shown on the Drawings may be encountered during the course of the work.*

C. Use a pipe locator and/or hand excavation to determine the exact location of underground facilities in the interest of avoiding unnecessary damage, maintenance costs, and to ensure continuity of customer service.

D. Contact all utility companies and departments having underground facilities within the construction area and request they locate and mark their utilities. In addition, verify the location of all buried utilities in the construction area 48 hours before contractor digs by calling the one-call locator service at 1-800-332-2344. The contractor shall comply with Oregon "locate law" ORS 757.541 to ORS 757.571.

1.04 UNDERGROUND UTILITIES WITHIN PRIVATE PROPERTY/EASEMENTS

A. Additional underground utilities which include private irrigation systems may be present within the easements. Owner does not guarantee the accuracy or completeness of this information and it is understood that other underground utilities not shown on the Drawings or described in the Specifications may be encountered during the course of the work. Repair and replacement of the utilities shall be incidental to the work and no further payments will be provided.

END OF SECTION

SECTION 01560

ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 DESCRIPTION

A. This section specifies environmental mitigation and temporary environmental controls required to be maintained during construction. Nothing in this section shall relieve any person from the obligation to comply with the regulations or permits of any federal, state, or local authority.

1.02 SUBMITTALS

A. Erosion Control Plan: Develop and maintain for the duration of the contract an Erosion Control Plan that will effectively incorporate and implement environmental protection precautions. The Contractor's Erosion Control Plan shall include methods and interim facilities to be constructed and/or used concurrently during construction to control erosion in such a manner as to ensure that sediment and sediment laden water does not enter any drainage system, roadways, or violate applicable water quality standards. Visible or measurable erosion which enters, or is likely to enter, a public storm and surface water system, wetland or stream is prohibited. The plan shall include the name of the Contractor's employee authorized to supervise and enforce compliance with the Erosion Control Plan and telephone number(s) to contact that person at any time.

B. The Erosion Control Plan shall be submitted and approved in accordance with Section 01300 prior to initiating clearing activities.

C. In the event a regulatory agency or jurisdiction determines the Erosion Control Plan to be inadequate to protect environment:

1. The Contractor shall stop immediately the affected work in progress until adequate environmental protection measures are implemented.

2. The Contractor shall modify the Erosion Control Plan to meet the requirements of said regulatory agencies, jurisdictions and provide the Engineer with the revisions to the Plan within five (5) calendar days of the notice of deficiency. Plan resubmittal will be in accordance with Section 01300.

PART 2 PRODUCTS

2.01 EROSION CONTROL

A. Temporary Sediment Fences

1. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers.

2. Filter fabric fence shall have manufactured stitched loops for 2”x2” post installation. Stitched loops shall be installed on he up-hill side of the sloped area, with posts spaced a maximum of 6 feet apart.

3. Where practical the filter fabric shall be purchased in a continuous roll to the length required to avoid the use of joints.

4. The physical integrity of all materials shall be sufficient to meet the requirements of their intended use and withstand normal wear and tear.

B. Straw Bale Sediment Barrier/Bio-Filter Bags: Standard 40 to 60-pound rectangular bales of cereal grain or seed straw. Wooden stakes (2”x2”x 3 feet) shall be used for straw bales and bio-filter bags.

C. Catch Basin Inserts: Woven polyproplene filter sack.

D. Plastic Sheeting: Polyethylene and have a minimum thickness of 6 mil.

E. Straw Mulch: Maintain a sufficient cover of straw mulch over bare ground to reduce sediment runoff until permanent restoration has begun.

PART 3 EXECUTION

3.01 SITE MAINTENANCE

Dust shall be minimized by the Contractor to the extent practicable, utilizing all measures necessary, including, but not limited to:

A. Sprinkling any exposed dust producing areas with water used by trucks or motorized mechanical equipment.

B. Use of covered haul equipment.

3.02 STREET CLEANING

A. Prevent dirt, mud, and dust from escaping trucks departing the work site, by covering dusty loads and cleaning truck tires before leaving the construction site.

B. All streets in the construction area used by Contractor’s trucks or any other equipment hauling material to and from the area, whether within the Contract limits or adjacent thereto, shall be kept clean by the Contractor and shall be serviced by the Contractor’s use of water distribution trucks to control dust on a daily basis. Engineer will require multiple sprinkling operations if the dust becomes excessive during the day. All cleaning and sprinkling shall be at the Contractor’s expense. Violations of these requirements are sufficient grounds for the Engineer to order the streets in question to be cleaned by others. The expense of the street cleaning will be charged against the Contractor and cost withheld from Contractor's payments.

3.03 NOISE CONTROL

A. Comply with all local controls and noise level rules, regulations and ordinances.

B. Each internal combustion engine, used on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

C. Noise levels for scrapers, pavers, graders, backhoes and trucks shall not exceed 90 dBA. For other equipment, noise levels shall not exceed 85 dBA. Equipment that cannot meet these levels shall be quieted by use of improved exhaust mufflers, noise attenuation barriers or other means.

D. If special circumstances or emergency conditions require work beyond the hours as specified, the Contractor shall:

1. Notify the Engineer and Owner 72 hours in advance of any proposed extended work hours for preauthorization. The Contractor's written request shall specify the work to be performed and the circumstances that warrant the request. The request shall include any additional measures to mitigate noise generated by this construction activity if deemed necessary by the Engineer.

2. If an emergency situation occurs that warrants immediate extended hours, the Contractor shall notify the Engineer immediately upon determining the need for this work.

3.04 TREE AND PLANT PROTECTION

A. The Contractor shall minimize vegetation removal during his construction operations. Contractor shall restore and bear the cost of any public or private land improvement and landscaping, which is damaged or injured directly or indirectly by or on account of an act, omission, or neglect in the execution of the Work. Restore to a condition substantially equivalent to that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise affecting restoration thereof, or if this is not feasible, make a suitable settlement with the owner of the damaged property.

A. Work areas shall be carefully located and marked to reduce potential damage. Trees shall not be used as anchors for stabilizing working equipment. Work performed adjacent to trees shall include protecting each tree with a high visibility perimeter barrier fence, located at the dripline of the tree. The barrier fence shall be an orange snow fence or approved equal. The Contractor shall not remove any trees without written approval from Engineer.

B. Where existing vegetation areas have been removed or disturbed by the Contractor's operations, the site shall be regraded and restored by the Contractor as soon as practicable.

C. If trees are damaged or destroyed by the Contractor's operations without prior authorization by the Engineer, the Contractor shall replace the tree in species, size and grade to the satisfaction of the Engineer at no cost to the Owner. The Contractor shall maintain the replacement tree for a period of two years to assure a satisfactory replacement. Replacement trees that are dead or dying, as determined by the Engineer, at the end of the first year establishment period shall be replaced by the Contractor to the satisfaction of the

Engineer and at no cost to the Owner. Should it not be practical to replace the tree, the Contractor shall pay damages in accordance with the size of the original tree that was damaged as measured 4 feet above the ground surface. Damages will include $500 for each tree 6" in diameter or less, $1,000 for each tree greater than 6" and less than 12", $1,500 for each tree from 12" to 24"and $2,500 for any tree 24" or greater in diameter. In the event the Contractor does not perform this replacement work in a timely manner as determined by the Engineer, the Owner reserves the right to have the work performed by others. The damages for trees deemed not practical to replace and/or the expense of trees Owner had to replace due to Contractor not replacing them in a timely manner, will be charged against the Contractor and the costs withheld from Contractor's payments.

3.05 DEWATERING AND WATER CONTROL

A. The Contractor shall not divert storm drainage or sewer flow through any portion of the new sewer or any other new facility until after that portion of the pipeline to be used has been field-acceptance tested in accordance with the Specifications, and until specific written approval from the Engineer has been received. No direct water from construction activities shall be diverted to the sanitary sewer.

B. Maintain excavations free from water while construction is in progress. Keep trenches and other areas free from water as required to permit continuous progress of, or to prevent damage to the work or the work of others.

3.06 WATER QUALITY PROTECTION AND STORMWATER CONTROL

A. All construction activities shall comply with all conditions contained in applicable Federal, State, and Local permits.

B. Contractor shall avoid disturbing any existing streams and wetlands. Contractor shall provide an Erosion Control Plan.

3.07 FISH AND WILDLIFE HABITAT

A. The requirements of local, state, and federal agencies charged with wildlife and fish protection shall be adhered to by the entire construction work force.

3.08 EROSION CONTROL

A. Execute the approved Erosion Control Plan.

B. Temporary Sediment Fences:

1. Filter fabric fence shall have a minimum vertical burial of 6 inches. All excavated material from filter fence installation shall be firmly re-deposited along the entire trenched area on the uphill side of the fence.

2. The filter fabric shall be installed to follow the contours where feasible. The fence posts shall be spaced a maximum of 6 feet apart and driven securely into the ground a minimum of 18 inches.

3. Sediment fences shall be inspected by the Contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs, relocations or additions shall be made immediately.

4. At no time shall more than one foot of sediment be allowed to accumulate behind a sediment fence. Sediment should be removed or regraded into slopes, and the sediment fences repaired and reestablished as needed.

5. Install filter fence along the length of any temporary construction easements where movement of sediment off-site would be possible as determined by the Engineer during prolonged rainfall. Engineer to have final decision on whether or not the filter fence is required for each site-specific installation

C. Straw Bale Sediment Barrier/Bio-Filter Bags: This method may be used to divert runoff around active work areas or into sediment filtration/sedimentation areas.

1. Bio-filter bags can be used in drainage ditches and/or swales.

2. Straw bales and bio-filter bags shall be secured with stakes driven through them and into the ground to a minimum depth of 12 inches. Straw bales shall be keyed into the existing ground 2 to 4 inches.

3. At no time shall more than one foot of sediment be allowed to accumulate behind a straw bale sediment barrier and/or bio-filter bag system. Sediment should be removed or regraded into slopes, or new lines of barriers installed uphill of sediment laden barriers.

D. Plastic Sheeting:

1. Spoils piles and exposed earth slopes shall be covered in wet weather or if wet weather is anticipated. Plastic sheeting shall be installed and maintained tightly in place by using sandbags or tires on ropes with a maximum 10 feet grid spacing in all directions. All seams shall be taped or weighted down full length and there shall be at least 12-inch overlap of all seams. For seams parallel to the slope contour, the uphill sheet shall overlap the downhill sheet. No runoff shall be allowed to run under the plastic covering.

2. Drainage from areas covered by plastic sheeting shall be controlled such that no discharge occurs directly onto uncontrolled, disturbed areas of the construction site.

E. Spoils excavated during trenching for the sewer shall be placed on the uphill side of the trench except when there are overriding safety requirements or lack of available space.

F. Vegetative Protection: The Contractor shall limit disturbance to existing vegetation in steep areas to the extent possible and install filter fence at the limit of removal downhill of the trench.

G. Under no circumstance shall Contractor's vehicles or equipment enter a property adjacent to a stream, watercourse, or other storm and surface water facility without an Erosion Control Plan approved and implemented.

H. The Contractor shall not drag, drop, track, or otherwise place or deposit, or permit to be deposited, mud, dirt, rock or other such debris into any part of the public storm or surface water system, or any part of a private storm or surface water system. Any such deposit of material shall be immediately removed by the Contractor at the Contractor's expense. No material shall be washed or flushed into any part of the storm or surface water system without erosion control measures installed to the satisfaction of the Engineer.

I. The Contractor shall maintain the facilities and techniques contained in the approved Erosion Control Plan so as to continue to be effective during the construction or other permitted activity. If the facilities and techniques approved in an Erosion Control Plan are not effective or sufficient as determined by the Engineer, the Contractor shall revise the plan immediately upon notification by the Engineer. Upon approval of the revised plan by the Owner, the Contractor shall immediately implement the additional facilities and techniques. In cases where erosion is occurring, the Engineer may require the Contractor to install interim control measures prior to submittal of the revised Erosion Control Plan.

J. The Contractor shall ensure that all necessary pollution control equipment, supplies, or materials are available to implement the Plan.

K. Filter fabric fences, sediment barriers and other erosion control devices shall be removed by the Contractor when they have served their useful purpose, but not before the upslope area has been permanently protected and stabilized.

3.09 FINES

A. Contractor shall be responsible for all fines incurred from non-compliance with regulations of governing authorities.

END OF SECTION

SECTION 02315

TRENCHING, BACKFILLING AND COMPACTING

PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies requirements for trenching, backfilling, and compacting of trenches for pipeline construction.

1.02 REFERENCES

A. AASHTO T-99

B. 2015 Oregon Department of Transportation (ODOT), *Standard Specifications for Construction*

PART 2 PRODUCTS

2.01 BEDDING AND BACKFILL MATERIALS

A. Gravel for Trench Foundation Material: 2 ½ inch minus clean pit-run gravel, crushed rock or gravel, having reasonably even gradation from coarse to fine or open graded. Maximum percent passing the ¼ inch screen shall be 20% by weight.

B. Crushed Gravel Pipe Base and Pipe Zone: 3/4 inch minus crushed gravel, having reasonably even gradation from coarse to fine, in accordance with the Oregon State Highway Commission Standard Specifications for Construction specification for Dense Aggregate, Section 02630.10.

C. Select Material for Trench Backfill and Aggregate Base: 3/4-inch minus crushed gravel or rock, as defined for Crushed Gravel Pipe Base above.

D. Portland Cement Concrete: PCC shall be composed of cement, pozzolans, fine aggregate, water and admixtures with a 28-day compressive strength of 3,300 psi.

E. Controlled Density Backfill (CDF): CDF shall be composed of cement, pozzolans, fine aggregate, water and admixtures. CDF shall have a low cement content, be non-segregating, self-consolidating, free-flowing and excavatable material which will result in a hardened, dense, non-settling fill and a compressive strength at 28 days of 100 to 200 psi.

PART 3 EXECUTION

3.01 TRENCHING

A. Work in Easements: The Contractor shall exercise all due care in protecting property in, or adjacent to, easements. This protection shall include, but not be limited to, trees, yard, fences, drainage lines, mail boxes, driveways, gravel or paved surfaces, shrubs and lawns. If any of the above have been disturbed, they shall be restored to as near their original condition as possible, and as approved by Owner.

B. Obstructions: This item refers to obstructions which may be removed and do not require replacement. Obstructions to the construction of the trench such as but not limited to stumps, abandoned waterlines, logs, rubbish, and debris of all types, shall be removed by the Contractor at his own expense without additional compensation from the Owner.

C. Blasting: Blasting for excavation will not be allowed.

D. Trench Width: Trench width at the ground surface shall kept to a minimum necessary to install the pipe and manholes in a safe manner. In all cases, trenches must be of sufficient width to allow for shoring and permit proper joining of pipe and compaction of the backfill material along sides of the pipe. Minimum trench width, in the pipe zone, must provide a clear working space 6 inches on each side of the barrel for sewer pipe. If there is a maximum width shown and said width is exceeded by Contractor without written authorization, Contractor will be required, at no expense to Owner, to provide pipe of a higher strength designation, a higher class of bedding, or both, as approved. In all cases, confine trench operations to dedicated right-of-way for public thoroughfares or within areas for which permanent easements have been obtained, unless special arrangements have been made with the affected property owners.

E. Grade: The bottom of the trench shall be carried to the lines and grades shown on the plans or as established by the Engineer, with proper allowance for pipe thickness and gravel bedding. Correct any part of the trench excavated below grade with material of the type specified in paragraph 2.01 for the full width of the trench; thoroughly compacted in layers not to exceed 6 inches to the established grade.

F. Shoring, Sheeting, and Grading of Trenches: Whenever necessary to prevent caving during excavation in gravel, sandy soil, or other unstable material, adequately sheet and brace the trench. Where sheeting and bracing are used, increase trench widths accordingly. Ensure trench sheeting remains in place until the pipe has been placed and backfill of the pipe zone is completed.

G. Location of Excavated Materials: During trench excavation, locate excavated materials to minimize erosion and sediment.

H. Removal of Water: Provide and maintain ample means and devices with which to promptly remove and dispose of all water when trench is being prepared for pipe laying, during laying of pipe, and until backfill has been completed. Dispose of water in accordance with state and local regulations.

I. Foundation Material: When, in the opinion of the Engineer, the material in the bottom of the trench is unsuitable for supporting the pipe or manhole, excavate below the flow line as directed by the Engineer, place 12-ounce non-woven geotextile fabric at bottom and backfill to the required grade with gravel of the type specified in paragraph 2.01.

J. Trench Backfill at Pipe Zone: For all classes of backfill, the pipe zone is defined as extending from the bottom of bedding in the trench (6 inches below invert) to a point 12 inches above the outside of the pipe, and for the full width of the trench. Backfill the entire pipe zone with 3/4 inch minus crushed gravel placed and hand-leveled in 6 inch layers. Special effort to properly bed pipe by slicing backfill in pipe haunches up to springline shall be provided.

3.02 BACKFILLING AND COMPACTION

A. Trench Backfill Above Pipe Zone: Use the following type of backfill on the project in all areas.

1. Class C Backfill: Backfill the entire trench above the pipe zone with ¾ inch minus to the finished ground surface or base of the asphalt concrete trench section and compact according to the specifications.

3.03 EXCESS EXCAVATED MATERIAL

A. Haul and dispose of all excess excavated material. The Contractor shall make arrangements for the disposal of the excavated material and shall bear all costs and retain any profit incidental to such disposal. The Contractor shall comply with all provisions of any agency having jurisdiction.

3.04 ROCK EXCAVATION

A. Before proceeding with rock excavation, complete the common excavation to such depths that only rock excavation remains. At this time, make the trench available to the Engineer and take measurements to determine the amount of rock excavation remaining.

3.05 GENERAL COMPACTION REQUIREMENTS

A. Backfill shall be maintained at proper moisture content so that the material is within 5%± of optimum moisture.

B. Maximum density and optimum moisture will be determined using Method A of AASHTO T-99. All listed compaction levels are based on the T-99 compaction requirements unless otherwise stated.

C. Imported backfill shall be mechanically compacted. The full trench depth shall be compacted to at least 95% of maximum density.

3.06 MECHANICAL COMPACTION REQUIREMENT

A. The method of compaction shall be at the Contractor's option, unless otherwise noted.

B. Unless otherwise noted, the Contractor shall be responsible to provide the proper size and type of compaction equipment and select the proper method of utilizing said equipment to attain the required compaction density without damage to pipe, adjacent utilities and properties.

3.07 WORK LIMITS

A. The intent of this specification is threefold:

1. To limit disruption to any individual property and resulting complaints to the greatest extent possible from mainline excavation until the time the trench is compacted and ready for restoration activities.

2. To identify and correct any pipe, compaction and restoration problems.

3. To comply with all regulatory or easement requirements concerning restoration and cleanup activities during construction.

END OF SECTION

SECTION 02500

STREET RESTORATION

PART 1 GENERAL

1.01 DESCRIPTION

This Section specifies pavement patching and asphalt overlay along the length of improvements on all streets that are currently paved with asphalt concrete. The work in this section for shall be in compliance with the Utility Placement Permits for Clackamas County and for State of Oregon Department of Transportation found in Appendix E.

1.02 RELATED SECTIONS

A list of sections of the project specifications that are most closely related to this section is provided for the convenience of the Contractor.

A. Section 01300, *Submittals Procedure*

B. Section 01570*, Traffic Control*

C. Section 02315, *Trenching, Backfilling and Compaction*

1.03 REFERENCES

This Section incorporates by reference the following documents:

A. ODOT/APWA, 2008 Standard Specifications for Construction.

1.04 SUBMITTALS

A. Procedures: Section 01300.

B. Shop drawings and equipment data required:

1. Certified test results that show materials meet ODOT requirements.
2. Manufacturer's product data showing conformance to the specified products.

1.05 QUALITY CONTROL

A. Testing: Testing will be conducted by the Contractor in accordance with ODOT/APWA 2008 Standard Specifications to determine compliance with the specified degree of compaction and asphalt content and compressive strength of the concrete. Compaction efforts for the initial lift of asphalt concrete over the prepared cement treated base shall be as determined by the Control Strip Method identified in ODOT/APWA 2008, Paragraph 00745.49(4). Control strip shall be reduced to 200 feet in length. All other asphalt concrete pavement shall be compacted to at least 92% of Rice theoretical maximum density.

B. Surface Tolerance: Surface smoothness of the replaced pavement shall be in accordance with ODOT Standard Specifications, Section 00745.70. Test with a 12-foot straightedge

laid across the patched areas. The variation of the ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed ¼ inch. Additionally, paving must conform to the grade and crown of the adjacent pavement and contain no abrupt edges, or high areas or any other imperfections as determined by DTD representative.

PART 2 PRODUCTS

2.01 AGGREGATE BASE

A. Base Course Aggregate. Aggregate for the base course of the street shall be ¾" – 0" and shall conform to the applicable portions ODOT/APWA 2008 Standard Specifications for course aggregate base material.

2.02 PORTLAND CEMENT

A. Portland Cement shall conform to AASHTO M85 for low alkali cement and Section 02010 of ODOT/APWA 2008 Standard Specifications. Type I or Type III cement shall be used.

2.03 TACK COAT

Emulsified asphalt RS-1, CRS-1, or approved equal.

2.04 ASPHALT CONCRETE (TEMPORARY AND PERMANENT)

A. Permanent trench patch using asphalt concrete shall be Level 2, 12.5 mm mix, Dense graded HMAC conforming to ODOT/APWA 2008 Standard Specifications Section 00744. Asphalt Concrete for overlay on Johnson Creek Boulevard and Bell Avenue shall be Level 3, 12.5 mm mix, Dense graded HMAC conforming to ODOT/APWA 2008 Standard Specifications Section 00744. Asphalt cement or fuel escalation/deescalation clause referenced in ODOT Specification Section 00195 is not included for this contract.

B. Temporary trench patch shall be Hot mix asphalt concrete for all main line and service lateral installations unless otherwise approved by the Engineer on an individual basis.

PART 3 EXECUTION

3.01 AGGREGATE BASE PLACEMENT

Base Aggregate Course. Workmanship in manufacturing, placing, compacting, and maintaining base, shall be in conformance with the requirements of the ODOT/APWA 2008 Standard Specifications section 00749.

3.02 ASPHALT PAVEMENT PLACEMENT – (PERMANENT TRENCH PATCH)

A. Asphalt concrete shall not be placed when the atmospheric temperature is lower than 50 degrees Fahrenheit, during rainfall, or when the surface is frozen or wet. Exceptions will be permitted only in special cases and only with prior written approval of the Engineer.

B. Contractor shall place the asphaltic concrete over the trench to a minimum depth of 2-inches, 4-inches or 8-inch depending upon location immediately after removal and disposal

of any temporary asphalt pavement. Additional pavement will be used outside the limits of the trench patch as described in Section 01025, Paragraph 1.02.W if necessary according to the Engineer based upon condition of the pavement. Maximum depth of each lift shall be 2-inches for the 4-inch trench patch and 3-inches for the 8-inch trench patch (excluding top lift). The Contractor shall spread and level the asphaltic concrete and compact it by rolling or by use of mechanical vibratory or impact tamper where rolling is impossible. Power rollers shall be capable of providing compression of 250 pounds per inch of width. The density of asphalt concrete shall be at least 92% of Rice theoretical maximum density. Streets that are to receive the milling will remove the top 2-inches of this permanent trench patch. Trench width must be greater than compaction equipment in order to have full compactive efforts available to the new asphalt material.

C. Adjust manhole rims to finish grade of final lift of asphalt concrete overlay without the use of (steel or polymer material) riser rings.

D. Meet lines shall be straight and the edges vertical where pavement is sawcut. The edges of all asphalt shall be painted with hot liquid asphalt at a rate of 0.06 to 0.12 gallons per square yard prior to placing asphalt concrete. Jagged edges from previously removed asphalt shall be removed through additional cutting in straight lines prior to final patching. Upon completion of patching, all joints shall be sealed with hot liquid asphalt and choked with sand.

E. After completion of the paving, clean the entire roadway surface by brooming.

F. Following completion of final trench patch, Contractor shall stripe all streets that currently have striping to match existing paint removed by trenching. Striping shall be of same type of material that is presently on the pavement surface. Application of the material shall be as recommended by the manufacturer.

G. Hot liquid asphalt and choke with sand all edges of asphalt concrete patch following installation of final lift.

3.03 ASPHALT PAVEMENT PLACEMENT – (2" OVERLAY AND PRE-LEVELING COURSE AFTER PERMANENT TRENCH PATCH)

A. Asphalt concrete overlay and pre-leveling course shall not be placed between September 30 and March 15. Exceptions may be permitted only in special cases and only with prior written approval of the Engineer. Asphalt concrete overlay shall not be placed when the atmospheric temperature is lower than 50 degrees Fahrenheit, during rainfall, or when the surface is frozen or wet

B. Coat all surfaces of existing pavement along with edges of manhole and clean out frames, inlet boxes and like items. When rate is not specified, hot liquid asphalt will be applied at the rate of 0.1 gallon per square yard. All utility valves shall be raised to match height of new overlay.

C. Following placement of the compacted asphalt concrete trench patch within the limit of the trench and including all areas removed for tee-cut, a single 2-inch thick layer of Level 2 or Level 3 asphalt concrete mix depending upon street location described in Paragraph 2.04.A of this Section shall be placed over the entire width of existing roadway surface. Final widths will vary from 16 feet to 24 feet or greater depending upon the street. Final

width of overlay for individual streets to be determined in field by the Owner. As a pre-cursor to installation of the 2-inch thick overlay, there may be sections of the street that will require placement of a pre-leveling course of asphalt concrete mix. This layer shall be installed where directed by the Owner.

D. Manholes shall have been previously adjusted to the height of the final overlay as part of the permanent trench patch effort. Protect manholes as necessary. If manholes do not fit roadway, adjustments will be made between the manhole cone and frame/cover that retain the integrity of the structure.

E. Asphalt berms may be necessary where directed by the Owner along limited sections of the street to direct surface drainage. Berms shall be approximately 6 to 8-inches wide and 3 to 4-inches in height. Place tack coat along surface of asphalt concrete prior to placement of berm.

F. Following completion of overlay, Contractor shall stripe all streets that currently have striping to match existing paint removed by trenching. This will also include any stop bars. Striping and stop bars shall be of same type of material that is presently on the pavement surface. Application of the material shall be as recommended by the manufacturer.

3.04 ASPHALT PAVEMENT PLACEMENT – (2" INLAY AFTER PERMANENT TRENCH PATCH)

A. Asphalt concrete inlay consisting of a 2-inch layer shall not be placed between September 30 and March 15. Asphalt concrete shall not be placed when the atmospheric temperature is lower than 50 degrees Fahrenheit, during rainfall, or when the surface is frozen or wet. Exceptions will be permitted only in special cases and only with prior written approval of the Engineer. Insure the existing milled asphalt surface is thoroughly cleaned by a vacuum sweeper and tacked prior to placement of the asphalt concrete.

B. Tack coat all surfaces of existing pavement along with edges of manhole and clean out frames, inlet boxes and like items. When rate is not specified, asphalt will be applied at the rate of 0.1 gallon per square yard. All valves shall be raised to match height of final overlay.

C. Manholes shall have been previously adjusted to the height of the final overlay as part of the permanent trench patch effort. Protect manholes as necessary. If manholes do not fit roadway, adjustments will be made between the manhole cone and frame/cover that retain the integrity of the structure.

A. Following completion of inlay, Contractor shall stripe all streets that currently have striping to match existing paint removed by trenching. This will also include any stop bars. Striping shall be of same type of material that is presently on the pavement surface. Application of the material shall be as recommended by the manufacturer.

3.05 TEMPORARY TRENCH PATCH

A. Temporary asphalt concrete shall be placed over trenches at the end of the day when they are open to traffic or as required by the Engineer. Special care shall be taken when placing the temporary asphalt on high traffic volume roads. Surface smoothness of the temporary material will be closely monitored by the Owner and will be cause for rejection of the

material requiring it to be immediately replaced at Contractors expense. Streets that will eventually be restored using full-depth reclamation (FDR) and overlays may not require the trench patch, although final decision on location will be up to the Engineer.

B. Contractor shall be responsible for maintaining the integrity of all streets within the project area that have been disturbed by construction activities. This may include placement of additional temporary asphalt concrete patch, use of milling materials as a possible temporary surfacing (versus initially hauling off site), or other solutions not mentioned above to eliminate pot holes or address surface runoff issues, all as approved by Engineer. Sweep up any loose gravel or other material on a daily basis that may be carried onto an adjoining roadway from the work areas.

3.06 FIELD TESTING

Testing will be conducted by the Contractor at locations as directed by Engineer to determine compliance with the specified degree of compaction for asphalt concrete. Aggregate base compaction testing will be the Contractor's responsibility as described in Section 02315.

3.07 BASE ROCK

Place rock surfacing beyond the limits of the main-line AC trench patch prior to placement of the widened section of 2- inch thick asphalt concrete. Base rock shall be ¾ inch – 0 inches crushed aggregate, as directed. Remove and dispose of native materials to provide space for base rock. Subgrade shall be graded reasonably smooth prior to placement of the base rock. The purpose of the layer is to provide a relatively smooth surface to place the asphalt concrete overlay upon. Compact with mechanical vibratory or impact tamper.

END OF SECTION

SECTION 02530

SANITARY SEWER PIPE AND MANHOLES

PART 1 GENERAL

1.01 DESCRIPTION

A. The work covered by this section consists of furnishing and installing all sanitary sewer pipe, and appurtenances.

1.02 REFERENCES

A. ASTM A746, *Ductile-Iron Gravity Sewer Pipe*

B. ASTM A48, *Gray Iron Castings.*

C. ASTM A304, *Steel Bars, Alloy, Subject to End-Quench Hardenability Requirements.*

D. ASTM A615, *Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.*

E. ASTM C478, *Precast Reinforced Concrete Manhole Sections*.

F. ASTM C924, *Practice for Testing Pipe Sewer Lines by Low-Pressure Air Test Method.*

G. ASTM C1244, *Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.*

H. ASTM D2837, *Long Term Strength (L.T.H.S.) @ 74.4 degrees F, 1600 PSI*

I. ASTM D3034, *Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.*

J. ASTM D2241, *Poly(Vinyl Chloride)(PVC) Pressure-Rated Pipe (SDR Series).*

K. ASTM D3212, *Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.*

1.03 SUBMITTALS

A. Provide sufficient data for the Engineer to properly evaluate the proposed pipe, manholes and appurtenances.

B. Product data submittals shall include, at a minimum, test reports. Provide test reports upon request, certifying that the pipe has been tested in accordance with and exceeds minimum requirements.

C. Precast manhole submittals shall include shop drawings from supplier

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyvinylchloride (PVC) Gravity Sanitary Sewer/Storm Pipe (less than 18-inch diameter): Of the size and type indicated on the plans, conforming to appropriate specifications detailed below.

1. PVC Sanitary Sewer/Storm Pipe and Fittings: Conform to ASTM D-3034, SDR 35. Fittings shall be injection molded, factory welded, or factory solvent cemented.

2. Minimum Pipe Stiffness: 46 psi.

3. Joint Type: Elastomeric gasket, conforming to the requirements of ASTM D3212.

4. Rubber Gaskets: Conform to ASTM D1869.

B. Manholes and Appurtenances:

1. Concrete: Concrete used in the construction of the manhole base and other structures specified shall be so proportioned and mixed as to meet a minimum 3,000 psi compression test after 28 days. There shall be a minimum of five sacks of cement per cubic yard of concrete.

2. Precast Manhole Sections:

a. Minimum 48 or 60 inches in diameter, reinforced concrete pipe, Class 2, conforming to ASTM C478, with added requirement that the reinforcement be circular and not elliptical. Cones shall be eccentric with wall thickness and reinforcement similar to that of manhole pipe sections. The tops and bottoms of the cones shall be parallel.

b. Preformed gaskets may be used in lieu of mortar type joints and shall be RAM-NEK, manufactured by K.T. Snyder Company, Inc., Houston, Texas; Kent-Seal by Hamilton Kent, Kent, Ohio; or as approved.

c. Flat-top manhole sections for all size manholes shall be used in lieu of eccentric cones where the depth from finish grade to invert is 6’-0” or less. Suburban frames shall be used with flat top manholes.

d. 48” manholes will be installed full diameter, capped with a three feet tall 48” diameter eccentric cone. Maximum 24-inch diameter riser adjustment shall be 10-inches. Depths greater than 10” to achieve finished grade with six -inch exposure will require a separate 4’ diameter riser below the eccentric cone before manhole will be approved.

3. Precast Concrete Bases:

a. Precast base sections or manhole bases shall be approved by the Owner prior to installation. All precast bases shall conform to ASTM C478.

b. Construct bases per standard details and as noted on the plans.

c. Provide flexible connectors that are designed to produce a positive watertight connection for pipes entering a precast manhole. The connector shall be manufactured by A-lok or an owner approved equal and shall meet the requirements of ASTM C-923..

4. Nonshrink Grout. Sika 212, Euco N-S, Five Star, or USA approved equal nonmetallic cementitious commercial grout exhibiting zero shrinkage. Grout shall not be amended with cement or sand and shall not be reconditioned with water after initial mixing. Nonshrink grout shall be placed or packed only with the use of an approved commercial concrete bonding agent. Unused grout shall be discarded after 20 minutes and shall not be used.

5. Manhole Extensions and Rings. Install rings and covers on top of manholes to positively prevent all infiltration of surface or groundwater into manholes. Rings shall be set in a bed of nonshrink grout with the nonshrink grout carried over the flange or the ring and shall be set so that tops of covers are flush with the surface of adjoining pavement, or 6-inches above natural ground, unless otherwise directed by the Owner. Extensions shall be limited to a maximum height of 27 inches from the center point of the first step to the top of the casting..

6. Manhole Frames and Covers: Of size and shape detailed on the plans or approved equal; ensure castings are tough, close-grained, gray iron, free from blowholes, shrinkage, and cold shuts, and they conform to ASTM A48, Class 30; ensure they are sound, smooth, clean, and free from blisters and defects. Plane and grind all castings where necessary to ensure perfectly flat and true surfaces. Covers shall be true and shall seat within the ring at all points. Manhole covers shall have two holes. Watertight/locking covers shall be solid with no holes.

7. Existing Manholes: Install new Kor-n-Seal boot following coring for all existing manholes that will have pipes extended in order to insure a positive watertight connection.

8. Manhole Steps:

a. Steel reinforced polypropylene plastic, Lane International Corp. No. P-13850, or approved equal, in conformance with ASTM C478; aligned vertically. Ensure steps within a manhole are of the same design, type, and size. Mixing of unmatched steps within the same manhole is not permitted.

b. Prior to delivery to the jobsite, manufacturer is to drive steps into preformed holes in precast concrete manhole cones and sections in conformance with the following: ASTM A615 Grade 60, 1/2" deformed steel rod and ASTM 2146-78 Type II, Polypropylene.

c. Place steps where there are no incoming or outgoing lines. Loose steps shall be cause for rejection of that manhole cone or section.

PART 3 EXECUTION

3.01 PREPARATION OF TRENCH

A. Crushed Gravel Pipe Base: Place in trench to a minimum depth of six inches below the flow line of the pipe. Place and level the base to approximate flow line grade in advance of laying pipe. Immediately following the placement of each pipe, place the crushed gravel pipe base to the invert of the ductile iron pipe or spring line of the flexible pipe. It is important that the gravel is "sliced" with a shovel on both sides of and for the full length of the pipe, to insure gravel is uniformly supporting the pipe haunches.

B. Bell Holes: At the location of each joint, bell holes of ample dimensions shall be dug in the bottom of the trench and at the sides where necessary to permit the joint to be properly fitted; to permit easy inspection of the entire joint; and to provide uniform bearing for the barrel of the pipe for its entire length.

C. Removal of Water: Provide and maintain ample means and devices to remove and dispose of all water entering the trench excavation during the process of laying pipe. Ensure water and debris does not enter the Owner's sewer system or new pipe. Ensure water and debris does not enter the Owner's sewer system or new pipe unless it will be discharged where provided in the Erosion Control plan. At no time will untreated groundwater be allowed to enter the live downstream sewer system.

3.02 PREPARATION OF SEWER PIPE

A. Carefully inspect pipes and fittings before being laid; no cracked, broken, or defective pipe or fittings shall be used in the work. Clean the ends of the pipe to remove dirt or other foreign material.

B. Exercise extreme care to ensure the inside surfaces of the bell are smooth and free from any projections which would interfere with the assembly or water tightness of the joint.

3.03 LAYING AND JOINTING PIPE AND FITTINGS

A. Line and Grade:

1. Lateral reconnection to new PVC pipe: Lay sewer pipe in full lengths as manufactured; lay on a constant grade and in straight alignment from manhole to manhole or cleanout. Do not install pipe with bows or bellies. The Contractor shall establish line and grade for pipe by the use of accurate pipe lasers to maintain the line and grade. The Contractor shall check line and grade as necessary to insure accuracy of installation.. In the event that the limits prescribed in this section are not met, the work shall be immediately stopped, the Engineer notified, and the cause remedied before proceeding further with the work. Variance from the established line and grade shall not be greater than 1/32-inch per inch of pipe diameter and shall not exceed 1/2-inch for line and 1/4-inch for grade, providing that such variation does not result in a level or reverse-sloping invert.

B. Sanitary Sewer Service Connections:

1. Lateral reconnection to new PVC pipe:

a. Utilize factory T-fittings on the new 8" PVC pipe, with the lateral ID being sized to equal the size of the existing lateral pipe ID. Make connections between dissimilar pipe materials with rigid fittings. Flexible and reinforce flexible fittings such as Fernco and Fernco Strong Back fittings are not allowed.

C. Manhole Connections:

1. Connect PVC pipe to concrete manholes by means of an approved Kor-n-Seal gasket or other approved coupling. The use of Portland Cement grout for connecting PVC Pipe to manholes will not be permitted. Manholes shall be cored to insure a watertight connection using the approved coupling.

3.04 MANHOLE INSTALLATION:

A. Precast Manhole Concrete Base: Construct so the first section of the precast manhole has a uniform bearing throughout the full circumference of the manhole wall. Deposit sufficient mortar on the concrete base to provide a watertight seal between the base and the manhole wall.

B. Placing Precast Manhole Sections: The joints for the precast concrete manhole shall be made of nonshrink grout. Construct the walls true to line and grade as established by the Engineer. Place grout on the groove of the lower section of the pipe prior to placing the next section of pipe. Completely fill entire joint with grout and trowel to a smooth surface. Manhole sections with a captive groove rubber gasket need not be grouted between sections. Manhole shelf shall be integrally poured against the wall and over the pipe stub. Construct shelf in such a manner that when capacity of the pipe is reached, no portion of the shelf surface is used as part of the cross sectional flow channel required for free flow through the manhole. Manholes with more than 10% change in slope on inlet versus outlet pipes shall have full depth channels placed across the base.

C. Manhole Inverts: Ensure manhole invert channels provide a smooth flow-through characteristic. No sharp edges or rough sections that will tend to obstruct the flow of sewerage will be permitted. In the event a full section of pipe is laid through the manhole, pour the concrete up to spring line (one-half the diameter of the pipe), then break or cut out the top half of the pipe and mortar smooth all rough edges. Trowel smooth all cement mortar used in the construction of the inverts. The Contractor may, at his option, use precast bases with pre-poured and formed invert channels.

D. Manhole and Cleanout Rings and Covers: Set rings so the tops of the covers will match final finished surface. Manholes located within unimproved areas shall be placed 6 inches above the finished ground surface or as directed by the Engineer.

3.05 TESTING OF GRAVITY SEWER PIPE AND APPURTENANCES

A. General:

1. Test all new gravity sewer lines by "low pressure air testing".

2. Air Tests For Gravity Sewers: Ensure all gravity sewers and appurtenances successfully pass the air test prior to acceptance and are free of visible leakage or infiltration.

3. The Contractor may desire to make an air test prior to backfilling for his own purposes; however, the acceptance air test shall be made after backfilling and compaction has been completed to final grade.

4. Furnish all facilities and personnel for conducting the test under the observation of the Engineer. The equipment and personnel shall be subject to the approval of the Engineer. Notify Engineer 24-hours in advance of testing to provide time to witness all test.

5. Acceptance testing shall be conducted on all new manholes.

B. Testing Procedures:

1. The Contractor shall provide all equipment and personnel for the Time-Pressure Drop Method for all air testing. The method, equipment and personnel shall be subject to the approval of the Engineer. The Engineer may, at any time, require a calibration check of the instrument used. The pressure gauge used shall have minimum divisions of 0.10 psi and have an accuracy of 0.0625 psi (one ounce per square inch).

2. Immediately following the pipe cleaning, test the pipe with low pressure air. Plug all sewer outlets with suitable test plugs. Slowly supply air to the plugged pipe installation until the internal air pressure reaches 4.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe. The test pressure shall be increased 0.433 pounds per square inch for each foot of average water depth over the sewer. This pressure will be in addition to the initial 4.0 pounds per square inch previously identified. Allow at least two minutes for temperature stabilization, adding only the amount of air required to maintain pressure before proceeding further. After the temperature stabilization period, disconnect the air supply. Determine and record the time in seconds that is required for the internal air pressure measured by the gage to drop from 3.5 pounds per square inch to 2.5 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe.

3. Safety Precautions: All plugs used to close the sewer for the air test must be capable of resisting the internal pressures and must be securely braced, if necessary. All air testing equipment must be placed above ground and no one shall be permitted to enter a manhole or trench where a plugged line is under pressure. All pressure must be released before the plugs are removed. The testing equipment used must include a pressure relief device designed to relieve pressure in the line under test at 10 psi or less and must allow continuous monitoring of the test pressures in order to avoid excessive pressure. The Contractor shall use care to avoid the flooding of the air inlet by infiltrated ground water. The Contractor shall inject the air at the upper plug if possible. Only qualified personnel shall be permitted to conduct the test.

C. Acceptance of Test:

1. The pipeline shall be considered acceptable when tested as described herein before if the section under test does not lose air at a rate greater than 0.0015 cfm per square foot of internal sewer surface. For test sections containing over 625 square feet of

surface area, the time measured by this method for 1.00 pounds per square inch pressure drop shall be calculated according to the following formula:

$$T = d^2L/42$$

T = test duration, seconds
D = pipe diameter, inches
L = section length, feet
42 = conversion factor

For test sections containing less than 625 square feet of internal surface area, the time measured by this method for 1.00 pounds per square inch pressure drop shall be calculated according to the following formula:

$$T = 56d$$

The internal surface area of pipeline sections may be calculated using the formula:

$$A = \pi Ld/12$$

The surface areas of lateral lines of differing lengths and diameters may be accommodated in Equations 1 and 2 above by using the sums $d_1 2L_1 + \ldots d_n 2L_n$ and $d_1 + \ldots + d_n$ in place of d^2L and d, respectively.

2. If the pipe installation fails to meet these requirements, the Contractor shall determine, at his own expense, the source or sources of leakage, and shall repair or replace all defective materials and correct all faulty workmanship. The type of repairs proposed by the Contractor must be approved by the Engineer before the repair work is begun. The completed pipe installation shall meet the requirements of the air test before being considered acceptable.

D. Manhole Vacuum Test (Adapted from ASTM C1244-93):

1. Summary of Practice: Plug all lift holes and pipes entering the manhole. A vacuum will be drawn and the vacuum drop over a specified period of time is used to determine the acceptability of the manhole.

2. Significance and Use: This is not a routine test. The values recorded are applicable only to the manhole being tested and at the time of testing.

3. Preparation of the Manhole:

   a. Plug all lift holes with an approved non-shrink grout.

   b. Plug all pipes entering the manhole, taking care to securely brace the pipes and plugs from being drawn into the manhole. The manhole shall be set to finish grade and all paving (if applicable) completed.

4. Procedure:

   a. Place the test head at the inside of the top of the frame and the seal inflated in accordance with the manufacturer's recommendations.

b. Draw a vacuum of 10 inches of mercury, with the valve on the vacuum line of the test head closed, and the vacuum pump shut off. With the valves closed, measure the time for the vacuum to drop to 9 inches.

c. The manhole shall pass if the time for the vacuum reading to drop from 10 inches of mercury to 9 inches meets or exceeds the values indicated below.

d. Utilizing the formulas that follow, the comparable times for a successful vacuum test for different size manholes are:

DEPTH (ft) (Length of Manhole)	TIME (sec) (Dia.)		
	48"	60"	72"
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73

e. If the manhole fails the initial test, make necessary repairs with a nonshrink grout after the vacuum has been released. Proceed with retesting until a satisfactory test is obtained.

f. Use or failure of this vacuum test shall not preclude acceptance by appropriate water infiltration or exfiltration testing, or other means.

E. Subsequent Failure: Infiltration of groundwater, in any amount, following a successful hydrostatic vacuum or air test as specified, shall be considered as evidence that the original test was in error or that subsequent failure of the pipeline, manhole or cleanout assembly has occurred. The Contractor will be required to correct such failures should they occur.

F. Deflection Testing: In addition to hydrostatic or air testing, gravity sanitary sewers constructed of PVC pipe shall be deflection tested not less than 14 days after the trench backfill and compaction has been completed. Conduct the test by pulling an approved solid pointed mandrel through the completed pipeline. Ensure the diameter of the mandrel is 95 percent of the inside diameter of the pipe. Conduct testing on a manhole-to-manhole basis and after the line has been completely cleaned and flushed. Excavate, repair, or realign and retest any portion of the sewer that fails to pass the test for air, leakage or deflection.

3.06 ACCEPTANCE

A. Thoroughly clean all pipelines after acceptance of all joint testing and after backfilling and restoration of surfaces.

B. Base acceptance of the pipeline on a final inspection of the entire line conducted jointly by the Contractor and the Engineer. This will also include results from Owner's operations staff which will lamp each individual section between manholes.

C. Any infiltration evidence in manholes or pipe shall be properly repaired, even if unit passed testing.

END OF SECTION

SECTION 02609

MANHOLE REHABILITATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide all labor, materials, equipment, power, water, and incidentals necessary to prevent infiltration of groundwater into manholes and prevent entrance of soil or debris.

B. The extent of Work is shown on the Drawings. Field verify interceptor, manholes, collection sewers, and all other utility locations prior to any work.

C. Manholes identified on the Drawings to be rehabilitated are included in the Work described in this Section.

1.2 REFERENCES

A. Comply with applicable provisions and recommendations of the following:

1. ASTM C 309, Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete.

2. ASTM C 321, Test Method for Bond Strength of Chemical-Resistant Mortars.

3. ASTM C 443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.

4. ASTM C 478, Standard Specification for Precast Reinforced Concrete Manhole Sections.

5. ASTM C 596, Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement.

6. International Concrete Repair Institute (ICRI) Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

1.3 MANUFACTURER'S PRODUCT SUPPORT

A. Provide a representative employed by the manufacturer having technical training in admixture and manhole wall liner design and construction available for consultation on site during the repair work.

1.4 QUALIFICATIONS

A. There is no licensing requirement for installation of internal manhole injection grouting. CONTRACTOR shall have completed the successful internal grouting of manholes on at least 30 manholes. The CONTRACTOR may provide on-site training by an approved

representative of the manufacturer in lieu of the experience requirement for installation. The training must take place in the presence of the ENGINEER or designated representative.

1.5 SUBMITTALS

A. Product Data: Submit product data including warranty information, surface preparation instructions and application instructions from manufacturer of wall repair materials, hydraulic cements, cleaning materials, specialized sealants, and grouts.

1.6 GUARANTEE

A. All manhole grouting shall be guaranteed by the CONTRACTOR against infiltration, spalling, loss of adhesion or failure for a period of 3 years from the date of Conditional Acceptance. During this period, repair all defects in a manner satisfactory to the ENGINEER at no additional compensation.

PART 2 - PRODUCTS

2.1 GENERAL

A. Handle, formulate, and store sealing compounds and grouts in conformance with the manufacturer's recommendations. The uncured compound and grouts shall be delivered to the Site in unopened containers, with the date of manufacture clearly indicated. Remove from the Site any uncured compound determined to be more than six months old. Do not use uncured compound or grout if container has been open for more than 24 hours.

B. Mix and handle the compounds and grouts, including their component parts in accordance with manufacturer's recommendations and to minimize hazard to personnel. Provide appropriate protective measures to ensure that the components and the chemicals produced in mixing are under the control of the CONTRACTOR at all times and are not available to unauthorized personnel or others. Dispose of excess material resulting from rehabilitation operations in a safe manner. All equipment and material shall be subject to the review of the ENGINEER.

C. Use only chemical materials that meet the following minimum application requirements:

1. All component materials shall be easily transportable by common carriers.

2. Packing of component materials shall be compatible with field storage requirements.

3. Components shall be packed in such a fashion as to provide for maximum worker safety when handling the materials and minimize spillage when preparing for use.

4. Mixing of the components shall be compatible with field applications, not require precise measurements, and be within the limits recommended by the manufacturer.

5. Catalyzation shall take place at the point of injection/repair.

6. Cleanup shall be done without inordinate use of flammable or hazardous chemicals.

7. Residual sealing materials shall be removed from the sewer after injection to ensure no flow reductions restriction or blockage of sewer flows.

2.2 MANHOLE INJECTION GROUT

A. For low leakage sites with limited voids in backfill, use acrylamide, acrylic, or low viscosity urethane grout.

1. Residual sealing materials shall be removed from the sewer after injection to ensure no flow reductions restriction or blockage of sewer flows.

2. Product Manufacturer:

a. Avanti AV-100 Chemical Grout; or equal (acrylamide).

b. Avanti AV-118 Duriflex; or equal (acrylic).

c. Avanti AV-254 Gelseal; or equal (low viscosity urethane).

B. For low leakage sites with potential void in the backfill, use urethane grout.

1. Product Manufacturer: Avanti AV-350 MultiGel; or equal (urethane).

C. For high leakage sites with limited voids in the backfill, use urethane grout.

1. Product Manufacturer: Avanti AV-202 Multigrout; or equal (polyurethane foam).

D. For high leakage sites with potential voids in the backfill, use urethane grout.

1. Product Manufacturer: Avanti AV-310 Hydro Sealant; or equal (polyurethane expanding foam).

E. For pipe penetrations, use urethane grout.

1. Product Manufacturer: Avanti AV-333 Injectaflex; or equal (urethane expanding foam).

F. Additives

1. Root deterrent chemical – Add dichlobenil to the grout in proportions as recommended by the manufacturer to prevent root growth.

a. Product Manufacturer: Avanti AC-50W Root Inhibitor; or equal

2. Shrink control agent - add a water-based emulsion with the grout to reduce shrinkage and improve strength of the grout providing the resultant cured material with both improved hydrostatic pressure resistance and flexibility. Add the agent

in proportions as recommended by the manufacturer.

a. Product Manufacturer: Avanti AV-257 Icoset; or equal.

2.2 WALL PATCH

A. Wall patch shall be a quick setting fiber reinforced calcium aluminate cementitious material. Mix and apply according to manufacturer's recommendations. Wall patch shall have the following minimum physical properties:

1.	Compressive Strength (ASTM C 109B):	1,400 psi, 1 hrs
		2,000 psi, 24 hours
2.	Shrinkage (ASTM C 596):	<0.06% at 90% R.H.
3.	Bond Strength (ASTM C 321):	900 psi, 24 hour
4.	Flexural Strength	500 psi, 24 hour; 900 psi, 28 days
5.	Cement:	sulfate resistant
6.	Density, when applied:	105 +/- 5 pcf

2.3 HYDRAULIC CEMENT

A. Hydraulic cement shall be a rapid setting cementitious product specifically formulated for leak control shall be used to stop minor water infiltration, mixed and applied according to manufacturer's recommendations, and having the following minimum physical properties:

1.	Compressive Strength (ASTM C 109B):	600 psi, 6 hours
		2000 psi, 24 hours
2.	Shrinkage (ASTM C 596):	<0.06% at 90% R.H.
3.	Bond Strength (ASTM C 321):	40 psi, 1 hour
		80 psi, 24 hours

B. The hydraulic cement shall require no additives, shall set in 45-90 seconds, and shall be dimensionally stable, freeze/thaw resistant and sulfate resistant.

PART 3 - EXECUTION

3.1 MANHOLE CLEANING / PREPARATION

A. Clean bench/invert floor and interior walls of manholes by removing deleterious material, including dirt, grease, and other debris. Use high-pressure water, at a minimum force of 3,500 psi. If required, use approved cleaners to remove grease, oil, and other matter, which would prevent a good bond between existing manhole wall and the approved repair

materials.

B. Prepare the interior surfaces in accordance with the requirements of the wall liner material manufacturer. Remove loose and protruding brick, mortar and concrete using a mason's hammer and chisel and/or scrapper.

C. Make all sub-surfaces clean and free of laitance or loose material.

D. Inset plywood mats or sheeting over the existing flow channel and bench to prevent debris from falling into the sewer and to collect debris from manhole bench.

3.2 INJECTION GROUTING MANHOLE JOINTS, PIPE PENETRATIONS AND OTHER DEFECTS

A. Use grout injection method to seal the manhole base and wall joints, and penetrating pipe joints. Seal other defects by injection grouting where shown, specified or required to stop leaks.

B. Where indicated by field conditions or directed by the ENGINEER, grout wall joints as follows.

1. The wall joints shall have the drill holes at 4, 8, and 12 o'clock positions one foot above the joint to be sealed and drill holes with grout sleeves inserted into the walls at 2, 6, and 10 o'clock positions one foot below the joint to be sealed. For each wall joint, pump grout into the lower holes until grout comes out of the upper holes.

C. Where indicated by field conditions or directed by the ENGINEER, grout base and/or bench by drilling one hole on one side of the defect with grout sleeves inserted into the bench or base, whichever is lower. Pump grout into drill hole.

D. For each penetrating pipe joint, drill one hole on each side of the pipe with grout sleeves inserted into the walls at the spring line or top of manhole bench, whichever is lower. Pump grout into both drill holes.

E. For other manhole defects, perform injection grouting in a manner to seal the defect watertight.

F. Into each insert sleeve, pump grout at controlled pressures which are in excess of groundwater pressures. Install additional insert sleeves and grout as necessary, due to type and size of leak encountered, type of soil and type of voids being filled.

G. Leaks, which are determined to be too large to be effectively eliminated by the grout injection method, shall be plugged with hydraulic cement prior to initiating the injection of grout.

H. Allow one day for the grout to cure, after which each sealed joint shall be inspected. If leaks are observed in the sealed area, place new gel insert sleeves and apply more sealant as necessary to stop the leak. Repeat the process as necessary to stop the leaks.

I. Repair all holes created by the grouting process with hydraulic cement. Manholes shall be cleaned, as specified, after chemical sealing operation. Fill any large voids with wall patch

mix.

3.2 INSPECTION AND TESTING

A. After manhole wall sealing or manhole rehabilitation has been completed, visually inspect the manhole in the presence of ENGINEER. Check for cleanliness and for elimination of active leaks.

3.3 CLEANUP

A. Remove all debris from the manhole.

B. If debris from CONTRACTOR'S work has entered the sewer pipe, clean the affected pipe(s) to the satisfaction of the ENGINEER and at no additional cost to the OWNER.

3.4 WARRANTY INSPECTION

A. Re-inspect (Warranty Inspection) all manholes repaired or rehabilitated in accordance with this Section in the presence of the ENGINEER 18 to 24 months after Conditional Acceptance of the Work during high groundwater conditions. The ENGINEER shall select the time for the Warranty Inspection and will give the CONTRACTOR two to four weeks notice prior to such inspection. Visually inspect each repaired or rehabilitated manhole in the presence of the ENGINEER.

B. If any repair or rehabilitation is found to be defective, make repairs necessary to eliminate or repair the defect at no additional cost to the OWNER.

C. All repair techniques and methods shall be approved by the ENGINEER prior to the initiation of any repair activities.

END OF SECTION

SECTION 02730

TEMPORARY BYPASS PUMPING

PART 1 GENERAL

1.01 DESCRIPTION

A. The work covered by this section consists of temporary bypass pumping of sanitary sewer around individual sections of sanitary sewer main within the project area.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 SANITARY SEWER BYPASS FLOWS

A. The Contractor shall submit a "Flow Diversion and By-Pass Pumping Plan" to the Owner prior to the start of construction. Under no circumstances shall sewage be allowed to flow or leak onto the ground surface, into gutters or onto streets, over sidewalks, or into storm inlets. The Flow Diversion and By-Pass Pumping Plan shall outline the Contractor's proposed method of handling all flows during all elements of construction. The plan shall show all flow inputs (connections) in the work area and how the flow from each connection will be managed. Flow inputs shall be confirmed by the Contractor during initial surveys and television inspections.

B. The Contractor shall provide complete diversion regardless of flow rate. The diversion plan for each segment shall contain at a minimum, a plan view of the diversion on a site map and the individual components of the diversion including but not limited to:

1. Pumps: type, size and placement

2. Diversion pipe: size, type, and placement

3. Power supply to pumps

4. Method of holding back the flow

5. Facilities for redundancy

C. Diversion of flows shall be accomplished by the use of pumps to a manhole downstream of the construction. The Contractor shall have adequate pumps and piping or alternative methods to divert flow to the downstream conveyance lines. The pumping or transportation capacity shall be sufficient to maintain normal flows plus additional flows that may occur during a rainstorm. Contractor shall provide all measures necessary to temporarily collect/divert flows from private services if necessary to properly install the pipe. Each impacted business should be contacted by the Contractor to insure that the least disruption as possible to the public is adhered to for the individual services.

D. Flow diversion piping shall be arranged such that the piping is protected from traffic

loads, traffic is maintained at driveways and roadways, and sidewalks are free of obstruction unless otherwise approved by the Owner. ***All sewage diversion piping shall be water-tight.***

E. The Contractor shall use critically silenced generators and pump units and shall meet or exceed the requirements of any local noise ordinances. Such approved generators and accompanying pumps shall be continuously monitored while in operation and shall be placed to minimize disturbances to residential areas. lf necessary to meet noise ordinances, sound baffles and temporary sound walls shall be installed to deflect sound from generators and bypass-pumps away from residential areas or as directed by the Owner. No variance from any local noise ordinances will be allowed unless the Contractor secures a noise variance at no additional expense to the Owner.

F. Diversion of all flows shall be maintained at all times. This could also include individual sanitary sewer services if necessary to provide a suitable environment to install the CIPP according to manufacturer's recommendations. The Contractor shall provide a qualified operator who is capable of making emergency repairs or who is able to mobilize forces to handle power, pump or other problems. This operator shall be on call 24/7 while the diversion is in operation. The Contractor shall be responsible for continuity of sewer service to each facility connected to the section of the sewer being impacted during the execution of the work. No leaks in the diversion piping shall be permitted. Diversion pipes shall be cleaned and disinfected prior to disassembly and the liquid shall be discharged into an existing sanitary sewer. Service connections or laterals shall not be disconnected or plugged during the day. Service must be restored to service connections or laterals within the normal work day.

G. Each flow diversion pump shall be powered by a dedicated power generator and shall operate as a single pumping unit. For system redundancy, the Contractor shall have on site an equivalent back-up flow pumping unit set up and fully operational for the pumping operation with capability to automatically switch over in case of failure to the primary system. In addition, an auto-dialer call out system shall be provided to notify the Contractor and the Owner's Field Operation Staff via a 24-hour number if/when the back-up flow pumping unit is utilized. Contractor is expected to visit site immediately to determine cause for primary system failure.

H. Flow diversion piping and pumps shall be free of leaks. Leaking pipes and pumps shall be replaced immediately. Sewage spills shall be cleaned up immediately. If a sewage release occurs during any sewage diversion activity, the Contractor shall be responsible for taking immediate action to cease, contain, and clean up the release, and to notify the proper authorities. The Contractor shall have sufficient equipment and materials at the work site to cease, contain and cleanup any sewage release that occurs during diversion operations and will be responsible for all costs associated with sewage spill cleanup including associated fines. The Contractor shall be responsible for cleanup, repair, property damage costs and claims.

I. No flow diversion operations may proceed unless the Contractor has, at the work site, the following items:

1. Dry granular lime, of sufficient quantities, to be spread on any release for purposes of disinfectant. A 10% bleach solution may also be used as a disinfectant. Disinfectants may not be directly applied to any surface waters, streams, creeks, etc.

2. Equipment to secure the area of sewage release and isolate the public from accessing the release site. As a minimum this shall include barricades and caution tape.

3. The equipment and materials on hand to stop the release and repair the failed item.

4. Equipment and materials to clean the site, rake up solid debris and to dispose of material properly.

J. In case of sanitary sewage release during diversion operations, the Contractor shall immediately contact the Owner notifying them of the release:

The Owner will take appropriate measures within 24 hours to report the sewage spill to the Oregon Department of Environmental Quality and any other appropriate entities if it is determined the spill was of sufficient magnitude. Even if a sewage spill or release is contained within an excavation, the spill or release must be reported to the Owner.

Failure by the Contractor to report a spill or release to the appropriate Owner's representative will result in liquidated damages in the amount of $500.00 per incident plus an amount sufficient to reimburse the Owner for any civil and administrative penalties paid by the Owner as a result of the Contractor's failure to report as described above.

K. The Contractor shall be responsible for providing the following information to the authorities in case of a spill or release:

1. Release location

2. Date and time release found or started and time stopped

3. Release flow rate and estimated total volume

4. Receiving stream, if any

5. Action taken to stop release

6. Cause of release

7. Clean-up actions taken

8. Any other information as requested by relevant authorities

END OF SECTION

SECTION 02775

CURED- IN- PLACE PIPE (CIPP)

PART 1 GENERAL

1.01 SUMMARY

A. This section specifies rehabilitation of pipelines by the installation of a resin-impregnated fabric liner.

B. Related sections: The work of the following Sections is related to the work of this Section. Other Sections, not referenced below, may also be related to the proper performance of this work. It is the Contractor's responsibility to perform all the work required by the Contract Documents.

1. Section 01300: Submittals.

1.02 REFERENCES

A. This section incorporates by reference the latest revisions of the following documents. They are part of this section insofar as specified and modified herein. In case of conflict between the requirements of this Section and the listed documents, the requirements of this Section shall prevail.

Reference	Title
ASTM D543	Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
ASTM D790	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D903	Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
ASTM D1600	Standard Terminology for Abbreviated Terms Relating to Plastics
ASTM D5813	Standard Specification for Cured-in-Place Thermosetting Resin Sewer Pipe
ASTM F1216	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Inversion and Curing of a Resin-Impregnated Tube
ASTM F1743	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pull-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe

1.03 DEFINITIONS

A. Definitions are in accordance with terminology of ASTM F412, unless otherwise specified. Abbreviations are in accordance with terminology of ASTM D1600, unless otherwise specified.

1. Service connection is the point where the lateral pipe intersects with the mainline pipe, also known as the lateral interface. It can be the interface portion of a tee, wye, or cut-in connection where the lateral pipe flows into the main.

2. Host Pipe: An existing pipeline or conduit to be internally rehabilitated by installation of a pipe liner.

3. Manufacturer and/or Assembler: The entity responsible for obtaining individual components of a system and assembling into the final products which are shipped to the job site for installation.

4. Installer: Licensed contractor or subcontractor responsible for the installation of the system in the field.

1.04 QUALIFICATIONS

A. Product, Manufacturer/Assembler and Installer Qualification Requirements:

1. The Manufacturer or Assembler shall have supplied the product bid for a minimum of 50,000 linear feet of installations. Contractor shall provide a list of installation projects. Also, provide the project names, owner contacts, phone numbers, and year installed.

2. The Contractor shall have a minimum of 5 years recent experience in sewer main rehabilitation, including familiarity with CIPP processes. Contractor shall submit list of a minimum of 5 references including contact names, phone numbers, and year installed for sewer rehabilitation projects.

3. Certification showing that the Installer is currently licensed by the appropriate licensor to perform CIPP installation.

1.05 SUBMITTALS

A. Submit the following in accordance with Section 01300:

1. Catalog data and manufacturer's technical data showing complete information on material composition, physical properties, depth of installation and dimensions of system components of the tube and resin system. Include manufacturer's recommendation for handling, storage, insertion, curing, trimming, finishing and repair of damaged liner.

2. Certification showing that the Installer is currently licensed by the appropriate licensor to perform CIPP installation. Certification shall be given to the Owner prior to delivery of material to the job site.

3. Certification from the manufacture that the materials meet the requirements of these specifications and intended use. Certification of test results confirming than the liner and resin meet the minimum chemical resistance requirement according to ASTM F1216 or ASTM 1753 depending upon which installation method is used.

4. Details on all lining materials and resins. Include calculations for the volume of resin to be used for each segment including the calculated amount of excess resin necessary to account for liner material properties, changes in the resin's physical and chemical characteristics due to the polymerization and the structural condition of the gravity pipe. Color of the resin shall also be identified.

5. Flow diversion plan for the mainline including services laterals (if applicable). This will include a specific plan for each individual manhole section which identifies location of bypass pipe, method of crossing individual driveway/street intersection, pumping capacity and location of equipment within the street. Generic bypassing plans will be rejected as incomplete.

6. Detailed method for samplings, including recommended location and size of each sample, method of removal and method of liner repair including a procedure to repair the cured liner when core/plate samples are taken.

7. Detailed description of the wet out process. Include tube and resin manufactures wet out recommendations including the roller gap, material feed speed and vacuum requirements for each liner size and thickness. If wet out occurs off-site, provide certification by the person in responsible charge that the entire wet out process including handling and delivery to the site followed the defined procedures.

8. A letter identifying the cleaning methods Contractor plans to employ to remove sediment, debris, grease, scale, encrustation, mineral deposits and roots throughout the gravity pipe to be lined and in the structures to be repaired. The letter shall include a detailed explanation of the cleaning process and a schedule of activities.

9. Name of resin supplier and liner fabric supplier. Resin manufacturer installation procedures including curing and cooling temperature and time requirements and sequences. Provide detailed calculations to confirm the liner thickness for the proposed resin system. List all assumptions, design criteria and material characteristics whether they are based on the information in the specifications, plans or not.

10. Technical data showing that the cured CIPP system meets the chemical resistance and corrosion resistance requirements of this specification section.

11. Manufacturer's or Assembler's certification that the liner materials and system are in compliance with the specifications, codes, and standards referenced herein.

12. Manufacturer's or Assembler's recommendations for factory and field (whichever applies) wet out procedures including: volume of resin per unit of liner, roller gap setting, mixing ratios and procedures for resin and catalyst/hardener,

shelf life of resin, pot life of resin, required wet out procedure to ensure full saturation, and other criteria deemed necessary to ensure proper wet out of the liner.

13. Manufacturer's or Assembler's certification that all Manufacturer's or Assembler's wet out recommendations have been followed on all lengths of CIPP which have factory wet out.

14. Manufacturer's or Assembler's recommendations for storage procedures and temperature control, handling and inserting the liner, curing details and minimum equipment requirements to allow for an adequate installation.

15. Manufacturer's or Assembler's recommendations for minimum and maximum pressures, temperatures, and time durations to be used during liner inversion, cure, and cool down for each shot installed.

16. Data on Contractor's equipment to be used on site including: type and tolerance of temperature gages and thermocouples used to monitor cure temperature; type and tolerance of equipment used to generate liner inversion pressure; make model, and technical data of all equipment used to generate heat for the curing process; make, model and technical data of backup equipment used to maintain curing temperature; approximate size of vehicle(s) which carries the CIPP pipe and installation equipment.

17. Procedures for cool down and relieving static head after CIPP cure.

18. CIPP samples in accordance with Paragraph 3.04A of this section.

19. Data-logger output in printed and electronic (excel spreadsheet) formats.

20. Material Safety Data Sheets for resins, hardeners, solvents, and all other compounds or chemicals to be used on job site.

21. Hydrophillic end seal material to be used and each manhole and method of installation.

22. Name and location of the testing laboratory to perform CIPP tests. Provide certification that each test shall be performed by a laboratory with an American Association for Laboratory Accreditation (A2LA) for the specific test to be performed.

B. Closeout Documents:

1. Submit the pressure and temperature data for each segment. This includes at a minimum the temperature of the hot water, steam, and/or interior of the liner and the temperature of external thermocouples.

2. Provide CCTV inspection video

3. Material testing documentation in accordance with Paragraph 3.04

1.06 QUALITY ASSURANCE

A. The Manufacturer or Assembler shall send a representative familiar with CIPP processes to the site to observe the initial five (5) installations of each product installed by the Contractor.

1. The Manufacturer or Assembler's representative shall provide certification to the Project Representative stating that the Contractor's installation methods meet the Manufacturer or Assembler's requirements.

2. After the initial installations, the product Manufacturer or Assembler's representative shall meet with the Owner to discuss inspection items that the Owner should observe and record for subsequent installations. Inspection items include pre-installation activities, product identification, installation procedures, equipment operations, and post installation activities.

B. The finished CIPP shall be continuous over the entire length of an insertion run between two manholes or access points and shall be free from visual defects such as foreign inclusions, dry spots, pinholes, and delamination.

C. Wrinkles in the finished CIPP liner that cause a backwater of 1/2-inch or more or reduce the hydraulic capacity of the pipe are unacceptable and shall be removed and repaired by the Contractor at the Contractor's expense. Methods of repair shall be proposed by Contractor and submitted to the Project Representative for review. No wrinkles in the CIPP are allowed within 4 feet of liner terminations at manholes. Refer to Paragraph 3.04.B for additional conformance standards.

1.07 LICENSING AND CERTIFICATION

A. The Contractor or subcontractor installing the CIPP shall have a current license agreement with the product Manufacturer or Assembler.

B. Individuals installing the CIPP shall be certified by the product Manufacturer or Assembler.

C. Lining installation shall be in accordance with the requirements of the product Manufacturer or Assembler and as directed by their Technical Representative. This includes the correction of defective work.

1.08 WARRANTY

A. The Contractor shall warrant each mainline, lateral, and side sewer lined with the specified product against defects in materials, surface preparation, lining application, and workmanship for a period of 24 months from the date of final acceptance of the project. The Contractor shall, within one month of written notice thereof, repair defects in materials or workmanship that may develop during said 24-month period. Defects shall be defined as: evidence of visible leakage of groundwater through the CIPP system, delamination of any portion of the CIPP system as visible from CCTV inspection, or separation of any part of the CIPP system from the host pipe to the extent that the CIPP system inside diameter in the separated area is 95 percent or less of the completed CIPP system inside diameter. The

Contractor shall also repair any damage to other work; damage to sewer system components, damage to buildings, houses or environmental damage caused by the backup of the sewer because of the failure of the lining system; or repairing of the same.

B. Repairs shall include removal of the existing liner and re-lining if possible, or excavation and replacement of the section of pipe where the defect occurs.

PART 2 MATERIALS

2.01 CURED IN PLACE PIPE LINER

A. The CIPP shall consist of one or more layers of flexible needled felt or an equivalent non-woven material, or a combination of non-woven and woven materials capable of carrying resin, withstanding installation pressures.

1. The CIPP shall be continuous in length and the wall thickness shall be uniform. No overlapping sections shall be allowed in the length of the liner. No overlapping sections shall be allowed in the circumference of the liner when felt liner is used.

2. The CIPP will be capable of confirming to offset joints, bells, and disfigured pipe sections. It shall be able to stretch to fit irregular pipe sections and negotiate bends.

3. The CIPP resin shall be compatible with the liner fabric, other rehabilitation systems it may contact, and the host pipe materials.

4. Seams in the CIPP shall be stronger than the non-seamed felt.

5. The CIPP shall be marked at regular intervals along its entire length, not to exceed 5 feet. Markings shall include Manufacturer's or Assembler's name or identifying symbol.

6. The CIPP liner shall be manufactured with materials from a consistent supplier. All materials of similar type shall be from a single source for the entire project.

B. The CIPP shall be fabricated to a size that, when installed, will tightly fit the internal circumference and length of the original pipe.

1. Allowance shall be made for circumferential stretching during the installation process.

2. The hydraulic capacity of the CIPP shall be greater than or equal to the hydraulic capacity of the original host pipe, based on hydraulic calculations with standard engineering roughness coefficients.

C. The liner thickness shall be 4.5 mm or greater. The thickness shall be sufficient to prevent groundwater from entering the pipe, while maintaining the maximum cross-sectional pipe area possible.

D. For liners inserted by the inversion method, the CIPP shall be coated on one side with translucent waterproof coating of:

1. Polyvinyl chloride (PVC)
2. Polyurethane
3. Polyethylene

E. For liners inserted by the pull/winch method, the CIPP shall be coated on one side with a translucent waterproof coating of:

1. Polyvinyl chloride (PVC)
2. Polyurethane
3. Polyethylene
4. Polypropylene
5. Or approved equal

F. Subject to these specifications, the following manufacturers or assemblers are acceptable:

1. Gelco Services Inc. (Salem, OR)
2. C.I.P.P. Corporation (Hudson, IA)
3. Perma-Liner Industries, Inc. (Clearwater, FL)
4. LMK Enterprises Inc. (Ottawa, IL)
5. Insituform Technologies, Inc. (Chesterfield, MO)
6. Masterliner Inc. (Hammond, LA)
7. Michels Corporation
8. Or approved equal.

G. UV-cured pipe will also be considered, if all performance requirements of this specification are met and approved by Engineer.

2.02 RESIN

A. A general purpose, unsaturated thermosetting, polyester, vinyl ester, or epoxy resin compatible with the fabric liner material, host pipe material, and other rehabilitation products that the resin may contact. No part of the properly curer liner shall be less than 100 percent saturated by resin.

B. Resin shall meet or exceed the physical properties listed in Section 2.03 and shall not be created from recycled materials.

C. Resin shall form no excessive bubbling or wrinkling during lining.

D. Resin shall be manufactured with materials from a consistent supplier. All materials of similar type shall be from a single source for the entire project.

E. The resin shall have no fillers added for the sole purpose of increasing the resin volume.

2.03 PHYSICAL PROPERTIES

A. The composite materials of the fabric liner tube and resin shall, upon installation inside the host pipe, exceed the minimum test standards specified by the American Society for Testing and Materials based upon restrained sample cured in host pipe and flat plate sample:

Physical Properties	
Flexural Strength (ASTM D790)	4,500 psi
Flexural Modulus (ASTM D790)	
Short Term	250,000 psi
Long Term	125,000 psi

B. The CIPP after installation shall be corrosion resistant to withstand exposure to sewage gases containing quantities of hydrogen sulfide, carbon monoxide, diluted sulfuric acid, and other chemical reagents typical of sewage conveyance. Chemical resistance of the installed CIPP shall meet the chemical resistance requirements of ASTM F1216.

C. The wall color of the interior pipe surface of the CIPP after installation shall be a light reflective color.

D. The hydraulic profile of the installed CIPP shall be maintained as large as possible. The CIPP shall have at a minimum the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using commonly accepted roughness coefficients for the existing pipe material taking into consideration its age and condition.

2.04 PRESSURE GROUT

A. Chemical grout designed for injection to seal leaks in manhole walls. AV-100 chemical grout as manufactured by Avanti International, or approved equal.

2.05 PIPE PENETRATIONS AT MANHOLE

A. Hydrophilic joint seal around pipe penetrations in manhole wall. Swellseal®8F by De Neef Construction Chemicals, Insignia™ Hydrophilic End Seal by LMK Technologies, Hydrotite Style DS-0520-351 or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Make all necessary provisions to ensure service conditions and structural conditions of host pipe are suitable for installation and warranty of the liner. Provisions shall include, but are not limited to temporary sewer bypassing, temporary service interruption of side sewers tributary to the sewer main, correction of structural, and sealing of active infiltration through pressure grouting.

B. Inspect and confirm the inside diameter, alignment, condition and length of each pipe segment to be lined. Use the data and information from this inspection to verify the size of the liner and refine the installation techniques. If unknown physical conditions in the work area are discovered during the investigation that materially differ from those ordinarily encountered by industry standards, notify the Engineer.

C. Bypass Pumping

1. The Contractor shall provide bypass pumping and/or diversion for acceptable completion of the liner installation. Bypass pumping shall consist of furnishing, installing, and maintain all power, primary and standby pumps, appurtenances and bypass piping required to maintain existing flows and services. Plans show the names of most, but not all major businesses that contribute sewage flows to each line. Contractor shall investigate further the additional tenants if necessary to complete this work. Refer to Section 02730, Paragraph 3.01 for additional bypass pumping requirements. No flow that will negatively affect the liner shall be allowed in pipe during CIPP installation.

2. Bypass pumping shall be done in such a manner as to not damage private or public property, or create a nuisance or public menace. The pumped sewage shall be in an enclosed hose or pipe that is adequately protected from traffic, and shall be redirected into the sanitary sewer system. Dumping or free flow of sewage on private property, gutters, streets, or into storm sewers is prohibited. All bypass piping shall have traffic rated fully enclosed ramps specifically designed for this type installation. Use of wooden ramps for driveways will not be allowed without specific permission of the Owner. Specifically, all work within the parking lot of Clackamas Promenade shall also be protected from the public. Any accidental spillage of sewage onto the pavement surface in this area shall be thoroughly cleaned to the satisfaction of the Owner to fully protect the general public from this exposure.

3. The Contractor shall take all necessary precautions including constant monitoring of bypass pumping to insure that no private residences or properties are subjected to a sewage backup or spill. The Contractor shall be liable for all cleanup, damages, and resultant fines in the event of a spill. After the work is completed, flow shall be restored to normal.

D. Temporary Interruption of Service

1. When it is necessary to shut down a private service lateral to perform the rehabilitation work, notify all the affected parties one week prior to and again 24 hours prior to the shutdown. Gravity pipe service shall not be out of service for more than eight hours and not between 6:00 p.m. and 8:00 a.m. without approval of the District.

E. Cleaning and Inspection of Existing Sewer

1. The Contractor shall be responsible for cleaning, inspecting, confirming the inside diameter and determining the condition of each manhole-to-manhole segment to be lined. The cleaning process shall include the removal of all roots. A television inspection witnessed by Owners Representative shall be performed by the Contractor after the sewer cleaning operation, point repairs and grouting is completed. All services that will be reinstated will be identified at this time and approved by the Owner. This may require dye testing or other means necessary by the Contractor to verify whether or not the service is live. The television inspection shall be competed in the same direction each time and shall be done with a CCTV color camera recoded in DVD format. A pivot head camera shall be used for all pipelines 6-inches in diameter or greater to allow detailed lateral inspection. A copy

of the television inspection video discs from all televising operations shall be provided to the District for review prior to the liner installation. Installation of the new liner shall commence within 48 hours of the final cleaning for each section of pipe from manhole to manhole. Installations delayed beyond the 48 hour period will require Contractor to clean the interior with a pressure washing operation again and thereby starting another 48 hour window for installation. Television inspection will not be required during the subsequent cleanings unless excessive debris in the opinion of the Owner are found in the downstream manhole for each section.

F. Removal of Obstructions

1. It shall be the responsibility of the Contractor to clear the line of obstructions such as solids, offset joints, protruding service connections or collapsed pipe that will prevent linear insertion. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment (including but not limited to equipment capable of cutting, filing, shaving, etc.) or by remotely performed point repair methods acceptable to the Engineer, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Before any point repair excavation is pursued, the Contractor shall give the Engineer three (3) working days notice. Point repair excavation shall proceed only with the District's written authorization. The excavation process shall be completed by mechanical means with adequate trench shoring and dewatering of the trench as necessary. Backfill of all excavations shall be with Class C imported rock compacted to a minimum of 95% maximum density according to ASTM – T99. Pavement restoration shall match existing pavement.

G. Point Repairs

1. Clean and prepare pipe

2. Remove rolled gaskets, roots, mineral deposits, and other objects protruding into the pipe, internally with a remote controlled cutter.

H. Manholes

1. Protect all manholes to withstand forces generated by the equipment while installing the liner.

3.02 INSTALLATION

A. Resin Impregnation

1. The uncured resin in the original containers and the unimpregnated fiberfelt tube shall be impregnated by vacuum or other means prior to installation. The materials and 'wet-out' procedure shall be subject to inspection by the Owner. A resin and catalyst system that re compatible with the requirements of the method shall be used.

2. The impregnated liner bag shall be transported to and stored at the site in such a manner that it will not be damaged, exposed to direct sunlight, or result in any

public safety hazard. The impregnated liner bag shall be kept cool during shipment and storage. All materials shall be subject to inspection and review prior to installation

3. Use a volume of resin sufficient to fill all voids in the tube material at nominal thickness and diameter. Volume should be adjusted by adding excess resin for the change in resin volume due to polymerization and to allow for any migration of resin into the cracks and joints of the host pipe, per Manufacturer's or Assembler's recommendations.

4. The resin impregnated tube shall be stored in such a manner that it will not be damaged, exposed to direct sunlight, exposed to any curing environment, or result in a public safety hazard. All materials shall be subject to inspection and review prior to installation.

B. Liner Installation

1. Inversion Method

a. The impregnated tube shall be inserted through an existing manhole or other access point by means of the Manufacturer's or Assembler's recommended installation process and in accordance with ASTM F1216. The application of a hydrostatic head, compressed air, or other means shall fully extend the liner to the next designated manhole or termination point and inflate and firmly adhere the liner to the pipe wall.

b. The rate of the liner installation shall not exceed the maximum rate recommended by the manufacturer. This installed rate shall be identified in the submittal of materials as provide in Section 01300.

2. When inversion is by hydrostatic head, the Contractor shall use methods which control the installation rate, accounting for the increase in hydrostatic head in pipes which have significant elevation change.

3. A Preliner may be installed between manhole sections at the option of the Contractor.

4. Insert continuous or properly trimmed hydrophilic waterstops at each structure opening approximately three inches from structure wall. Trimmed waterstop edges shall be butted up against each other at the crown of the pipe using a 45 degree miter cut or butted up horizontally against each other for a distance of 3 inches. Vertical overlap (e.g. stacking) of the hydrophilic waterstops will not be allowed. Waterstops with any gap between the ends will not be accepted.

4. Pull/Winch Method

a. The impregnated tube shall be pulled into place in accordance with ASTM F1743 within the host pipe with the aid of a power winch power winch that for felt tubes is equipped with a device to monitor the force and prevent excessive tension and tube elongation.

b. The maximum allowable longitudinal elongation, or stretch, of the material shall be one (1) percent. The longitudinal stretch of the tube shall be gauged by comparing marker on the fully inserted tube to the actual length of pipe being rehabilitated.

c. The Contractor shall use a flexible and impermeable calibration hose to inflate the tube. The calibration hose may or may not remain in the complete installation. Any dry tube or inflation hose material that enters the existing pipe that has not been previously vacuum impregnated with resin cannot be included in the structural wall of the CIPP. Hose materials remaining in the installation shall be compatible with the resin system used, shall bond permanently with the tube, and shall be translucent to facilitate post-installation inspection. Hose materials that are to be removed after curing shall be of non-bondable material.

C. Curing

1. After placement of the liner is complete, follow submitted cure schedule in curing of line. Provide a suitable recirculation system capable of delivering air, steam, water or ultraviolet light, as required by the liner system manufacturer, uniformly throughout the section to achieve a consistent cure of the resin. Maintain the curing temperature or exposure times as recommended by the liner system manufacturer. Prevent excessive temperatures that could scald or bubble the liner. The rate of temperature rise during heating shall not exceed resin manufacturer's recommendations.

2. The heat source shall be fitted with continuous monitoring thermocouples to measure and record the temperature of the incoming and outgoing water or steam supply. The Contractor shall provide an additional continuous monitoring thermocouple placed between the impregnated felt tub and the pipe crown at the remote manhole to determine the temperature during the cure. The temperature during the cure shall follow resin manufacturer's recommendation.

3. Provide standby equipment to maintain the heat source supply. The temperature during the cure shall not be less than 130 degrees Fahrenheit at the boundary between the pipe wall and the liner unless otherwise directed by the Manufacturer or Assembler to meet resin system requirements.

4. The initial cure shall be deemed to be completed when inspection of the exposed portions of the liner appear hard and sound and the remote temperature sensors indicate than an exotherm reaction has occurred. The cure period shall be of duration recommended by the resin manufacturer during which time the recirculation of the water and/or air and cycling of the heat exchanger continuously maintain the required temperature.

5. Provide for vapor tight connections in the downstream structure such that minimal vapors enter downstream pipes. Alternatively and at no additional cost to the Owner, provide styrene reducing agents, venting and downstream plugs sufficient to prevent steam, styrene, or other odors from entering downstream buildings.

D. Cool Down

1. The hardened liner shall be cooled to a temperature below 100 degrees F before relieving the static head or pressure in the lined pipe and returning normal flow back in the system.

2. Care shall be taken to ensure that a vacuum is not induced which could damage the new CIPP during the release of head on the new CIPP.

E. Sealing at the Sewer Main and Manholes.

1. After the cool down period is complete perform final trimming and sealing of the liner at access structures. Provide a watertight seal between the CIPP and the host pipe at each manhole. Trim the finished ends of the liner to within one inch of manhole wall. Provide a smooth transition between the existing structure channel invert and the liner using a cementitious coating, or other approved material to prevent settling of sediment or debris and ponding of standing water.

2. Care shall be taken to ensure that a vacuum is not induced which could damage the new CIPP during the release of head on the new CIPP.

3. Seal all holes and voids in manhole walls immediately surrounding the new liner with a hydrophilic rubber joint seal and the approved chemical grout identified in Paragraph 2.05A and 2.06A of this section. Contractor shall verify with the CIPP manufacturer the mixture applied is compatible with the liner/resin system utilized. No water shall be able to migrate between the CIPP and the host pipe, otherwise the CIPP shall be considered defective and shall be repaired or replaced at the Contractor's expense.

4. Where new CIPP can be installed through manholes, leave bottom half in place to provide continuous run through manhole channel. Seal watertight at each wall penetration as described in Paragraph 3 above.

F. A data logger shall continuously record temperature, pressure and time during heating, cure and cool down at the liner insertion, termination and intermediate points from the installed thermocouple. Temperature and pressure versus time shall be plotted on a line graph and provided to the Engineer for each lining.

3.03 SERVICE CONNECTION RESTORATION

A. Restore service connections (also known as reinstating service connections) to the lined pipe by the following method:

1. Internally reconnected by using a pivot-headed CCTV camera and a remote cutting tool to locate the service connections from inside the lined pipe, cutting a hole matching the service connection diameter which may vary from 4" to 6" nominal opening, and grouting the area where the service connection enters the lined pipe to produce a water tight seal. Grouting at mainline need not be performed if service connection rehabilitation liners are installed. Provide a nearly full-diameter hole, free from burrs or projections and with a smooth and crack-free edge. The hole shall be 95 percent minimum and 100 percent maximum of the original service connection inside diameter. The invert of the service connection shall match the bottom of the reinstated service opening. Each active service connection shall be cut completely open and shall

have smooth edges with no protruding material capable of hindering flow or catching and holding solids contained in the flow stream. This specifically includes any portion of the cuttings that remain within the lateral invert or excess grout from packer operations. Excess grout shall be defined as a thickness of grout that given its location, size and geometry, could cause a blockage. The CCTV during cutting shall be recorded on DVD and shall include a pan and tilt view of entire lateral circumference following cutting. Any resultant leaks between host pipe liner at lateral shall be grouted watertight.

2. Each lateral connection shall be sealed from the mainline by packer injection grouting. Pressure inject grout through the lateral packer into the mainline connection joint and any visible deficiencies extending approximately two feet up the existing service lateral pipe. Equipment shall be designed to monitor the injection of material and determine when any leaks are sealed to a minimum of 0.5 psi per vertical foot of depth plus 2 psi; however, test pressure shall not exceed 10psi without approval of the Engineer. Once the designated pressure is displayed on the meter of the control panel, application of air pressure will be stopped and a 15 second waiting period will commence. The void pressure will be observed during this period. If the void pressure drop is greater than 2.0 psi within 15 seconds, the lateral will be considered to have failed the air test and shall be grouted and retested. The grout shall be chemical grout AV-100 as manufactured by Avanti International or approved. Confirm lateral flow after sealing of each lateral connection. If a grout blockage exists, the Contractor shall immediately clear the lateral at no additional cost to the satisfaction of the Engineer.

3.04 TESTING

A. Material Testing

1. All material testing shall be performed by a registered independent, third-party laboratory in accordance with the applicable ASMT test methods to confirm compliance with the requirements of these specifications.

2. The Contractor shall provide certified test results of the short term properties of the cured CIPP lining material from the actual installed liner as a minimum on one location per each liner insertion setup.

3. The cured CIPP liner shall be sampled and tested for flexural strength and flexural modulus (short term). Flexural strength and modulus shall be tested in accordance with the requirements of ASTM D790. The liner shall be incompliance with the physical properties started under Paragraph 2.03A of this section. A certificate of compliance shall be provided for long term flexural modulus.

4. Minimum chemical resistance requirements shall be as stated in ASTM F1216, Section X2. Chemical solutions include Tap Water (pH 6-9), Nitric acid, Phosphoric acid, Sulfuric acid, Gasoline, Vegetable oil, Detergent and Soap at concentrations identified in Table X2.1. This test shall be required on a single installation for the project. The Engineer will determine which installation field sample shall be used for testing. If analytical results show that the finished CIPP does not meet the requirements of ASTM F1216, additional chemical resistance testing will be required at no additional cost to the Owner on another section of pipe.

B. Field Testing

1. Visual inspection of the CIPP shall be in accordance with ASTM F1743, Section 8.6.

2. After completion of all CIPP insertions, service reconnections, and finish work at the manholes the sewer shall be video recorded with Owner Representative witnessing and a copy of the tape provided to the Owner.

   a. Repair CIPP per the Manufacturer's or Assembler's recommendations if defects, including infiltration of groundwater is observed.

   b. All service connections shall be accounted for and be unobstructed. This will include any residual grout or coupons from the CIPP liner section removed.

3. Conformance Standards and Remedies must meet or exceed the following:

   a. No radially positioned (perpendicular to flow) wrinkles, fins or other discontinuities in the lower third of the pipe which exceed ½ inches in height, or more than 3 percent of the host pipe inside diameter; whichever is the least.

   b. No radial wrinkles, fins or other discontinuities in the upper two-thirds of the pipe having a height of 5 percent or more of the host pipe inside diameter, unless approved. The requirement may be waved at the option of the Owner under specific circumstances.

   c. No leakage through the liner.

   d. No separation of the liner from the existing pipe

   e. No delamination of CIPP layers.

   f. If an installed liner has unacceptable wrinkles, fins, discontinuities, leakage, delamination, pinholes, soft spots, blisters, failed tests, or other defects, remedy the defect by installing a second liner, removing and reinstalling a full-thickness liner, constructing a full pipe replacement, or installing a liner repair as approved.

   g. Any necessary replacement repair also included all surface restoration to equal or better condition before repair was begun, as approved.

END OF SECTION

SECTION 09600

PROTECTIVE COATINGS - CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION

The work described within details a complete program for use on new or existing brick, steel or concrete structures including but not limited to wet wells, manholes, pump stations, digesters, large diameter pipe or other large wastewater structures. This section details the methods, procedures, materials and equipment as required to provide a corrosion resistant coating product that restores walls to original surface smoothness to the greatest extent possible and eliminates water infiltration and exfiltration.

1.02 REFERENCES

A. ASTM D4541 - Adhesion
B. ASTM D412 - Tensile Strength (PSI)
C. ASTM D412 - Elongation (%)
D. ASTM D624 - Tear Strength (PLI)
E. ASTM D2240 - Hardness
F. ASTM D522 - Flexibility (1/8" mandrel)
G. ASTM D4060 - Taber Abrasion (mg loss)
H. SSPC SP-13 NACE No. 6 – Surface preparation of concrete.

1.03 SUBMITTALS

All materials and procedures required to establish compliance with the specifications shall be submitted for review/approval. Submittals shall include at least the following:

1. Technical Data Sheet on each product used.
2. Material Safety Data Sheet (MSDS) for each product used.
3. ASTM References.
4. Descriptive literature, bulletins and or catalogs of materials. Literature shall be adequate to fully define manufacturers recommended specifications, component physical properties and chemical resistance, manufacturers recommendations for surface preparation techniques to be followed, environment restrictions and compatibility of material recommended by manufacturer (and those specified herein or proposed by Contractor) for stopping infiltration prior to coatings.
5. Work procedures including flow diversion plan, method of repair, etc.
6. Certified statement from coatings manufacturer that the contractor/installer is a currently approved installer of the proposed coating system.
7. Material and method for repair of leaks or cracks in wastewater structures.
8. Coatings manufacturer approved testing procedure that will be followed, indicating adequacy of surface preparation steps and acceptable environmental conditions prior to applying coating system.
9. Required experience with coating system applications. Provided name of projects, date of project, material applied, approximate square feet of coatings applied on each referenced project and contact information for the referenced projects owner.
10. Final installation report on each completed manhole.

1.04 WARRANTY

Contractor shall warrant the coating against failure for a period of 10 years. “Failure” will be deemed to have occurred if the protective lining fails to (a) prevent the internal deterioration or corrosion of the structure (b) protect the manhole substrate from contamination by sanitary sewage flows or (c) prevent groundwater infiltration. If any such failure occurs within 10 years of initial completion of work on a structure, the damage will be repaired to restore the lining at no cost to the Owner within 60 days after written notification of the failure. “Failure” does not include damage resulting from mechanical or chemical abuse or act of God. Mechanical or chemical abuse means exposing the lined surfaces of the structure to any mechanical force or chemical substance not customarily present or used in connection with structures of the type involved.

1.05 QUALITY ASSURANCE

A. The manufacturer and/or applicator of the total coating system of wastewater structures shall be a company that specializes in the design, manufacture or installation of corrosion protection systems for wastewater structures. Applicator shall be competent in leak repair, surface preparation and corrosion materials application. Corrosion materials/products shall be suitable for installation in a severe hydrogen sulfide environment without any deterioration to the coating product over the lifetime of the manufactures’ warranty period.

B. The Contractor (or his subcontractor applying the coating system) shall be trained and certified by the manufacturer for the handling, mixing, application and inspection of the liner system as described herein. The Contractor (or his subcontractor applying the coating system) shall have successfully completed projects totaling a minimum of 10,000 square feet in the last 5 years using the specified coating system. In addition, the Contractor’s project superintendent shall have a minimum of 5 successfully completed projects totaling a minimum of 5,000 square feet using the specified coating system.

C. To ensure total unit responsibility, all materials and installation thereof shall be furnished and coordinated with/by one supplier/applicator who turnkeys the work and assumes full responsibility for the entire operation.

D. At completion of the work, Contractor shall provide daily reports for all efforts including but not limited to: surface preparation, substrate conditions, ambient conditions application procedures, lining materials applied, material quantities, material batch number(s), description of work completed.

E. The final rehabilitated manhole coating shall be designed to protect against all corrosive elements found in this sanitary sewer, shall be free of any infiltration, adhesion problems, coating pinholes, or any other elements that could affect the service life or operation of the manhole. Prior to application of final coatings, all infiltration shall have been completely stopped with materials fully compatible with the final coatings.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. The materials to be utilized in the lining of wastewater structures shall be designed and manufactured to withstand the severe effects of hydrogen sulfide in a wastewater environment.

B. Equipment for installation of lining materials shall be as recommended by the manufacture.

C. The coating system to be utilized for wastewater structures shall be a multi-component liner system manufactured by CCI Spectrum, Inc. (Spectrashield System) , Raven Lining Systems, Inc. Raven 405 system, Tnemec System, or approved equal.

1. SPECTRASHIELD SYSTEM

a) Coating System identified is the minimum as recommended by Spectrashield- but may need to be modified, as approved, to meet the most stringent performance criteria specified in these documents.

Installation	Material
Moisture displacement barrier	Primer
Moisture barrier	Modified Polymer
Surfacer	Polyurethane/Polymeric blend foam
Final corrosion barrier	Modified polymer

b) Modified polymer shall be sprayable, solvent free, two-component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment with the following physical properties:

Tensile Strength, PSI	>2400
Elongation, %	>300
Tear Strength, PLI	>500
Shore A Hardness	96
100% Modulus, PSI	>2400

c) Polyurethane Rigid Structure Foam, low viscosity two-component, containing flame retardants with the following physical properties:

Density, nominal, core, lbs/ft3 ASTM D-1622 @ 74° F	4-10
Compression Strength, ASTM D-1621 @74° F parallel rise; PSI	90-150
Closed Cell Content, % @ 74° F	Over 95
Shear Strength, PSI - ASTM C-273 @ 74° F	225-250

d) Total thickness of multi-component stress panel liner shall be a minimum of 500 mils.

2. RAVEN 405 SYSTEM

100% solids, solvent-free ultra-high-build epoxy spray applied monolithic liner system conforming to the following minimum physical characteristics

Product Type		Amine Cured Epoxy
VOC Content	ASTM D2584	0%
Compressive Strength	ASTM D695	>18,000 psi
Tensile Strength	ASTM D638	>7,500 psi
Flexural Modulus	ASTM D790	>500,000 psi
Adhesion to Concrete	ASTM D4541	Substrate (concrete) failure
Chemical Resistance	ASTM D534	Municipal sanitary sewer environment

a) The complete Raven 405 Coating System shall be as recommended by Raven, in conformance with these specifications, and shall be applied only to properly prepared surfaces that will insure the required adhesion. Coating System may need to be modified as needed and as approved to meet the most stringent performance criteria specified in these documents.

b) Patching, profiling and grouting mix shall be as required and recommended by the coating system manufacturer for suitability. It shall be mixed and applied according to the manufacturer's recommendations.

c) Total thickness of Raven coating system shall be a minimum of 125 mils above the fully prepared substrates highest profile point.

3. TNEMEC SYSTEM

Protective Lining shall be comprised of 1) concrete repair mortar and/or epoxy resurfacer, 2) trowel applied liner (basecoat), and 3) epoxy glaze (topcoat).

a) Wire Mesh Protective Coating: Provide Modified aromatic polyurethane primer for any exposed wire mesh within interior of manhole.

b) Cementitious Repair Mortar: Trowelable grade rapid-setting cementitious repair mortar when concrete is deteriorated greater than a depth of 1/4-inch and when recommended by the Manufacturer to restore concrete and provide level substrate for application of the protective lining; or

c) Epoxy Resurfacer: Epoxy-polymer modified cementitious resurfacer (thin overlay) applied to new or existing concrete to a depth up to 1/2-inch. Repair new or existing concrete and provide a uniform, level substrate for application of the protective lining; and

d) Trowel applied high-build epoxy liner (basecoat) to provide a chemical, permeation, and abrasion resistant protective lining against physical and chemical attack phenomena typically associated with municipal wastewater headspace conditions; and

e) Epoxy glaze coat (topcoat) to provide enhanced chemical, permeation, and abrasion resistance.

Contractor shall provide all accessory components such as polysulfide sealants, and curing compounds, as recommended by the manufacturer for maximum protective lining adhesion to substrate, and long-term service performance.

f) Modified Aromatic Polyurethane Primer:

Properties	Tnemec Series 1 Omnithane®
Minimum thickness	2.5 mills
Maximum thickness	3.5 mills
Application Working Time at 75°F	20 min

g) Epoxy modified Cementitious Resurfacer:

Properties	Tnemec Series 218 Mortar Clad
Minimum thickness	1/16 inch
Maximum thickness	½ inch
Application Working Time at 75°F	0 min
Bond Strength (ASTM D 7234)	
Applied to 1/16" Concrete	Concrete Failure/500psi
Compressive Strength (ASTM C 579)	7,100 psi
Curing Requirements (ACI 308)	
Method	Ambient Cure
Duration	15 hours
Flexural Strength (ASTM C580)	1,290 psi
Slant Shear (ASTM C882)	1,040 psi
Splitting Tensil (ASTM C496)79)	640 psi

h) Epoxy Lining, Trowel Mortar Protective Lining (basecoat):

Properties	Tnemec Series 434 Perma-Shield H_2S
Application Time at 75°F	30 min
Color	Beige
Minimum Dry Film Thickness (DFT)	100 mils
Maximum Dry Film Thickness (DFT)	125 mils
Bond Strength (ASTM D 7234)	
Bare Concrete /Series 434	Concrete Cure
Bare Concrete/ Series 217/Series 434	Concrete Cure
Bare Concrete/ Series 218/Series 434	Concrete Cure
All exceeds the cohesive strength of the concrete	
Compressive Strength (ASTM D 695)	12,331 psi

i) Epoxy Lining, Glaze Protective Lining (topcoat):

Properties	Tnemec Series 435 Perma-Glaze
Application Time at 75°F	30 min
Color	Gray
Minimum Dry Film Thickness (DFT)	15 mils
Maximum Dry Film Thickness (DFT)	20 mils
Bond Strength (ASTM D 7234)	
Bare Concrete /Series 434	Concrete Cure
Bare Concrete/ Series 217/Series 434	Concrete Cure
Bare Concrete/ Series 218/Series 434	Concrete Cure
Compressive Strength (ASTM D 695)	9,427 psi
Elongation (ASTM D 638)	14.1%
Flexural (ASTM D 790)	
Strength	3,289 psi
Modulus of Elasticity	3.0×10^5 psi

Shrinkage (ASTM C 531)	-0.06%
Tensile Strength (ASTM D 2370)	2,053psi

D. Materials specified are those that have been evaluated for the specific service. Products of Spectrashield, Raven and Tnemec Company (along with performance requirements) are listed to establish a standard of performance and quality. Equivalent materials including warranty of other manufactures may be substituted on written approval of the Engineer.

PART 3 EXECUTION

3.01 INSPECTION

A. Applicator shall take appropriate action to comply with all local, state and federal regulations including those set forth by OSHA, EPA, the Owner and any other applicable authorities.

B. Prior to conducting any work, perform inspection of structure to determine need for protection against hazardous gases or oxygen depleted atmosphere.

C. Submit plan for bypass pumping to Owner for approval prior to conducting the work. Refer to Section 02730, Paragraph 3.01 for specific information.

D. New Portland Cement structures shall have endured a minimum of 28 days since manufacture prior to commencing installation of the coating product.

3.02 SURFACE PREPARATION

A. Divert flow from channel with sanitary sewer bypass system as specified in Section 02720, Sanitary Sewer Manholes.

B. Conduct surface preparation program to include monitoring of atmosphere for hydrogen sulfide, methane, low oxygen or other gases, approved flow control equipment, and surface preparation equipment.

C. Surface preparation methods may include high pressure water cleaning, hydro blasting, abrasive blasting, grinding, detergent water cleaning, hot water blasting and others to meet the latest edition of SSPC-SP13/NACE No. 6 requirements. The finished effort shall be suited to provide a uniform, sound clean neutralized surface suitable for installation of the specified coating product.

D. Surface preparation method shall produce a cleaned, abraded and sound surface with no evidence of laitance, loose concrete, brick or mortar, oils, grease, chemical contaminants or debris, and shall display a surface profile suitable for application of coating product. Concrete and/or mortar damaged by corrosion, chemical attack or other means of degradation shall be removed.

E. After the defects in the structure are identified, repair all active leaks to the satisfaction of the Owner with a hydrophobic and/or hydrophilic sealant designed to stop infiltration of ground water by pressure injection as supplied by Avanti International (AV-248-LV or AV-202-LV), SealBoss (1510 or FlexGel2), or as approved. This applies to all leaks into

the manhole including any leaks between manhole and pipe wall ore even leaks from annular spaces between a host pipe and pipe liner.

F. Repairs to exposed rebar, defective pipe penetrations or inverts, etc. shall be repaired utilizing quick setting hydraulic cement as manufactured by Euclid Chemical Company, BASF, Tnemec Series 217 mortar or equal.

G. After completion of surface preparation inspect all areas to be coated for leaks, cracks, holes and any exposed rebar with the Owner and a representative from the coating supplier to verify the area is ready for application of the product.

H. The entire interior manhole surface including the flow channel shall be prepared for application of the coating system. This will include removal of the existing manhole steps from each structure identified in the plans. Rungs shall be cut flush with the exterior walls to the satisfaction of the Engineer.

I. Surface preparation shall be accepted by coating system manufacturer's authorized representative (which may be coatings applicator, if so identified in writing by coating system manufacturer) prior to application of the coating system.

3.03 COATING SYSTEM MATERIAL INSTALLATION

A. Application procedures shall conform to recommendations of the manufacturer, including materials handling, mixing, environmental controls during application, safety and spray equipment.

B. Spray equipment shall be specifically designed to accurately ratio and apply the coating system.

C. Application of multi-component coating system shall be in strict accordance with manufacturer's recommendation.

1. Final installation of Spectrashield system shall be a minimum of 500 mils or manufacture's recommended thickness to meet the required warranty described in Paragraph 1.03 of this Section. A permanent identification and date of work performed shall be affixed to the structure in a readily visible location.

2. Final installation of a Raven 405 coating system shall be the greater of 125 mils or manufacture's recommended thickness to meet the required warranty described in Paragraph 1.04 of this Section. A permanent identification and date of work performed shall be affixed to each manhole structure in a readily visible location.

3. Final installation of Tnemec system shall consist of the following: 1st System – apply Tnemec Series 1@ 3.5 mils dry covering any wire mesh exposed during surface preparation. Refer to Paragraph 3.02.C for exposed wire mesh considerations. 2nd System - apply parge coats of Tnemec Series 218 to bring the finished surface flush with original plane of concrete filling all voids from any missing aggregate. The finished surface shall be prepared to a Class A finish (+/- 1/8" smoothness) as described in the latest version of ACI 117; 3rd System - apply Tnemec Series 434 H_2S @ 100- 125 mils dry; 4th System - apply Tnemec Series 435 @ 15-20 mils dry. Contractor shall apply necessary "coats" of each individual Tnemec Series to achieve the required dry film thickness.

D. Coating products shall interface with adjoining construction materials throughout the structure to effectively seal and protect concrete substrates from infiltration and attack by corrosive elements. Procedures and materials necessary to effect this interface shall be as recommended by the primary coating products manufacturer.

E. Termination points of the coating products shall be made at the manhole frame and cover.

F. The finished surfaces shall be relatively smooth, free of ridges, wrinkles and sags. Special care shall be used to insure a smooth transition between the manhole invert and the intersecting pipeline inverts such that flow will be impaired. Should any of these conditions occur, the liner shall be repaired according to the manufacturer's standards or liner shall be rejected and removed at Contractor's expense.

G. Sewage flow shall be bypassed or diverted for application of the coating system to the full invert and interface with pipe materials.

H. Provide final written report (including photographs) to Owner detailing the location, date of repair, and description of repair done in each manhole. Daily written reports given to owner's representative are to include ambient conditions measured at the time of coating, including relative humidity, manhole wall surface temperature, dew point, ambient temperature and wet-film thickness measurements of coating to insure stated compliance for materials applied.

3.04 TESTING

A. Contractor shall notify the Engineer upon completion of surface preparation work at least 2 hours prior to application of the initial coating in order to conduct a visual inspection of surface preparation work. Acceptance of the final preparation by the Engineer does not impact the validity of the warranty by the Contractor. Contractor is fully responsible for providing a finished product that will meet or exceed the required warranty described in Paragraph 1.04 of this Section.

B. Contractor shall provide the services of an independent testing agency approved by the Owner to verify that all surfaces are coated sufficiently and no holidays or pinholes exist through to the substrate. Testing will include a high voltage test in accordance with the latest version of ASTM D 4748 (Standard Practice for Continuity Verification of Liquid or Sheet Lining Applied to Concrete Substrates) and/or NACE SPO 188.
   1. Perform test after the manufacturers minimum cure times have elapsed after application of the last coat in order to develop sufficient physical properties in the coating to withstand the high voltage arc.
   2. High voltage setting shall be sufficient to arc through a distance of one-half inch to ground.
   3. Circle all indications with a dark felt tip pen.
   4. A double application of the final corrosion protection coat will be made so as to completely cover the indicated holiday and no visible marks showing through the final coat. Retest recoated areas to confirm conformance to requirements.

C. Coating Adhesion: After coating system application and cure, measure and record the results

of a minimum of three passing adhesion tests, without glue failures, in two manholes as directed by engineer. Tests shall be per ASTM D4541 as modified herein. Utilize 20 mm test dollies and a calibrated portable pull-off adhesion tester. Document any test failure mode, whether failure is within concrete, failure is within coating or failure is at the concrete/coating interface. Failure of the dolly adhesive shall require retesting. Prior to conducting the pull test, the coating shall be scored around the dolly to just above the substrate by mechanical means without disturbing the dolly or bond within the test area. If the testing damages the coating, spot repair the test location while following manufacturer's recommendations. Failure of the coating/concrete interface with less than 20% of the substrate adhering to the coating and less than 300-psi pull-off strength, shall be deemed a coating system failure and the contractor shall remove the coating to soundly adhered edges, re-perform surface preparation procedures, and recoat the failed surfaces, at contractor's cost. Low pull-off strength values (<150 psi) will require additional testing/evaluation to determine potential adhesion defects at the sole discretion of Owner's representative.

D. All manholes shall be visibly inspected after completion of coating system and again during warranty period. No visible leakage or lack of adhesion will be allowed.

END OF SECTION

SITE SPECIFIC SAFETY PLAN CERTIFICATION

APPENDIX A

SITE SPECIFIC SAFETY PLAN CERTIFICATION

Contractor performs all operations in strict accordance with all applicable standards set by Oregon Occupational Safety and Health Division (OR-OSHA), including, but not limited to Oregon Administrative Rules (OAR) 437, Chapter 2, Sections 141 – 147 (29 CFR Part 1910, 29 CFR Part 1926).

Contractor creates and maintains a Site-Specific Safety Plan, which is require on-site through the entirety of the project. The Contractor's Safety Manager is trained and knowledgeable in all safety requirements and shall be responsible for the compliance with all applicable safety requirements. All job personnel are knowledgeable of and comply with the Site Specific Safety Plan requirements.

The Site-Specific Safety Plan includes the following basic elements:

- Policy or goals statement
- List of responsible persons, including 24 hour contact information
- Hazzard identification and assessment (Job Hazard Analysis)
- Hazzard controls and safe practices
- Emergency and accident response
- Confined Space Entry Plan, including the Rescue Plan
- Emergency Spill Response Plan
- Pollution Control Plan
- Employee training and communication
- Recordkeeping

Contractor acknowledges that they are solely and completely responsible for the safety of the construction site, including, but not limited to, the safety of all persons and property present at the site at any time until final completion and acceptance by District.

I, _____ (the undersigned Contractor), affirm that I comply with the above information.

_____
Name of Firm

_____
Signature

_____
Printed Name

_____
Title

MANHOLE/PIPELINE TESTING FORMS

APPENDIX B

WATER ENVIRONMENT SERVICES
A DEPARTMENT OF CLACKAMAS COUNTY

LOW PRESSURE AIR/MANDREL TEST

Project: NCRA – Phase III Improvements______ Date: ____________________________

Contractor: ______________________________ Project #: __________________________

Testing Company: _________________________ Inspector: __________________________

Tested Section: Air Test: Passed Failed Mandrel Test: Passed Failed

Diameter (in)	Length (ft)	$T=d^2L/42$	T=Minutes
T = 56 d if A < 625 ft^2	Totals		

1. Average Ground Water Height Above Pipe =________feet
2. Psi/ft of Ground Water x 0.433 psi/ft
3. Average Ground Water Pressure =________psi
4. Test Pressure + 4.00 psi
5. Beginning Test Pressure =________psi
6. Timed Pressure Drop -________psi
7. Ending Test Pressure =________psi
8. TIME REQUIRED BY SPEC =________Min

Tested Section: Air Test: Passed Failed Mandrel Test: Passed Failed

Diameter (in)	Length (ft)	$T=d^2L/42$	T=Minutes
T = 56 d if A < 625 ft^2	Totals		

1. Average Ground Water Height Above Pipe =________feet
2. Psi/ft of Ground Water x 0.433 psi/ft
3. Average Ground Water Pressure =________psi
4. Test Pressure + 4.00 psi
5. Beginning Test Pressure =________psi
6. Timed Pressure Drop -________psi
7. Ending Test Pressure =________psi
8. TIME REQUIRED BY SPEC =________Min

Tested Section: Air Test: Passed Failed Mandrel Test: Passed Failed

Diameter (in)	Length (ft)	$T=d^2L/42$	T=Minutes
T = 56 d if A < 625 ft^2	Totals		

1. Average Ground Water Height Above Pipe =________feet
2. Psi/ft of Ground Water x 0.433 psi/ft
3. Average Ground Water Pressure =________psi
4. Test Pressure + 4.00 psi
5. Beginning Test Pressure =________psi
6. Timed Pressure Drop -________psi
7. Ending Test Pressure =________psi
8. TIME REQUIRED BY SPEC =________Min

Inspector's Signature: ____

Procedure for Air Testing of Sewer Pipe & Appurtenances

1. The Contractor may desire to make an air test prior to backfilling for his own purposes. However, the acceptance air test shall be made after backfilling and compaction has been completed to finish grade.
2. The Contractor shall furnish all facilities and personnel for conducting the test under the observation of the Engineer. The equipment and personnel shall be subject to the approval of the Engineer. The pressure gauge used shall have minimum divisions of 0.10 psi and have an accuracy of 0.0625 psi (one ounce per square inch). All air used shall pass through a single control panel.
3. The first section of pipe not less than 300 feet in length installed by each crew shall be tested in order to qualify the crew and/or material. Successful installation of this section shall be a prerequisite to further pipe installation by said crew.
4. All tees, and/or ends of side sewer stubs shall be plugged and banded, or acceptable alternate and securely fastened to withstand the internal test pressures. The Contractor shall clean the line before proceeding with the air test. All debris shall be removed at the first manhole where its presence is noted. In the event cemented or wedged debris or a damaged pipe shall prevent cleaning, the contractor shall remove the obstruction.
5. Safety Provisions. The plugs must be firmly secured and care should be exercised in their removal. The total force on a 12" plug at 4.0 psi is over 450 pounds. Care must be exercised in not loading the sewer line with the full pressure of the compressor. Keep all personnel out of manholes until the pressure has been released. If water leaks into the line after the plugs are installed and floods the air inlet and the needle on the air pressure gage indicates zero, then possibly the water column has balanced the air pressure in this instance and care is necessary in releasing the pressure. If testing below ground water level, inject the air at the upper plug and/or turn the inlet up as with a water test apparatus.
6. The pipe or sections of pipe to be tested may be wetted before the air test is started. Immediately following the pipe cleaning and wetting, the pipe shall be tested with low pressure air. Air shall be slowly supplied to the plugged pipe installation until the internal air pressure reaches 4.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe.
7. At least two minutes shall be allowed for temperature stabilization before proceeding further. After the two minute temperature stabilization period, disconnect the air supply.
8. The pipeline shall be considered acceptable, when tested for the calculated period of time at an average pressure of 4.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe; if: (1) the total rate of air loss from any section tested in its entirety between manhole and cleanout structures does not exceed 1.0 cubic feet per minute, or (2) the section under test does not lose air at a rate greater than 0.0015 cubic feet per minute per square foot of internal pipe surface.
9. If the Pipe installation fails to meet these requirements, the Contractor shall determine at his own expense the source or sources of leakage, and he shall repair or replace all defective materials and correct all faulty workmanship. The type of repairs proposed by the Contractor must be approved by the Engineer before the repair work is begun. The completed pipe installation shall meet the requirements of the air test before being considered acceptable.

Mandrel Testing Procedures

1. In addition to hydrostatic or air testing, sanitary sewers constructed of PVC sewer pipe shall be deflection tested not less than 30 days after the trench backfill and compaction has been completed. The test shall be conducted by pulling an approved solid pointed mandrel through the completed pipeline. The diameter of the mandrel shall be 95 percent of the inside diameter of the pipe. The mandrel shall be a rigid, nonadjustable, odd-numbered-leg (9 legs minimum) mandrel having an effective length of not less than its nominal diameter.
2. Testing shall be conducted on a manhole to manhole basis and shall be done after the line has been completely cleaned and flushed. Any portion of the sewer which fails to pass the test shall be excavated, repaired or realigned, and retested with both air and deflection tests.

Sample Calculations for Time in Minutes of Air Testing Procedure for 1 psi drop

If A is > 625

$T = d^2L/42$

d - Inches	L - Feet	d^2L	T - Seconds	T- Minutes
4	200	3200	76	1.27
8	502	32128	765	12.75
		35328	841	14.02

$A = \pi Ld/12$

πd - Inches	L-feet	A = Ft^2	
4	200	209	
8	502	1051	
		1260	is > 625

If A is < 625 then use formula (T= 56d)

$T = 56d$

d - Inches	T - Seconds	T- Minutes
12 (8 + 4)	672	11.20
8	448	7.47

$A = \pi Ld/12$

πd - Inches	L-feet	A = Ft^2	
4	20	21	
8	150	314	
		335	is < 625

WATER ENVIRONMENT SERVICES
A DEPARTMENT OF CLACKAMAS COUNTY

MANHOLE VACUUM TEST

PROJECT: _____ DATE: _____

CONTRACTOR: _____ PROJ #: _____

TESTING COMPANY: _____ INSPECTOR: _____

DATE	MH#	MH DIAM.	MH DEPTH	TIME REQD	VACUUM START	VACUUM END	PASS / FAIL	COMMENTS

NOTE: All manhole vacuum tests will be conducted in accordance with CCSD#1 Standard Sewer Specifications, Section 2-C-3-c-8. The manhole shall be set to finish grade and all paving (if applicable) completed.

Inspector's Signature: _____

Procedures on back

Procedure for manhole vacuum test

1. All lift holes shall be plugged with an approved non-shrink grout.
2. All pipes entering the manhole shall be plugged, taking care to securely brace the pipes and plugs from being drawn into the manhole. The manhole shall be set to finish grade and all paving (if applicable) completed.
3. The test head shall be placed at the inside of the top of the frame and the seal inflated in accordance with the manufacturers' recommendations.
4. A vacuum of 10 inches of mercury shall be drawn, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches.
5. The manhole shall pass if the time for the vacuum reading to drop from 10 inches of mercury to 9 inches meets or exceeds the values indicated below.

Depth of Manhole (feet)	Allowable Time (seconds)		
	48 - inch	60 – inch	72 - inch
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	64	85	105
28	69	91	113
30	74	98	121

6. If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout after the vacuum has been released. Retesting shall proceed until a satisfactory test is obtained.

CONSTRUCTION DRAWINGS (PLANS)

APPENDIX C

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. This contract consists of installation of approximately 6,800 lf of 8" Cured in Place Pipe (CIPP), 1,900 lf of 10" CIPP, 450 lf of 12" CIPP, as well as, lateral reconnection, lateral sealing, 4 manhole replacements, and manhole rehab with injection grouting.

B. The accomplishment of all of the above work, if awarded, shall meet the scheduled sequence, milestones, limitations and the final completion dates specified.

1.02 WORK OF THIS CONTRACT

A. The work generally consists of furnishing and installing the following:

1. 6,800 LF of 8" CIPP
2. 1,900 LF of 10" CIPP
3. 450 LF of 12" CIPP
4. Replace 4 48-inch standard precast manhole
5. Manhole rehabilitation with injection grouting
6. Bypass Pumping
7. Erosion and Sedimentation Control
8. Traffic control
9. All other ancillary work necessary to complete the sanitary sewer and comply with all easement and permit conditions.

B. Contractor Duties

1. Provide and pay for labor, materials, tools, equipment, superintendence, temporary facilities and services necessary for proper execution and completion of Work.
2. Maintain ready access for business adjacent to the Work.
3. Comply with ordinances and regulation of public authorities having jurisdiction, including, but not limited to following:

a. Clackamas County
b. City of Happy Valley
c. City of Milwaukie
d. State of Oregon Department of Environmental Quality

e. State of Oregon Department of Transportation

1.03 EXISTING UTILITIES

A. In general, the locations of existing major utilities, whether aboveground or underground, are indicated on the Drawings. This information has been obtained from utility maps and field surveys. Owner does not guarantee the accuracy or completeness of this information, and it is to be understood that other aboveground or underground facilities not shown on the Drawings may be encountered during the course of the work. In any case, most minor lines such as individual services for water, gas and sprinkler irrigation lines are not indicated.

B. Existing utilities, whether shown on the Drawings or not, shall be maintained, relocated, rerouted, removed and restored as may be necessary by the Contractor in a manner satisfactory to owners and operators of the utilities and to Owner in accordance with the provisions and to the satisfaction of the affected utility or local agency.

1.05 SURVEY INFORMATION

A. Contractor will be responsible for staking all manhole locations, pipeline alignment with cut and fill to invert.

1.06 SPECIFICATION LANGUAGE

A. Portions of the Specifications are written in imperative and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" shall be included by inference where a colon (:) is used within sentences or phrases. Example: Aggregate: ASTM C33.

Where the Bidding Documents define methods, materials, or equipment by specifying a trade name, manufacturer and model or catalog number, the intent is not to limit competition but to establish a standard of quality, features, workmanship, reliability, serviceability, compatibility, performance, etc. Unless the specification description expressly states that no substitutions or "equals" will be allowed, the words "or equal" shall be deemed inserted in each such instance.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 DESCRIPTION

A. Measurement is described under each proposal item in Paragraph 01025-1.02.

B. Payment for the various items on the Proposal, as further specified herein, shall be based on measurements of completed work in accordance with United States Standard Measures and shall include all compensation to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the work all in accordance with the requirements of the Contract Documents, including all appurtenances thereto and including all costs of compliance with the regulations of public agencies having jurisdiction, including safety and health requirements of the Occupational Safety and Health Act of the U.S. Department of Labor (OSHA) and Oregon State Department of Labor and Industries, also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work until the final acceptance by the Owner. No separate payment will be made for any item that is not specifically set forth in the Proposal Schedule, and all costs therefor shall be included in the prices named in the Proposal Schedule for the various appurtenant items of work. ***Note that all work shall be completed within the project limits during varying times including either 7 am to 7 pm or 10 pm to 7 am depending upon specific locations***

C. Quantities listed in the Proposal do not govern final payment. Payments to the Contractor will be made only for actual quantities of Contract items performed in accordance with terms of the Contract and for items of work actually performed under Change Orders.

D. Indirect costs, such as supervision and overheads, profit, the general conditions specified in the Contract, all shall be allocated to each proposal item as applicable for work defined in the proposal item. No separate payment will be made to the Contractor for these items.

1.02 PROPOSAL ITEM MEASUREMENT AND PAYMENT

A. Item 1 - Mobilization: Payment for Mobilization will be made on a lump sum basis. The amount to be allowed for Mobilization in the partial payment to be made under the Contract will be as follows:

1. When 5% of the total original contract amount is earned from other proposal items, not including advances on materials, 50% of the amount bid for Mobilization, or 2.5% of the original contract amount, whichever is the least, less normal retainage, will be paid.

2. When 10% of the total original contract amount is earned from other proposal items, not including advances on materials, 100% of the amount bid for mobilization, or 5% of the original contract amount, whichever is the least, less normal retainage, will be paid.

3. Upon completion of all work on the project, payment of any amount bid for Mobilization in excess of 5% of the total original contract amount will be paid.

4. The above schedule of progress payments for Mobilization shall not limit or preclude progress payments otherwise provided by the Contract.

B. Item 2 - Traffic Control: Measurement and payment for traffic control shall be made on a lump sum basis. The lump sum price shall include all costs for materials, equipment and labor for: furnishing, erecting and maintaining temporary barricades, signs and other traffic control devices; detours, and other safeguards necessary for orderly flow of traffic; preparing and updating the Traffic Control Plan for approval by the Owner; notification schedules and notifying property owners and businesses at least 7 days in advance of beginning work; and providing all flagging identified in the approved Traffic Control Plan.

C. Item 3 - Erosion Control: All erosion control measures including materials, equipment and labor
unless identified as part of other individual bid items shall be measured and paid on a lump sum basis.

D. Item 4 - By-pass Pumping: Measurement and payment for sanitary sewer bypass pumping shall be made on a per each basis. The per each price shall include all costs for materials, equipment and labor to provide the appropriately sized flow diversion and piping during all elements of construction for CIPP installation, point repairs and manhole improvements.

E. Item 5 - Replace Manhole: Measurement and payment for replacing manholes shall be made on a per each basis. The per each price shall include all costs for materials, equipment and labor to remove the existing manhole and install a new manhole. This will include, but is not limited to, the disposal of the existing manhole, the new manhole, pipe connections, excavation, backfill, compaction and testing. If pavement restoration is required, pavement will be paid for as a separate item.

F. Item 6 - Grout Manhole: Measurement and payment for grouting manholes shall be made on a vertical foot basis as measured from the invert of the manhole to the rim of the manhole and rounded to the nearest ½ foot measurement. The vertical foot price shall include all costs for materials, equipment and labor to grout the manhole.

G. Item 7, 8, & 9 - CIPP Liner, 8-inch, 10-inch and 12-inch: Measurement shall be per linear foot of main line rehabilitation as measured from center of manhole to center of manhole (or end cap). Payment shall include complete compensation for all work, labor, materials, equipment and incidentals necessary to provide CIPP in place and approved for use. This will include, but is not limited to pre-installation video inspection, cleaning, injection grouting of active infiltration, cutting of protruding taps, or root removal necessary to install the liner. No separate or additional payment will be made for additional testing, cleaning and video inspection required as a result of correction of unsatisfactory work. Internal reinstatement of laterals and lateral sealing of existing active service laterals agreed to be connected are paid under a separate bid item. Point repairs to clear the line of obstructions or collapsed pipe that prevent liner installation which require open cut excavation and replacement of the existing short section are not considered part of this bid item and shall be paid under a separate item.

H. Item 10 - Lateral Reinstatement: Measurement shall be on a per each basis for each lateral that is internally reconnected. Payment shall include full compensation for providing all

labor, materials, equipment, tools and incidentals for all aspects of cutting the hole to the specified diameter.

I. Item 11 - Lateral Connection Sealing: Measurement shall be on a per each basis for each lateral connection injected with a chemical grout to seal the interface between lateral and the sewer pipe. This will also include grouting any visible defects to the satisfaction of Engineer from the mainline connection extending approximately two feet up the lateral. Payment shall include full compensation for providing all labor materials, equipment, tools and incidentals for all aspects of packer injection grouting to form a watertight seal between the CIPP liner and the host pipe along with approximately two feet of the lateral to seal defects with a non-shrink, watertight chemical grout compatible with the liner system. Additional efforts include pressure testing of each connection and removal of all residual grout from the sewer main and lateral as approved by the Engineer to prevent blockage of sewage flow.

J. Item 12 - Post-installation Video Inspection: Measurement for post-installation video inspection will be measured on the length basis to the neared foot. The length will be measured, with no deduction for structures or fittings, along the pipe flow line from center of manholes or the ends of pipe. Payment shall include compensation for all labor, materials, equipment and incidentals necessary to complete the work as specified. Provide Owner with a copy of the video inspection.

K. Item 13 - Pavement Restoration: Measurement and payment for pavement restoration shall be made on a per ton basis. The per ton price shall include all costs for materials, equipment and labor to do the required pavement restoration.

END OF SECTION

SECTION 01040

COORDINATION AND PROJECT REQUIREMENTS

PART 1 GENERAL

1.01 PROJECT COORDINATION

A. Coordinate scheduling, submittals and work of various Sections of the Specifications and subcontractors to assure efficient and orderly sequence of interdependent construction.

1.02 UNDERGROUND UTILITIES, CONDUITS, OR PROCESS PIPING

A. Obtain best available current information on location, identification and marking of existing utilities, piping and conduits and other underground facilities before beginning any excavation. Contact Oregon Utility Notification center at 503-246-6699 for information at least 48 hours in advance of beginning work. Give Engineer 48 hours notice before beginning work.

B. The location of existing utilities and underground facilities known to the Engineer are shown in their approximate location based on information available at the time of preparing the Drawings. The actual location, size type and number of utilities and underground facilities may differ from that shown and utilities or underground facilities may be present that are not shown.

C. Use extreme care when excavating or working in areas that may contain existing utilities, process piping, conduits or other underground facilities. Use careful potholing, hand digging and probing to determine the exact location of underground installation. Some locations contain multiple pipes or conduits. Prior to performing any subsurface work, investigate, determine and prepare a plan to turn off or disconnect each utility believed to be within 100 feet of the subsurface work in the event of an accidental breach of a utility conduit.

D. Where connections to existing utilities or other underground facilities is required or where new piping or conduits may cross or interfere with existing utilities or underground facilities carefully excavate and uncover existing installations to a point 1 foot below the pipe or conduit to determine the actual elevation and alignment. Call the Engineer's attention to differing existing conditions that may require a clarification or change.

1.03 PRECONSTRUCTION MEETINGS

A. Prior to beginning the Work, the Contractor and its key personnel and Subcontractors including the Contractor's Superintendent and Project Manager shall attend a meeting with the Owner and the Engineer to discuss the following:

1. Name, Authority, and Responsibilities of Parties Involved

2. Project Procedures:

    a. Progress meetings

    b. Correspondence

c. Notification

d. Submittal of Shop Drawings

e. Requests for Information

f. Response to Requests for Information

g. Work Directive Change

h. Contractor Reporting requirements

i. Change Orders

3. Temporary Schedule and Contractor's Construction Schedule

4. Temporary Facilities and Control

5. Testing During Construction

6. Contractors Coordination

7. Maintenance of Record Drawings

8. Punch Lists and Project Closeout Procedures

9. Final Deliverables including Record Drawings

1.04 PROGRESS MEETINGS

A. Contractor's Superintendent and Project Manager shall attend weekly meetings, held on site to discuss plans for the following week and to evaluate project progress. Contractor will provide a two-week look ahead schedule for review during the meeting. Items to be discussed shall include a review of critical items/action list, review work progress, review of submittal status, delivery dates, coordination problems, and any items of concern.

1.05 MATERIALS

A. General:

1. Verify that products delivered meet requirements of Contract Documents and the requirements of Favorably Reviewed submittals.

B. Transportation and Handling:

1. Transport and handle products in accordance with manufacturer's instructions.

2. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

3. Provide equipment and personnel to handle products by methods to prevent

soiling, disfigurement, or damage.

C. Storage and Protection:

1. Store and protect products in accordance with manufacturer's instructions. Seals and labels shall be intact and legible.

2. Provide offsite storage and protection including insurance coverage when site does not permit onsite storage or protection.

3. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

1.06 SAFETY

A. In accordance with generally accepted construction practice, applicable law and the General Conditions, the Contractor shall be solely and exclusively responsible for:

1. Construction means and methods.

2. Safety of employees engaged in the work while on and off the site.

3. Safety of the Owner, the Engineer, the Design Engineer, and others who may visit or be affected by the work.

4. Safety of the work itself including material and equipment to be incorporated therein.

5. Safety of other property at the site or adjacent thereto.

6. Safety programs, equipment and protective devices required to assure the safety of persons and property for whom/which the Contractor is responsible.

B. The duties of the Engineer in conducting review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's work methods, equipment, bracing, scaffolding or safety measures in, on, or near the construction site.

C. The Contractor is hereby informed that work on this project could be hazardous. The Contractor shall carefully instruct all personnel working in potentially hazardous work areas as to potential dangers and shall provide such necessary safety equipment and instructions as required to prevent injury to personnel and damage to property, and to comply with all applicable laws and regulations including State OSHA, Federal OSHA, and other regulations referenced in these Contract Documents.

D. The Contractor shall, at all times, maintain the job in a condition that is safe for the Owner, the Engineer and their Consultants to make site visits and to conduct construction reviews. If the Owner or the Engineer cannot allow personnel to visit the job because it is not safe, the Contractor is not providing required safe access to the Work as required by General Conditions.

E. The Contractor shall prepare a Safety Plan meeting the requirements of applicable regulations. As a minimum, the Contractors Safety Plan shall set forth definite

procedures for informing workers about safety, for instructing workers in safe practices, for assuring that workers are using appropriate safety equipment and safe work practices and for reporting accidents.

F. The Contractor shall submit a completed Site Specific Safety Plan Certification Form (Appendix A).

1.07 CONTRACTOR'S QUALITY CONTROL

A. The Contractor shall be fully responsible for inspecting the work of its suppliers and Subcontractors to assure that the work when completed will comply with the standards for materials and workmanship required by the Contract Documents.

B. Inspections, periodic observations and testing performed by the Owner or the Engineer are for the Owner's benefit and information only and shall not be construed as partial or incremental acceptance of the work and shall not be deemed to establish any duty on the part of the Owner or the Engineer to the Contractor, its subcontractors or suppliers.

C. The Contractor shall:

1. Monitor quality control over suppliers, manufacturer, products, services, site conditions, and workmanship, to produce work of specified quality.

2. Comply fully with manufacturer's installation instructions, including performing each step in sequence as recommended by the manufacturer.

3. Submit a Request for Information to Engineer before proceeding with work when manufacturers' instructions or reference standards conflict with Contract Documents.

4. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

5. Perform work by persons specializing in the specific trade and class of work required and qualified to produce workmanship of specified quality.

D. The Contractor shall provide assistance required by the Engineer to adequately inspect the Work including ladders, scaffolding, shoring, lighting, ventilation and other aids to facilitate access and provide a safe working environment.

1.08 TESTING LABORATORY SERVICES AND CERTIFIED LABORATORY REPORTS

A. Provide certified testing service in accordance with specific requirements contained in each technical specification section. Submit Certified Laboratory Reports required by technical specification sections as soon as they are available.

B. District retains authority to identify location where required onsite testing is to take place. Any failing tests will require two additional tests to have passing results, after corrective actions have taken place and at retesting locations as identified by District, at no additional cost to the Owner.

END OF SECTION

SECTION 01060

PERMITS AND EASEMENTS

PART 1 GENERAL

1.01 PERMITS

A. Owner will obtained Utility Permit for Clackamas County and the City of Happy Valley. Contractor shall sign and meet all of the conditions set forth in the permit.

1.02 RESTORATION OF PROPERTY/MISCELLANEOUS

A. Comply with property restriction and restoration requirements contained in all permits. It is expected that additional items requiring protection and/or replacement will be encountered as a general construction practice and the Contractor shall assume responsibility thereof at no additional cost.

END OF SECTION

SECTION 01300

SUBMITTALS PROCEDURE

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section specifies procedures for Contractor submittals. Where required by the Specifications, submit descriptive information that will enable the Engineer to assess whether the Contractor's proposed materials, equipment or methods of work are in general conformance to the design concept and in compliance with the Drawings and Specifications. The information to be submitted shall consist of drawings, specifications, descriptive data, certificates, samples, test results and such other information, all as specifically required in the Specifications.

PART 2 PRODUCTS

2.01 CONTRACTOR RESPONSIBILITIES

A. Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall ensure that the material, equipment or method of work shall be as described in the submittal. Verify that the material and equipment described in each submittal conforms to the requirements of the Specifications and Drawings prior to transmittal to the Engineer. Ensure that there is no conflict with other submittals and notify the Engineer in each case where such submittal may affect the work of another contractor or Owner.

B. If the Contractor's review determines that the information shows deviations from the Specifications or Drawings, submit items that will conform or request consideration of a substitution.

PART 3 EXECUTION

3.01 TRANSMITTAL PROCEDURE

A. General:

1. Submittals regarding material and equipment shall be accompanied by Submittal/Transmittal Form. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate, discrete sections for which the submittal is required. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.

2. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: "XXX"; where "XXX" is the sequential number assigned by the Contractor. Resubmittals shall have the following format: "XXX-Y"; where "XXX" is the originally assigned submittal number and "Y" is a sequential letter assigned for resubmittals, i.e., A, B or C being the 1st, 2nd and 3rd resubmittals,

respectively. Submittal 25B, for example, is the second resubmittal of Submittal 25.

B. Deviation from Contract: Submit a request for substitution for deviations from the Specifications or Drawings. Include the reason for the deviation and cost differential for the deviation. Deviations from the Contract shall be authorized by Owner's written approval only.

C. Submittal Completeness: Submittals which do not have all the information required to be submitted are not acceptable and will be returned without review.

D. Submit to the Engineer the following items for review:

1. Construction Schedule

2. Detailed Schedule of the first two weeks of work

3. List of employees to be contacted in an emergency with their home phone numbers and cell numbers (available 24 hrs/day)

4. List of subcontractors that will work on the project

5. Erosion control plan

6. Site Specific Safety Plan Certification

7. Sanitary Sewer Bypass Plan

8. CIPP Material

9. Injection grout material

10. Traffic Control Plans

11. Final Utility Permits

12. Shoring Plan

13. Imported granular materials: supplier and location of pit, gradation

14. Manholes and connections to pipe

15. Castings

16. Manhole steps

17. PVC pipe and PVC fittings: Manufacturer and certificates of compliance

The Engineer reserves the right to ask for additional SUBMITTALS that are not included on the above list. Review by the Engineer shall not relieve the Contractor from responsi-

bility for error of omission. Obtain the Engineer's approval prior to beginning any fabrication or other work. No deviation from the reviewed drawings shall be allowed without written approval from the Owner or Engineer.

3.02 REVIEW PROCEDURE

A. For each required submittal, submit one (1) digital copy of all the submitted information.

B. Unless otherwise specified, within 14 days after receipt of the submittal/resubmittal, the Engineer will review and return it to the Contractor. The returned material will consist of one (1) marked-up copy of the submittal. The returned submittal will indicate one of the following actions:

1. If the review indicates that the material, equipment or work method is in general conformance with the Contract Drawings/Specifications, the submittal copies shall be marked "Approved." In this event, the Contractor may begin to incorporate the material/equipment/work method covered in the submittal.

2. If the review indicates that the submittal is insufficient or that limited corrections are required, the submittal copies may be marked "Approved as Noted." The Contractor may begin to implement the work method or incorporate materials/comments covered in the submittal in accordance with the corrections/comments noted.

3. If the review reveals the submittal is insufficient or contains incorrect data and the comments require revision and resubmittal, the submittal copies shall be marked "Not Approved, Resubmit." In this case, the Contractor shall not then undertake work covered by this submittal until the submittal has been revised, resubmitted and returned to the Contractor with a marking of "Approved" or "Approved as Noted."

4. If the review indicates that the submittal is incomplete or that additional information is required, the submittal copies may be marked "Submit Specified Item". In this case the Contractor shall not undertake work covered by this item until the submittal has been revised resubmitted and returned to the Contractor with a marking of "Approved" or "Approved as Noted."

5. If the review reveals the material, equipment, or work does not require submittal, then the submitted copies shall be marked "Review Not Required Per Contract Documents." In this event, the Contractors may begin to incorporate the material/equipment/work covered by the submittal and no further action is required.

3.03 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

A. Review of drawings, methods of work or information regarding materials or equipment the Contractor proposes to provide shall not relieve the Contractor of his responsibility for errors therein, nor shall it be regarded as an assumption of risks or liability by the Engineer on behalf of Owner, or by any officer or employee of Owner. The Contractor shall have no claim under the Contract on account of the failure, or partial failure, of the method of work, material or equipment so reviewed. A mark of "Approved" or "Approved as Noted" shall mean the Owner has no objection to the Contractor, upon the Contractor's own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULE

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section specifies requirements and procedures for the Contractor in preparing a construction schedule. The purpose of the schedule shall be to ensure adequate planning of the work by the Contractor, to establish the standard against which satisfactory completion of the project shall be judged, to assist the Engineer in monitoring progress, and to assess a change proposal's impact on the construction schedule.

1.02 SUBMITTALS

A. Before starting work, the Contractor shall submit to the Engineer an overall contract construction schedule showing the proposed order of work and indicate the time required for completion of the major items and sub-items of work. The schedule shall also show the critical path to accomplish all of the work. The format for the schedule shall be as a minimum a Gantt Chart format showing start and completion dates for the various work activities.

B. Prior to each Weekly Progress Meeting, Contractor shall submit a two-week look ahead schedule. The two week schedule need not include the overall project schedule. The two-week schedule shall include all major activities and a descriptor of where on the site the activity will occur. If work is being completed at multiple sites, the site of the work shall be specified for each activity. The two week schedules may be a Gantt Chart, Bar Chart, or equivalent as approved by the Owner or Engineer. Two-week schedules will not receive formal review by the Owner or Engineer.

PART 2 PRODUCTS

2.01 CONSTRUCTION SCHEDULES

A. Gantt Chart, Bar Chart, or equivalent as approved by the Owner or Engineer.

PART 3 EXECUTION

3.01 SUBMISSION AND APPROVAL

A. The schedule shall be realistic and definitive as to the amount of work which is to be accomplished within the time indicated and shall be updated monthly to reflect actual work progress. The schedule shall breakdown the project into activities corresponding to the plan sheets and will include major tasks to complete all phases of work. It will be used as an indication of the sequence of the major construction operations and as a check on the progress of the work and may, at the sole discretion of the Engineer, be employed by the Engineer in determining delays and time extensions.

B. If the Contractor wishes to make changes in the construction schedule, then to the maximum extent possible provide two (2) weeks notice to the Engineer, or secure the approval of the Engineer prior to performing such changes. Such schedule changes shall

be strictly in accordance with the other requirements of this specification, and shall show the interrelationship between the original schedule and the proposed changes to the schedule.

C. The Engineer's review of the original schedule shall not constitute a warranty or representation by the Owner that the Contractor can perform the work according to such schedule.

D. Submission of a full updated schedule may not be required with each monthly progress payment invoice, if the two week look ahead schedule has been kept up to date to the satisfaction of the Engineer.

END OF SECTION

SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

PART 1 GENERAL

1.01 DESCRIPTION

A. This section specifies the furnishing, maintaining, and removing of construction facilities and temporary controls, including temporary utilities, construction aids, barriers and enclosures, security and removal after construction.

1.02 TEMPORARY UTILITIES

A. Temporary sanitary facilities:

1. Provide suitable and adequate sanitary facilities that are in compliance with applicable Laws and Regulations.

2. At completion of the Work, remove sanitary facilities and leave site in neat and sanitary condition.

1.03 CONSTRUCTION AIDS

A. Provide railings, kick plates, enclosures, safety devices, and controls required by Laws and Regulations and as required for adequate protection of life and property.

B. Accident prevention:

1. Exercise precautions throughout construction for protection of persons and property.

2. Observe safety provisions of applicable Laws and Regulations.

3. Guard machinery and equipment, and eliminate other hazards.

4. Make reports required by authorities having jurisdiction, and permit safety inspections of the Work.

5. Before commencing construction work, take necessary action to comply with provisions for safety and accident prevention.

C. Warning devices and barricades: Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers:

1. Devices shall conform to minimum requirements of OSHA and State agencies which administers OSHA regulations where Project is located.

1.04 TEMPORARY CONTROLS

A. Noise control:

1. In inhabited areas, particularly residential, perform operations in manner to minimize noise.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01530

PROTECTION AND MAINTENANCE OF WORK AND PROPERTY

PART 1 GENERAL

1.01 DESCRIPTION

A. This section specifies the protection and maintenance of work and property as they are affected by the work.

1.02 PUBLIC AND PRIVATE PROPERTY

A. Protect all public and private property, insofar as it may be endangered by Contractors' operations and take every reasonable precaution to avoid damage to such property.

B. Restore and bear the cost of any public or private improvement facility, structure or land and landscaping, which is damaged or injured directly or indirectly by or on account of an act, omission, or neglect in the execution of the Work. Restore to a condition substantially equivalent to that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise affecting restoration thereof, or if this is not feasible, make a suitable settlement with the owner of the damaged property.

C. Give reasonable notice to occupants of buildings on property adjacent to the Work to permit the occupants to remove vehicles, trailers and other possessions as well as salvage or relocate plants, trees, fences, sprinkler systems, or other improvements in the Right-of-Way or easements which are designated for removal or which might be destroyed or damaged by work operations.

1.03 LOCATION OF EXISTING FACILITIES

A. Pothole existing utilities well ahead of pipeline construction to verify locations, so as not to affect pipeline installation.

B. In general, the locations of existing major utilities are indicated on the Drawings. This information has been obtained from utility maps and field surveys. Owner does not guarantee the accuracy or completeness of this information, and *it is to be understood that other aboveground or underground utilities not shown on the Drawings may be encountered during the course of the work.*

C. Use a pipe locator and/or hand excavation to determine the exact location of underground facilities in the interest of avoiding unnecessary damage, maintenance costs, and to ensure continuity of customer service.

D. Contact all utility companies and departments having underground facilities within the construction area and request they locate and mark their utilities. In addition, verify the location of all buried utilities in the construction area 48 hours before contractor digs by calling the one-call locator service at 1-800-332-2344. The contractor shall comply with Oregon "locate law" ORS 757.541 to ORS 757.571.

1.04 UNDERGROUND UTILITIES WITHIN PRIVATE PROPERTY/EASEMENTS

A. Additional underground utilities which include private irrigation systems may be present within the easements. Owner does not guarantee the accuracy or completeness of this information and it is understood that other underground utilities not shown on the Drawings or described in the Specifications may be encountered during the course of the work. Repair and replacement of the utilities shall be incidental to the work and no further payments will be provided.

END OF SECTION

SECTION 01560

ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 DESCRIPTION

A. This section specifies environmental mitigation and temporary environmental controls required to be maintained during construction. Nothing in this section shall relieve any person from the obligation to comply with the regulations or permits of any federal, state, or local authority.

1.02 SUBMITTALS

A. Erosion Control Plan: Develop and maintain for the duration of the contract an Erosion Control Plan that will effectively incorporate and implement environmental protection precautions. The Contractor's Erosion Control Plan shall include methods and interim facilities to be constructed and/or used concurrently during construction to control erosion in such a manner as to ensure that sediment and sediment laden water does not enter any drainage system, roadways, or violate applicable water quality standards. Visible or measurable erosion which enters, or is likely to enter, a public storm and surface water system, wetland or stream is prohibited. The plan shall include the name of the Contractor's employee authorized to supervise and enforce compliance with the Erosion Control Plan and telephone number(s) to contact that person at any time.

B. The Erosion Control Plan shall be submitted and approved in accordance with Section 01300 prior to initiating clearing activities.

C. In the event a regulatory agency or jurisdiction determines the Erosion Control Plan to be inadequate to protect environment:

1. The Contractor shall stop immediately the affected work in progress until adequate environmental protection measures are implemented.

2. The Contractor shall modify the Erosion Control Plan to meet the requirements of said regulatory agencies, jurisdictions and provide the Engineer with the revisions to the Plan within five (5) calendar days of the notice of deficiency. Plan resubmittal will be in accordance with Section 01300.

PART 2 PRODUCTS

2.01 EROSION CONTROL

A. Temporary Sediment Fences

1. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers.

2. Filter fabric fence shall have manufactured stitched loops for 2”x2” post installation. Stitched loops shall be installed on he up-hill side of the sloped area, with posts spaced a maximum of 6 feet apart.

3. Where practical the filter fabric shall be purchased in a continuous roll to the length required to avoid the use of joints.

4. The physical integrity of all materials shall be sufficient to meet the requirements of their intended use and withstand normal wear and tear.

B. Straw Bale Sediment Barrier/Bio-Filter Bags: Standard 40 to 60-pound rectangular bales of cereal grain or seed straw. Wooden stakes (2”x2”x 3 feet) shall be used for straw bales and bio-filter bags.

C. Catch Basin Inserts: Woven polyproplene filter sack.

D. Plastic Sheeting: Polyethylene and have a minimum thickness of 6 mil.

E. Straw Mulch: Maintain a sufficient cover of straw mulch over bare ground to reduce sediment runoff until permanent restoration has begun.

PART 3 EXECUTION

3.01 SITE MAINTENANCE

Dust shall be minimized by the Contractor to the extent practicable, utilizing all measures necessary, including, but not limited to:

A. Sprinkling any exposed dust producing areas with water used by trucks or motorized mechanical equipment.

B. Use of covered haul equipment.

3.02 STREET CLEANING

A. Prevent dirt, mud, and dust from escaping trucks departing the work site, by covering dusty loads and cleaning truck tires before leaving the construction site.

B. All streets in the construction area used by Contractor’s trucks or any other equipment hauling material to and from the area, whether within the Contract limits or adjacent thereto, shall be kept clean by the Contractor and shall be serviced by the Contractor’s use of water distribution trucks to control dust on a daily basis. Engineer will require multiple sprinkling operations if the dust becomes excessive during the day. All cleaning and sprinkling shall be at the Contractor’s expense. Violations of these requirements are sufficient grounds for the Engineer to order the streets in question to be cleaned by others. The expense of the street cleaning will be charged against the Contractor and cost withheld from Contractor's payments.

3.03 NOISE CONTROL

A. Comply with all local controls and noise level rules, regulations and ordinances.

B. Each internal combustion engine, used on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

C. Noise levels for scrapers, pavers, graders, backhoes and trucks shall not exceed 90 dBA. For other equipment, noise levels shall not exceed 85 dBA. Equipment that cannot meet these levels shall be quieted by use of improved exhaust mufflers, noise attenuation barriers or other means.

D. If special circumstances or emergency conditions require work beyond the hours as specified, the Contractor shall:

1. Notify the Engineer and Owner 72 hours in advance of any proposed extended work hours for preauthorization. The Contractor's written request shall specify the work to be performed and the circumstances that warrant the request. The request shall include any additional measures to mitigate noise generated by this construction activity if deemed necessary by the Engineer.

2. If an emergency situation occurs that warrants immediate extended hours, the Contractor shall notify the Engineer immediately upon determining the need for this work.

3.04 TREE AND PLANT PROTECTION

A. The Contractor shall minimize vegetation removal during his construction operations. Contractor shall restore and bear the cost of any public or private land improvement and landscaping, which is damaged or injured directly or indirectly by or on account of an act, omission, or neglect in the execution of the Work. Restore to a condition substantially equivalent to that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise affecting restoration thereof, or if this is not feasible, make a suitable settlement with the owner of the damaged property.

A. Work areas shall be carefully located and marked to reduce potential damage. Trees shall not be used as anchors for stabilizing working equipment. Work performed adjacent to trees shall include protecting each tree with a high visibility perimeter barrier fence, located at the dripline of the tree. The barrier fence shall be an orange snow fence or approved equal. The Contractor shall not remove any trees without written approval from Engineer.

B. Where existing vegetation areas have been removed or disturbed by the Contractor's operations, the site shall be regraded and restored by the Contractor as soon as practicable.

C. If trees are damaged or destroyed by the Contractor's operations without prior authorization by the Engineer, the Contractor shall replace the tree in species, size and grade to the satisfaction of the Engineer at no cost to the Owner. The Contractor shall maintain the replacement tree for a period of two years to assure a satisfactory replacement. Replacement trees that are dead or dying, as determined by the Engineer, at the end of the first year establishment period shall be replaced by the Contractor to the satisfaction of the

Engineer and at no cost to the Owner. Should it not be practical to replace the tree, the Contractor shall pay damages in accordance with the size of the original tree that was damaged as measured 4 feet above the ground surface. Damages will include $500 for each tree 6" in diameter or less, $1,000 for each tree greater than 6" and less than 12", $1,500 for each tree from 12" to 24"and $2,500 for any tree 24" or greater in diameter. In the event the Contractor does not perform this replacement work in a timely manner as determined by the Engineer, the Owner reserves the right to have the work performed by others. The damages for trees deemed not practical to replace and/or the expense of trees Owner had to replace due to Contractor not replacing them in a timely manner, will be charged against the Contractor and the costs withheld from Contractor's payments.

3.05 DEWATERING AND WATER CONTROL

A. The Contractor shall not divert storm drainage or sewer flow through any portion of the new sewer or any other new facility until after that portion of the pipeline to be used has been field-acceptance tested in accordance with the Specifications, and until specific written approval from the Engineer has been received. No direct water from construction activities shall be diverted to the sanitary sewer.

B. Maintain excavations free from water while construction is in progress. Keep trenches and other areas free from water as required to permit continuous progress of, or to prevent damage to the work or the work of others.

3.06 WATER QUALITY PROTECTION AND STORMWATER CONTROL

A. All construction activities shall comply with all conditions contained in applicable Federal, State, and Local permits.

B. Contractor shall avoid disturbing any existing streams and wetlands. Contractor shall provide an Erosion Control Plan.

3.07 FISH AND WILDLIFE HABITAT

A. The requirements of local, state, and federal agencies charged with wildlife and fish protection shall be adhered to by the entire construction work force.

3.08 EROSION CONTROL

A. Execute the approved Erosion Control Plan.

B. Temporary Sediment Fences:

1. Filter fabric fence shall have a minimum vertical burial of 6 inches. All excavated material from filter fence installation shall be firmly re-deposited along the entire trenched area on the uphill side of the fence.

2. The filter fabric shall be installed to follow the contours where feasible. The fence posts shall be spaced a maximum of 6 feet apart and driven securely into the ground a minimum of 18 inches.

3. Sediment fences shall be inspected by the Contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs, relocations or additions shall be made immediately.

4. At no time shall more than one foot of sediment be allowed to accumulate behind a sediment fence. Sediment should be removed or regraded into slopes, and the sediment fences repaired and reestablished as needed.

5. Install filter fence along the length of any temporary construction easements where movement of sediment off-site would be possible as determined by the Engineer during prolonged rainfall. Engineer to have final decision on whether or not the filter fence is required for each site-specific installation

C. Straw Bale Sediment Barrier/Bio-Filter Bags: This method may be used to divert runoff around active work areas or into sediment filtration/sedimentation areas.

1. Bio-filter bags can be used in drainage ditches and/or swales.

2. Straw bales and bio-filter bags shall be secured with stakes driven through them and into the ground to a minimum depth of 12 inches. Straw bales shall be keyed into the existing ground 2 to 4 inches.

3. At no time shall more than one foot of sediment be allowed to accumulate behind a straw bale sediment barrier and/or bio-filter bag system. Sediment should be removed or regraded into slopes, or new lines of barriers installed uphill of sediment laden barriers.

D. Plastic Sheeting:

1. Spoils piles and exposed earth slopes shall be covered in wet weather or if wet weather is anticipated. Plastic sheeting shall be installed and maintained tightly in place by using sandbags or tires on ropes with a maximum 10 feet grid spacing in all directions. All seams shall be taped or weighted down full length and there shall be at least 12-inch overlap of all seams. For seams parallel to the slope contour, the uphill sheet shall overlap the downhill sheet. No runoff shall be allowed to run under the plastic covering.

2. Drainage from areas covered by plastic sheeting shall be controlled such that no discharge occurs directly onto uncontrolled, disturbed areas of the construction site.

E. Spoils excavated during trenching for the sewer shall be placed on the uphill side of the trench except when there are overriding safety requirements or lack of available space.

F. Vegetative Protection: The Contractor shall limit disturbance to existing vegetation in steep areas to the extent possible and install filter fence at the limit of removal downhill of the trench.

G. Under no circumstance shall Contractor's vehicles or equipment enter a property adjacent to a stream, watercourse, or other storm and surface water facility without an Erosion Control Plan approved and implemented.

H. The Contractor shall not drag, drop, track, or otherwise place or deposit, or permit to be deposited, mud, dirt, rock or other such debris into any part of the public storm or surface water system, or any part of a private storm or surface water system. Any such deposit of material shall be immediately removed by the Contractor at the Contractor's expense. No material shall be washed or flushed into any part of the storm or surface water system without erosion control measures installed to the satisfaction of the Engineer.

I. The Contractor shall maintain the facilities and techniques contained in the approved Erosion Control Plan so as to continue to be effective during the construction or other permitted activity. If the facilities and techniques approved in an Erosion Control Plan are not effective or sufficient as determined by the Engineer, the Contractor shall revise the plan immediately upon notification by the Engineer. Upon approval of the revised plan by the Owner, the Contractor shall immediately implement the additional facilities and techniques. In cases where erosion is occurring, the Engineer may require the Contractor to install interim control measures prior to submittal of the revised Erosion Control Plan.

J. The Contractor shall ensure that all necessary pollution control equipment, supplies, or materials are available to implement the Plan.

K. Filter fabric fences, sediment barriers and other erosion control devices shall be removed by the Contractor when they have served their useful purpose, but not before the upslope area has been permanently protected and stabilized.

3.09 FINES

A. Contractor shall be responsible for all fines incurred from non-compliance with regulations of governing authorities.

END OF SECTION

SECTION 02315

TRENCHING, BACKFILLING AND COMPACTING

PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies requirements for trenching, backfilling, and compacting of trenches for pipeline construction.

1.02 REFERENCES

A. AASHTO T-99

B. 2015 Oregon Department of Transportation (ODOT), *Standard Specifications for Construction*

PART 2 PRODUCTS

2.01 BEDDING AND BACKFILL MATERIALS

A. Gravel for Trench Foundation Material: 2 ½ inch minus clean pit-run gravel, crushed rock or gravel, having reasonably even gradation from coarse to fine or open graded. Maximum percent passing the ¼ inch screen shall be 20% by weight.

B. Crushed Gravel Pipe Base and Pipe Zone: 3/4 inch minus crushed gravel, having reasonably even gradation from coarse to fine, in accordance with the Oregon State Highway Commission Standard Specifications for Construction specification for Dense Aggregate, Section 02630.10.

C. Select Material for Trench Backfill and Aggregate Base: 3/4-inch minus crushed gravel or rock, as defined for Crushed Gravel Pipe Base above.

D. Portland Cement Concrete: PCC shall be composed of cement, pozzolans, fine aggregate, water and admixtures with a 28-day compressive strength of 3,300 psi.

E. Controlled Density Backfill (CDF): CDF shall be composed of cement, pozzolans, fine aggregate, water and admixtures. CDF shall have a low cement content, be non-segregating, self-consolidating, free-flowing and excavatable material which will result in a hardened, dense, non-settling fill and a compressive strength at 28 days of 100 to 200 psi.

PART 3 EXECUTION

3.01 TRENCHING

A. Work in Easements: The Contractor shall exercise all due care in protecting property in, or adjacent to, easements. This protection shall include, but not be limited to, trees, yard, fences, drainage lines, mail boxes, driveways, gravel or paved surfaces, shrubs and lawns. If any of the above have been disturbed, they shall be restored to as near their original condition as possible, and as approved by Owner.

B. Obstructions: This item refers to obstructions which may be removed and do not require replacement. Obstructions to the construction of the trench such as but not limited to stumps, abandoned waterlines, logs, rubbish, and debris of all types, shall be removed by the Contractor at his own expense without additional compensation from the Owner.

C. Blasting: Blasting for excavation will not be allowed.

D. Trench Width: Trench width at the ground surface shall kept to a minimum necessary to install the pipe and manholes in a safe manner. In all cases, trenches must be of sufficient width to allow for shoring and permit proper joining of pipe and compaction of the backfill material along sides of the pipe. Minimum trench width, in the pipe zone, must provide a clear working space 6 inches on each side of the barrel for sewer pipe. If there is a maximum width shown and said width is exceeded by Contractor without written authorization, Contractor will be required, at no expense to Owner, to provide pipe of a higher strength designation, a higher class of bedding, or both, as approved. In all cases, confine trench operations to dedicated right-of-way for public thoroughfares or within areas for which permanent easements have been obtained, unless special arrangements have been made with the affected property owners.

E. Grade: The bottom of the trench shall be carried to the lines and grades shown on the plans or as established by the Engineer, with proper allowance for pipe thickness and gravel bedding. Correct any part of the trench excavated below grade with material of the type specified in paragraph 2.01 for the full width of the trench; thoroughly compacted in layers not to exceed 6 inches to the established grade.

F. Shoring, Sheeting, and Grading of Trenches: Whenever necessary to prevent caving during excavation in gravel, sandy soil, or other unstable material, adequately sheet and brace the trench. Where sheeting and bracing are used, increase trench widths accordingly. Ensure trench sheeting remains in place until the pipe has been placed and backfill of the pipe zone is completed.

G. Location of Excavated Materials: During trench excavation, locate excavated materials to minimize erosion and sediment.

H. Removal of Water: Provide and maintain ample means and devices with which to promptly remove and dispose of all water when trench is being prepared for pipe laying, during laying of pipe, and until backfill has been completed. Dispose of water in accordance with state and local regulations.

I. Foundation Material: When, in the opinion of the Engineer, the material in the bottom of the trench is unsuitable for supporting the pipe or manhole, excavate below the flow line as directed by the Engineer, place 12-ounce non-woven geotextile fabric at bottom and backfill to the required grade with gravel of the type specified in paragraph 2.01.

J. Trench Backfill at Pipe Zone: For all classes of backfill, the pipe zone is defined as extending from the bottom of bedding in the trench (6 inches below invert) to a point 12 inches above the outside of the pipe, and for the full width of the trench. Backfill the entire pipe zone with 3/4 inch minus crushed gravel placed and hand-leveled in 6 inch layers. Special effort to properly bed pipe by slicing backfill in pipe haunches up to springline shall be provided.

3.02 BACKFILLING AND COMPACTION

A. Trench Backfill Above Pipe Zone: Use the following type of backfill on the project in all areas.

1. Class C Backfill: Backfill the entire trench above the pipe zone with ¾ inch minus to the finished ground surface or base of the asphalt concrete trench section and compact according to the specifications.

3.03 EXCESS EXCAVATED MATERIAL

A. Haul and dispose of all excess excavated material. The Contractor shall make arrangements for the disposal of the excavated material and shall bear all costs and retain any profit incidental to such disposal. The Contractor shall comply with all provisions of any agency having jurisdiction.

3.04 ROCK EXCAVATION

A. Before proceeding with rock excavation, complete the common excavation to such depths that only rock excavation remains. At this time, make the trench available to the Engineer and take measurements to determine the amount of rock excavation remaining.

3.05 GENERAL COMPACTION REQUIREMENTS

A. Backfill shall be maintained at proper moisture content so that the material is within 5%± of optimum moisture.

B. Maximum density and optimum moisture will be determined using Method A of AASHTO T-99. All listed compaction levels are based on the T-99 compaction requirements unless otherwise stated.

C. Imported backfill shall be mechanically compacted. The full trench depth shall be compacted to at least 95% of maximum density.

3.06 MECHANICAL COMPACTION REQUIREMENT

A. The method of compaction shall be at the Contractor's option, unless otherwise noted.

B. Unless otherwise noted, the Contractor shall be responsible to provide the proper size and type of compaction equipment and select the proper method of utilizing said equipment to attain the required compaction density without damage to pipe, adjacent utilities and properties.

3.07 WORK LIMITS

A. The intent of this specification is threefold:

1. To limit disruption to any individual property and resulting complaints to the greatest extent possible from mainline excavation until the time the trench is compacted and ready for restoration activities.

2. To identify and correct any pipe, compaction and restoration problems.

3. To comply with all regulatory or easement requirements concerning restoration and cleanup activities during construction.

END OF SECTION

SECTION 02500

STREET RESTORATION

PART 1 GENERAL

1.01 DESCRIPTION

This Section specifies pavement patching and asphalt overlay along the length of improvements on all streets that are currently paved with asphalt concrete. The work in this section for shall be in compliance with the Utility Placement Permits for Clackamas County and for State of Oregon Department of Transportation found in Appendix E.

1.02 RELATED SECTIONS

A list of sections of the project specifications that are most closely related to this section is provided for the convenience of the Contractor.

A. Section 01300, *Submittals Procedure*

B. Section 01570*, Traffic Control*

C. Section 02315, *Trenching, Backfilling and Compaction*

1.03 REFERENCES

This Section incorporates by reference the following documents:

A. ODOT/APWA, 2008 Standard Specifications for Construction.

1.04 SUBMITTALS

A. Procedures: Section 01300.

B. Shop drawings and equipment data required:

1. Certified test results that show materials meet ODOT requirements.
2. Manufacturer's product data showing conformance to the specified products.

1.05 QUALITY CONTROL

A. Testing: Testing will be conducted by the Contractor in accordance with ODOT/APWA 2008 Standard Specifications to determine compliance with the specified degree of compaction and asphalt content and compressive strength of the concrete. Compaction efforts for the initial lift of asphalt concrete over the prepared cement treated base shall be as determined by the Control Strip Method identified in ODOT/APWA 2008, Paragraph 00745.49(4). Control strip shall be reduced to 200 feet in length. All other asphalt concrete pavement shall be compacted to at least 92% of Rice theoretical maximum density.

B. Surface Tolerance: Surface smoothness of the replaced pavement shall be in accordance with ODOT Standard Specifications, Section 00745.70. Test with a 12-foot straightedge

laid across the patched areas. The variation of the ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed ¼ inch. Additionally, paving must conform to the grade and crown of the adjacent pavement and contain no abrupt edges, or high areas or any other imperfections as determined by DTD representative.

PART 2 PRODUCTS

2.01 AGGREGATE BASE

A. Base Course Aggregate. Aggregate for the base course of the street shall be ¾" – 0" and shall conform to the applicable portions ODOT/APWA 2008 Standard Specifications for course aggregate base material.

2.02 PORTLAND CEMENT

A. Portland Cement shall conform to AASHTO M85 for low alkali cement and Section 02010 of ODOT/APWA 2008 Standard Specifications. Type I or Type III cement shall be used.

2.03 TACK COAT

Emulsified asphalt RS-1, CRS-1, or approved equal.

2.04 ASPHALT CONCRETE (TEMPORARY AND PERMANENT)

A. Permanent trench patch using asphalt concrete shall be Level 2, 12.5 mm mix, Dense graded HMAC conforming to ODOT/APWA 2008 Standard Specifications Section 00744. Asphalt Concrete for overlay on Johnson Creek Boulevard and Bell Avenue shall be Level 3, 12.5 mm mix, Dense graded HMAC conforming to ODOT/APWA 2008 Standard Specifications Section 00744. Asphalt cement or fuel escalation/deescalation clause referenced in ODOT Specification Section 00195 is not included for this contract.

B. Temporary trench patch shall be Hot mix asphalt concrete for all main line and service lateral installations unless otherwise approved by the Engineer on an individual basis.

PART 3 EXECUTION

3.01 AGGREGATE BASE PLACEMENT

Base Aggregate Course. Workmanship in manufacturing, placing, compacting, and maintaining base, shall be in conformance with the requirements of the ODOT/APWA 2008 Standard Specifications section 00749.

3.02 ASPHALT PAVEMENT PLACEMENT – (PERMANENT TRENCH PATCH)

A. Asphalt concrete shall not be placed when the atmospheric temperature is lower than 50 degrees Fahrenheit, during rainfall, or when the surface is frozen or wet. Exceptions will be permitted only in special cases and only with prior written approval of the Engineer.

B. Contractor shall place the asphaltic concrete over the trench to a minimum depth of 2-inches, 4-inches or 8-inch depending upon location immediately after removal and disposal

of any temporary asphalt pavement. Additional pavement will be used outside the limits of the trench patch as described in Section 01025, Paragraph 1.02.W if necessary according to the Engineer based upon condition of the pavement. Maximum depth of each lift shall be 2-inches for the 4-inch trench patch and 3-inches for the 8-inch trench patch (excluding top lift). The Contractor shall spread and level the asphaltic concrete and compact it by rolling or by use of mechanical vibratory or impact tamper where rolling is impossible. Power rollers shall be capable of providing compression of 250 pounds per inch of width. The density of asphalt concrete shall be at least 92% of Rice theoretical maximum density. Streets that are to receive the milling will remove the top 2-inches of this permanent trench patch. Trench width must be greater than compaction equipment in order to have full compactive efforts available to the new asphalt material.

C. Adjust manhole rims to finish grade of final lift of asphalt concrete overlay without the use of (steel or polymer material) riser rings.

D. Meet lines shall be straight and the edges vertical where pavement is sawcut. The edges of all asphalt shall be painted with hot liquid asphalt at a rate of 0.06 to 0.12 gallons per square yard prior to placing asphalt concrete. Jagged edges from previously removed asphalt shall be removed through additional cutting in straight lines prior to final patching. Upon completion of patching, all joints shall be sealed with hot liquid asphalt and choked with sand.

E. After completion of the paving, clean the entire roadway surface by brooming.

F. Following completion of final trench patch, Contractor shall stripe all streets that currently have striping to match existing paint removed by trenching. Striping shall be of same type of material that is presently on the pavement surface. Application of the material shall be as recommended by the manufacturer.

G. Hot liquid asphalt and choke with sand all edges of asphalt concrete patch following installation of final lift.

3.03 ASPHALT PAVEMENT PLACEMENT – (2" OVERLAY AND PRE-LEVELING COURSE AFTER PERMANENT TRENCH PATCH)

A. Asphalt concrete overlay and pre-leveling course shall not be placed between September 30 and March 15. Exceptions may be permitted only in special cases and only with prior written approval of the Engineer. Asphalt concrete overlay shall not be placed when the atmospheric temperature is lower than 50 degrees Fahrenheit, during rainfall, or when the surface is frozen or wet

B. Coat all surfaces of existing pavement along with edges of manhole and clean out frames, inlet boxes and like items. When rate is not specified, hot liquid asphalt will be applied at the rate of 0.1 gallon per square yard. All utility valves shall be raised to match height of new overlay.

C. Following placement of the compacted asphalt concrete trench patch within the limit of the trench and including all areas removed for tee-cut, a single 2-inch thick layer of Level 2 or Level 3 asphalt concrete mix depending upon street location described in Paragraph 2.04.A of this Section shall be placed over the entire width of existing roadway surface. Final widths will vary from 16 feet to 24 feet or greater depending upon the street. Final

width of overlay for individual streets to be determined in field by the Owner. As a pre-cursor to installation of the 2-inch thick overlay, there may be sections of the street that will require placement of a pre-leveling course of asphalt concrete mix. This layer shall be installed where directed by the Owner.

D. Manholes shall have been previously adjusted to the height of the final overlay as part of the permanent trench patch effort. Protect manholes as necessary. If manholes do not fit roadway, adjustments will be made between the manhole cone and frame/cover that retain the integrity of the structure.

E. Asphalt berms may be necessary where directed by the Owner along limited sections of the street to direct surface drainage. Berms shall be approximately 6 to 8-inches wide and 3 to 4-inches in height. Place tack coat along surface of asphalt concrete prior to placement of berm.

F. Following completion of overlay, Contractor shall stripe all streets that currently have striping to match existing paint removed by trenching. This will also include any stop bars. Striping and stop bars shall be of same type of material that is presently on the pavement surface. Application of the material shall be as recommended by the manufacturer.

3.04 ASPHALT PAVEMENT PLACEMENT – (2" INLAY AFTER PERMANENT TRENCH PATCH)

A. Asphalt concrete inlay consisting of a 2-inch layer shall not be placed between September 30 and March 15. Asphalt concrete shall not be placed when the atmospheric temperature is lower than 50 degrees Fahrenheit, during rainfall, or when the surface is frozen or wet. Exceptions will be permitted only in special cases and only with prior written approval of the Engineer. Insure the existing milled asphalt surface is thoroughly cleaned by a vacuum sweeper and tacked prior to placement of the asphalt concrete.

B. Tack coat all surfaces of existing pavement along with edges of manhole and clean out frames, inlet boxes and like items. When rate is not specified, asphalt will be applied at the rate of 0.1 gallon per square yard. All valves shall be raised to match height of final overlay.

C. Manholes shall have been previously adjusted to the height of the final overlay as part of the permanent trench patch effort. Protect manholes as necessary. If manholes do not fit roadway, adjustments will be made between the manhole cone and frame/cover that retain the integrity of the structure.

A. Following completion of inlay, Contractor shall stripe all streets that currently have striping to match existing paint removed by trenching. This will also include any stop bars. Striping shall be of same type of material that is presently on the pavement surface. Application of the material shall be as recommended by the manufacturer.

3.05 TEMPORARY TRENCH PATCH

A. Temporary asphalt concrete shall be placed over trenches at the end of the day when they are open to traffic or as required by the Engineer. Special care shall be taken when placing the temporary asphalt on high traffic volume roads. Surface smoothness of the temporary material will be closely monitored by the Owner and will be cause for rejection of the

material requiring it to be immediately replaced at Contractors expense. Streets that will eventually be restored using full-depth reclamation (FDR) and overlays may not require the trench patch, although final decision on location will be up to the Engineer.

B. Contractor shall be responsible for maintaining the integrity of all streets within the project area that have been disturbed by construction activities. This may include placement of additional temporary asphalt concrete patch, use of milling materials as a possible temporary surfacing (versus initially hauling off site), or other solutions not mentioned above to eliminate pot holes or address surface runoff issues, all as approved by Engineer. Sweep up any loose gravel or other material on a daily basis that may be carried onto an adjoining roadway from the work areas.

3.06 FIELD TESTING

Testing will be conducted by the Contractor at locations as directed by Engineer to determine compliance with the specified degree of compaction for asphalt concrete. Aggregate base compaction testing will be the Contractor's responsibility as described in Section 02315.

3.07 BASE ROCK

Place rock surfacing beyond the limits of the main-line AC trench patch prior to placement of the widened section of 2- inch thick asphalt concrete. Base rock shall be ¾ inch – 0 inches crushed aggregate, as directed. Remove and dispose of native materials to provide space for base rock. Subgrade shall be graded reasonably smooth prior to placement of the base rock. The purpose of the layer is to provide a relatively smooth surface to place the asphalt concrete overlay upon. Compact with mechanical vibratory or impact tamper.

END OF SECTION

SECTION 02530

SANITARY SEWER PIPE AND MANHOLES

PART 1 GENERAL

1.01 DESCRIPTION

A. The work covered by this section consists of furnishing and installing all sanitary sewer pipe, and appurtenances.

1.02 REFERENCES

A. ASTM A746, *Ductile-Iron Gravity Sewer Pipe*

B. ASTM A48, *Gray Iron Castings.*

C. ASTM A304, *Steel Bars, Alloy, Subject to End-Quench Hardenability Requirements.*

D. ASTM A615, *Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.*

E. ASTM C478, *Precast Reinforced Concrete Manhole Sections*.

F. ASTM C924, *Practice for Testing Pipe Sewer Lines by Low-Pressure Air Test Method.*

G. ASTM C1244, *Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.*

H. ASTM D2837, *Long Term Strength (L.T.H.S.) @ 74.4 degrees F, 1600 PSI*

I. ASTM D3034, *Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.*

J. ASTM D2241, *Poly(Vinyl Chloride)(PVC) Pressure-Rated Pipe (SDR Series).*

K. ASTM D3212, *Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.*

1.03 SUBMITTALS

A. Provide sufficient data for the Engineer to properly evaluate the proposed pipe, manholes and appurtenances.

B. Product data submittals shall include, at a minimum, test reports. Provide test reports upon request, certifying that the pipe has been tested in accordance with and exceeds minimum requirements.

C. Precast manhole submittals shall include shop drawings from supplier

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyvinylchloride (PVC) Gravity Sanitary Sewer/Storm Pipe (less than 18-inch diameter): Of the size and type indicated on the plans, conforming to appropriate specifications detailed below.

1. PVC Sanitary Sewer/Storm Pipe and Fittings: Conform to ASTM D-3034, SDR 35. Fittings shall be injection molded, factory welded, or factory solvent cemented.

2. Minimum Pipe Stiffness: 46 psi.

3. Joint Type: Elastomeric gasket, conforming to the requirements of ASTM D3212.

4. Rubber Gaskets: Conform to ASTM D1869.

B. Manholes and Appurtenances:

1. Concrete: Concrete used in the construction of the manhole base and other structures specified shall be so proportioned and mixed as to meet a minimum 3,000 psi compression test after 28 days. There shall be a minimum of five sacks of cement per cubic yard of concrete.

2. Precast Manhole Sections:

a. Minimum 48 or 60 inches in diameter, reinforced concrete pipe, Class 2, conforming to ASTM C478, with added requirement that the reinforcement be circular and not elliptical. Cones shall be eccentric with wall thickness and reinforcement similar to that of manhole pipe sections. The tops and bottoms of the cones shall be parallel.

b. Preformed gaskets may be used in lieu of mortar type joints and shall be RAM-NEK, manufactured by K.T. Snyder Company, Inc., Houston, Texas; Kent-Seal by Hamilton Kent, Kent, Ohio; or as approved.

c. Flat-top manhole sections for all size manholes shall be used in lieu of eccentric cones where the depth from finish grade to invert is 6’-0” or less. Suburban frames shall be used with flat top manholes.

d. 48” manholes will be installed full diameter, capped with a three feet tall 48” diameter eccentric cone. Maximum 24-inch diameter riser adjustment shall be 10-inches. Depths greater than 10” to achieve finished grade with six -inch exposure will require a separate 4’ diameter riser below the eccentric cone before manhole will be approved.

3. Precast Concrete Bases:

a. Precast base sections or manhole bases shall be approved by the Owner prior to installation. All precast bases shall conform to ASTM C478.

b. Construct bases per standard details and as noted on the plans.

c. Provide flexible connectors that are designed to produce a positive watertight connection for pipes entering a precast manhole. The connector shall be manufactured by A-lok or an owner approved equal and shall meet the requirements of ASTM C-923..

4. Nonshrink Grout. Sika 212, Euco N-S, Five Star, or USA approved equal nonmetallic cementitious commercial grout exhibiting zero shrinkage. Grout shall not be amended with cement or sand and shall not be reconditioned with water after initial mixing. Nonshrink grout shall be placed or packed only with the use of an approved commercial concrete bonding agent. Unused grout shall be discarded after 20 minutes and shall not be used.

5. Manhole Extensions and Rings. Install rings and covers on top of manholes to positively prevent all infiltration of surface or groundwater into manholes. Rings shall be set in a bed of nonshrink grout with the nonshrink grout carried over the flange or the ring and shall be set so that tops of covers are flush with the surface of adjoining pavement, or 6-inches above natural ground, unless otherwise directed by the Owner. Extensions shall be limited to a maximum height of 27 inches from the center point of the first step to the top of the casting..

6. Manhole Frames and Covers: Of size and shape detailed on the plans or approved equal; ensure castings are tough, close-grained, gray iron, free from blowholes, shrinkage, and cold shuts, and they conform to ASTM A48, Class 30; ensure they are sound, smooth, clean, and free from blisters and defects. Plane and grind all castings where necessary to ensure perfectly flat and true surfaces. Covers shall be true and shall seat within the ring at all points. Manhole covers shall have two holes. Watertight/locking covers shall be solid with no holes.

7. Existing Manholes: Install new Kor-n-Seal boot following coring for all existing manholes that will have pipes extended in order to insure a positive watertight connection.

8. Manhole Steps:

a. Steel reinforced polypropylene plastic, Lane International Corp. No. P-13850, or approved equal, in conformance with ASTM C478; aligned vertically. Ensure steps within a manhole are of the same design, type, and size. Mixing of unmatched steps within the same manhole is not permitted.

b. Prior to delivery to the jobsite, manufacturer is to drive steps into preformed holes in precast concrete manhole cones and sections in conformance with the following: ASTM A615 Grade 60, 1/2" deformed steel rod and ASTM 2146-78 Type II, Polypropylene.

c. Place steps where there are no incoming or outgoing lines. Loose steps shall be cause for rejection of that manhole cone or section.

PART 3 EXECUTION

3.01 PREPARATION OF TRENCH

A. Crushed Gravel Pipe Base: Place in trench to a minimum depth of six inches below the flow line of the pipe. Place and level the base to approximate flow line grade in advance of laying pipe. Immediately following the placement of each pipe, place the crushed gravel pipe base to the invert of the ductile iron pipe or spring line of the flexible pipe. It is important that the gravel is "sliced" with a shovel on both sides of and for the full length of the pipe, to insure gravel is uniformly supporting the pipe haunches.

B. Bell Holes: At the location of each joint, bell holes of ample dimensions shall be dug in the bottom of the trench and at the sides where necessary to permit the joint to be properly fitted; to permit easy inspection of the entire joint; and to provide uniform bearing for the barrel of the pipe for its entire length.

C. Removal of Water: Provide and maintain ample means and devices to remove and dispose of all water entering the trench excavation during the process of laying pipe. Ensure water and debris does not enter the Owner's sewer system or new pipe. Ensure water and debris does not enter the Owner's sewer system or new pipe unless it will be discharged where provided in the Erosion Control plan. At no time will untreated groundwater be allowed to enter the live downstream sewer system.

3.02 PREPARATION OF SEWER PIPE

A. Carefully inspect pipes and fittings before being laid; no cracked, broken, or defective pipe or fittings shall be used in the work. Clean the ends of the pipe to remove dirt or other foreign material.

B. Exercise extreme care to ensure the inside surfaces of the bell are smooth and free from any projections which would interfere with the assembly or water tightness of the joint.

3.03 LAYING AND JOINTING PIPE AND FITTINGS

A. Line and Grade:

1. Lateral reconnection to new PVC pipe: Lay sewer pipe in full lengths as manufactured; lay on a constant grade and in straight alignment from manhole to manhole or cleanout. Do not install pipe with bows or bellies. The Contractor shall establish line and grade for pipe by the use of accurate pipe lasers to maintain the line and grade. The Contractor shall check line and grade as necessary to insure accuracy of installation.. In the event that the limits prescribed in this section are not met, the work shall be immediately stopped, the Engineer notified, and the cause remedied before proceeding further with the work. Variance from the established line and grade shall not be greater than 1/32-inch per inch of pipe diameter and shall not exceed 1/2-inch for line and 1/4-inch for grade, providing that such variation does not result in a level or reverse-sloping invert.

B. Sanitary Sewer Service Connections:

1. Lateral reconnection to new PVC pipe:

a. Utilize factory T-fittings on the new 8" PVC pipe, with the lateral ID being sized to equal the size of the existing lateral pipe ID. Make connections between dissimilar pipe materials with rigid fittings. Flexible and reinforce flexible fittings such as Fernco and Fernco Strong Back fittings are not allowed.

C. Manhole Connections:

1. Connect PVC pipe to concrete manholes by means of an approved Kor-n-Seal gasket or other approved coupling. The use of Portland Cement grout for connecting PVC Pipe to manholes will not be permitted. Manholes shall be cored to insure a watertight connection using the approved coupling.

3.04 MANHOLE INSTALLATION:

A. Precast Manhole Concrete Base: Construct so the first section of the precast manhole has a uniform bearing throughout the full circumference of the manhole wall. Deposit sufficient mortar on the concrete base to provide a watertight seal between the base and the manhole wall.

B. Placing Precast Manhole Sections: The joints for the precast concrete manhole shall be made of nonshrink grout. Construct the walls true to line and grade as established by the Engineer. Place grout on the groove of the lower section of the pipe prior to placing the next section of pipe. Completely fill entire joint with grout and trowel to a smooth surface. Manhole sections with a captive groove rubber gasket need not be grouted between sections. Manhole shelf shall be integrally poured against the wall and over the pipe stub. Construct shelf in such a manner that when capacity of the pipe is reached, no portion of the shelf surface is used as part of the cross sectional flow channel required for free flow through the manhole. Manholes with more than 10% change in slope on inlet versus outlet pipes shall have full depth channels placed across the base.

C. Manhole Inverts: Ensure manhole invert channels provide a smooth flow-through characteristic. No sharp edges or rough sections that will tend to obstruct the flow of sewerage will be permitted. In the event a full section of pipe is laid through the manhole, pour the concrete up to spring line (one-half the diameter of the pipe), then break or cut out the top half of the pipe and mortar smooth all rough edges. Trowel smooth all cement mortar used in the construction of the inverts. The Contractor may, at his option, use precast bases with pre-poured and formed invert channels.

D. Manhole and Cleanout Rings and Covers: Set rings so the tops of the covers will match final finished surface. Manholes located within unimproved areas shall be placed 6 inches above the finished ground surface or as directed by the Engineer.

3.05 TESTING OF GRAVITY SEWER PIPE AND APPURTENANCES

A. General:

1. Test all new gravity sewer lines by "low pressure air testing".

2. Air Tests For Gravity Sewers: Ensure all gravity sewers and appurtenances successfully pass the air test prior to acceptance and are free of visible leakage or infiltration.

3. The Contractor may desire to make an air test prior to backfilling for his own purposes; however, the acceptance air test shall be made after backfilling and compaction has been completed to final grade.

4. Furnish all facilities and personnel for conducting the test under the observation of the Engineer. The equipment and personnel shall be subject to the approval of the Engineer. Notify Engineer 24-hours in advance of testing to provide time to witness all test.

5. Acceptance testing shall be conducted on all new manholes.

B. Testing Procedures:

1. The Contractor shall provide all equipment and personnel for the Time-Pressure Drop Method for all air testing. The method, equipment and personnel shall be subject to the approval of the Engineer. The Engineer may, at any time, require a calibration check of the instrument used. The pressure gauge used shall have minimum divisions of 0.10 psi and have an accuracy of 0.0625 psi (one ounce per square inch).

2. Immediately following the pipe cleaning, test the pipe with low pressure air. Plug all sewer outlets with suitable test plugs. Slowly supply air to the plugged pipe installation until the internal air pressure reaches 4.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe. The test pressure shall be increased 0.433 pounds per square inch for each foot of average water depth over the sewer. This pressure will be in addition to the initial 4.0 pounds per square inch previously identified. Allow at least two minutes for temperature stabilization, adding only the amount of air required to maintain pressure before proceeding further. After the temperature stabilization period, disconnect the air supply. Determine and record the time in seconds that is required for the internal air pressure measured by the gage to drop from 3.5 pounds per square inch to 2.5 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe.

3. Safety Precautions: All plugs used to close the sewer for the air test must be capable of resisting the internal pressures and must be securely braced, if necessary. All air testing equipment must be placed above ground and no one shall be permitted to enter a manhole or trench where a plugged line is under pressure. All pressure must be released before the plugs are removed. The testing equipment used must include a pressure relief device designed to relieve pressure in the line under test at 10 psi or less and must allow continuous monitoring of the test pressures in order to avoid excessive pressure. The Contractor shall use care to avoid the flooding of the air inlet by infiltrated ground water. The Contractor shall inject the air at the upper plug if possible. Only qualified personnel shall be permitted to conduct the test.

C. Acceptance of Test:

1. The pipeline shall be considered acceptable when tested as described herein before if the section under test does not lose air at a rate greater than 0.0015 cfm per square foot of internal sewer surface. For test sections containing over 625 square feet of

surface area, the time measured by this method for 1.00 pounds per square inch pressure drop shall be calculated according to the following formula:

$$T = d^2L/42$$

T = test duration, seconds
D = pipe diameter, inches
L = section length, feet
42 = conversion factor

For test sections containing less than 625 square feet of internal surface area, the time measured by this method for 1.00 pounds per square inch pressure drop shall be calculated according to the following formula:

$$T = 56d$$

The internal surface area of pipeline sections may be calculated using the formula:

$$A = \pi Ld/12$$

The surface areas of lateral lines of differing lengths and diameters may be accommodated in Equations 1 and 2 above by using the sums $d_1 2L_1 + \ldots d_n 2L_n$ and $d_1 + \ldots + d_n$ in place of d^2L and d, respectively.

2. If the pipe installation fails to meet these requirements, the Contractor shall determine, at his own expense, the source or sources of leakage, and shall repair or replace all defective materials and correct all faulty workmanship. The type of repairs proposed by the Contractor must be approved by the Engineer before the repair work is begun. The completed pipe installation shall meet the requirements of the air test before being considered acceptable.

D. Manhole Vacuum Test (Adapted from ASTM C1244-93):

1. Summary of Practice: Plug all lift holes and pipes entering the manhole. A vacuum will be drawn and the vacuum drop over a specified period of time is used to determine the acceptability of the manhole.

2. Significance and Use: This is not a routine test. The values recorded are applicable only to the manhole being tested and at the time of testing.

3. Preparation of the Manhole:

   a. Plug all lift holes with an approved non-shrink grout.

   b. Plug all pipes entering the manhole, taking care to securely brace the pipes and plugs from being drawn into the manhole. The manhole shall be set to finish grade and all paving (if applicable) completed.

4. Procedure:

   a. Place the test head at the inside of the top of the frame and the seal inflated in accordance with the manufacturer's recommendations.

b. Draw a vacuum of 10 inches of mercury, with the valve on the vacuum line of the test head closed, and the vacuum pump shut off. With the valves closed, measure the time for the vacuum to drop to 9 inches.

c. The manhole shall pass if the time for the vacuum reading to drop from 10 inches of mercury to 9 inches meets or exceeds the values indicated below.

d. Utilizing the formulas that follow, the comparable times for a successful vacuum test for different size manholes are:

DEPTH (ft) (Length of Manhole)	TIME (sec) (Dia.)		
	48"	60"	72"
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73

e. If the manhole fails the initial test, make necessary repairs with a nonshrink grout after the vacuum has been released. Proceed with retesting until a satisfactory test is obtained.

f. Use or failure of this vacuum test shall not preclude acceptance by appropriate water infiltration or exfiltration testing, or other means.

E. Subsequent Failure: Infiltration of groundwater, in any amount, following a successful hydrostatic vacuum or air test as specified, shall be considered as evidence that the original test was in error or that subsequent failure of the pipeline, manhole or cleanout assembly has occurred. The Contractor will be required to correct such failures should they occur.

F. Deflection Testing: In addition to hydrostatic or air testing, gravity sanitary sewers constructed of PVC pipe shall be deflection tested not less than 14 days after the trench backfill and compaction has been completed. Conduct the test by pulling an approved solid pointed mandrel through the completed pipeline. Ensure the diameter of the mandrel is 95 percent of the inside diameter of the pipe. Conduct testing on a manhole-to-manhole basis and after the line has been completely cleaned and flushed. Excavate, repair, or realign and retest any portion of the sewer that fails to pass the test for air, leakage or deflection.

3.06 ACCEPTANCE

A. Thoroughly clean all pipelines after acceptance of all joint testing and after backfilling and restoration of surfaces.

B. Base acceptance of the pipeline on a final inspection of the entire line conducted jointly by the Contractor and the Engineer. This will also include results from Owner's operations staff which will lamp each individual section between manholes.

C. Any infiltration evidence in manholes or pipe shall be properly repaired, even if unit passed testing.

END OF SECTION

SECTION 02609

MANHOLE REHABILITATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide all labor, materials, equipment, power, water, and incidentals necessary to prevent infiltration of groundwater into manholes and prevent entrance of soil or debris.

B. The extent of Work is shown on the Drawings. Field verify interceptor, manholes, collection sewers, and all other utility locations prior to any work.

C. Manholes identified on the Drawings to be rehabilitated are included in the Work described in this Section.

1.2 REFERENCES

A. Comply with applicable provisions and recommendations of the following:

1. ASTM C 309, Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete.

2. ASTM C 321, Test Method for Bond Strength of Chemical-Resistant Mortars.

3. ASTM C 443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.

4. ASTM C 478, Standard Specification for Precast Reinforced Concrete Manhole Sections.

5. ASTM C 596, Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement.

6. International Concrete Repair Institute (ICRI) Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

1.3 MANUFACTURER'S PRODUCT SUPPORT

A. Provide a representative employed by the manufacturer having technical training in admixture and manhole wall liner design and construction available for consultation on site during the repair work.

1.4 QUALIFICATIONS

A. There is no licensing requirement for installation of internal manhole injection grouting. CONTRACTOR shall have completed the successful internal grouting of manholes on at least 30 manholes. The CONTRACTOR may provide on-site training by an approved

representative of the manufacturer in lieu of the experience requirement for installation. The training must take place in the presence of the ENGINEER or designated representative.

1.5 SUBMITTALS

A. Product Data: Submit product data including warranty information, surface preparation instructions and application instructions from manufacturer of wall repair materials, hydraulic cements, cleaning materials, specialized sealants, and grouts.

1.6 GUARANTEE

A. All manhole grouting shall be guaranteed by the CONTRACTOR against infiltration, spalling, loss of adhesion or failure for a period of 3 years from the date of Conditional Acceptance. During this period, repair all defects in a manner satisfactory to the ENGINEER at no additional compensation.

PART 2 - PRODUCTS

2.1 GENERAL

A. Handle, formulate, and store sealing compounds and grouts in conformance with the manufacturer's recommendations. The uncured compound and grouts shall be delivered to the Site in unopened containers, with the date of manufacture clearly indicated. Remove from the Site any uncured compound determined to be more than six months old. Do not use uncured compound or grout if container has been open for more than 24 hours.

B. Mix and handle the compounds and grouts, including their component parts in accordance with manufacturer's recommendations and to minimize hazard to personnel. Provide appropriate protective measures to ensure that the components and the chemicals produced in mixing are under the control of the CONTRACTOR at all times and are not available to unauthorized personnel or others. Dispose of excess material resulting from rehabilitation operations in a safe manner. All equipment and material shall be subject to the review of the ENGINEER.

C. Use only chemical materials that meet the following minimum application requirements:

1. All component materials shall be easily transportable by common carriers.

2. Packing of component materials shall be compatible with field storage requirements.

3. Components shall be packed in such a fashion as to provide for maximum worker safety when handling the materials and minimize spillage when preparing for use.

4. Mixing of the components shall be compatible with field applications, not require precise measurements, and be within the limits recommended by the manufacturer.

5. Catalyzation shall take place at the point of injection/repair.

6. Cleanup shall be done without inordinate use of flammable or hazardous chemicals.

7. Residual sealing materials shall be removed from the sewer after injection to ensure no flow reductions restriction or blockage of sewer flows.

2.2 MANHOLE INJECTION GROUT

A. For low leakage sites with limited voids in backfill, use acrylamide, acrylic, or low viscosity urethane grout.

1. Residual sealing materials shall be removed from the sewer after injection to ensure no flow reductions restriction or blockage of sewer flows.

2. Product Manufacturer:

a. Avanti AV-100 Chemical Grout; or equal (acrylamide).

b. Avanti AV-118 Duriflex; or equal (acrylic).

c. Avanti AV-254 Gelseal; or equal (low viscosity urethane).

B. For low leakage sites with potential void in the backfill, use urethane grout.

1. Product Manufacturer: Avanti AV-350 MultiGel; or equal (urethane).

C. For high leakage sites with limited voids in the backfill, use urethane grout.

1. Product Manufacturer: Avanti AV-202 Multigrout; or equal (polyurethane foam).

D. For high leakage sites with potential voids in the backfill, use urethane grout.

1. Product Manufacturer: Avanti AV-310 Hydro Sealant; or equal (polyurethane expanding foam).

E. For pipe penetrations, use urethane grout.

1. Product Manufacturer: Avanti AV-333 Injectaflex; or equal (urethane expanding foam).

F. Additives

1. Root deterrent chemical – Add dichlobenil to the grout in proportions as recommended by the manufacturer to prevent root growth.

a. Product Manufacturer: Avanti AC-50W Root Inhibitor; or equal

2. Shrink control agent - add a water-based emulsion with the grout to reduce shrinkage and improve strength of the grout providing the resultant cured material with both improved hydrostatic pressure resistance and flexibility. Add the agent

in proportions as recommended by the manufacturer.

a. Product Manufacturer: Avanti AV-257 Icoset; or equal.

2.2 WALL PATCH

A. Wall patch shall be a quick setting fiber reinforced calcium aluminate cementitious material. Mix and apply according to manufacturer's recommendations. Wall patch shall have the following minimum physical properties:

1.	Compressive Strength (ASTM C 109B):	1,400 psi, 1 hrs
		2,000 psi, 24 hours
2.	Shrinkage (ASTM C 596):	<0.06% at 90% R.H.
3.	Bond Strength (ASTM C 321):	900 psi, 24 hour
4.	Flexural Strength	500 psi, 24 hour; 900 psi, 28 days
5.	Cement:	sulfate resistant
6.	Density, when applied:	105 +/- 5 pcf

2.3 HYDRAULIC CEMENT

A. Hydraulic cement shall be a rapid setting cementitious product specifically formulated for leak control shall be used to stop minor water infiltration, mixed and applied according to manufacturer's recommendations, and having the following minimum physical properties:

1.	Compressive Strength (ASTM C 109B):	600 psi, 6 hours
		2000 psi, 24 hours
2.	Shrinkage (ASTM C 596):	<0.06% at 90% R.H.
3.	Bond Strength (ASTM C 321):	40 psi, 1 hour
		80 psi, 24 hours

B. The hydraulic cement shall require no additives, shall set in 45-90 seconds, and shall be dimensionally stable, freeze/thaw resistant and sulfate resistant.

PART 3 - EXECUTION

3.1 MANHOLE CLEANING / PREPARATION

A. Clean bench/invert floor and interior walls of manholes by removing deleterious material, including dirt, grease, and other debris. Use high-pressure water, at a minimum force of 3,500 psi. If required, use approved cleaners to remove grease, oil, and other matter, which would prevent a good bond between existing manhole wall and the approved repair

materials.

B. Prepare the interior surfaces in accordance with the requirements of the wall liner material manufacturer. Remove loose and protruding brick, mortar and concrete using a mason's hammer and chisel and/or scrapper.

C. Make all sub-surfaces clean and free of laitance or loose material.

D. Inset plywood mats or sheeting over the existing flow channel and bench to prevent debris from falling into the sewer and to collect debris from manhole bench.

3.2 INJECTION GROUTING MANHOLE JOINTS, PIPE PENETRATIONS AND OTHER DEFECTS

A. Use grout injection method to seal the manhole base and wall joints, and penetrating pipe joints. Seal other defects by injection grouting where shown, specified or required to stop leaks.

B. Where indicated by field conditions or directed by the ENGINEER, grout wall joints as follows.

1. The wall joints shall have the drill holes at 4, 8, and 12 o'clock positions one foot above the joint to be sealed and drill holes with grout sleeves inserted into the walls at 2, 6, and 10 o'clock positions one foot below the joint to be sealed. For each wall joint, pump grout into the lower holes until grout comes out of the upper holes.

C. Where indicated by field conditions or directed by the ENGINEER, grout base and/or bench by drilling one hole on one side of the defect with grout sleeves inserted into the bench or base, whichever is lower. Pump grout into drill hole.

D. For each penetrating pipe joint, drill one hole on each side of the pipe with grout sleeves inserted into the walls at the spring line or top of manhole bench, whichever is lower. Pump grout into both drill holes.

E. For other manhole defects, perform injection grouting in a manner to seal the defect watertight.

F. Into each insert sleeve, pump grout at controlled pressures which are in excess of groundwater pressures. Install additional insert sleeves and grout as necessary, due to type and size of leak encountered, type of soil and type of voids being filled.

G. Leaks, which are determined to be too large to be effectively eliminated by the grout injection method, shall be plugged with hydraulic cement prior to initiating the injection of grout.

H. Allow one day for the grout to cure, after which each sealed joint shall be inspected. If leaks are observed in the sealed area, place new gel insert sleeves and apply more sealant as necessary to stop the leak. Repeat the process as necessary to stop the leaks.

I. Repair all holes created by the grouting process with hydraulic cement. Manholes shall be cleaned, as specified, after chemical sealing operation. Fill any large voids with wall patch

mix.

3.2 INSPECTION AND TESTING

A. After manhole wall sealing or manhole rehabilitation has been completed, visually inspect the manhole in the presence of ENGINEER. Check for cleanliness and for elimination of active leaks.

3.3 CLEANUP

A. Remove all debris from the manhole.

B. If debris from CONTRACTOR'S work has entered the sewer pipe, clean the affected pipe(s) to the satisfaction of the ENGINEER and at no additional cost to the OWNER.

3.4 WARRANTY INSPECTION

A. Re-inspect (Warranty Inspection) all manholes repaired or rehabilitated in accordance with this Section in the presence of the ENGINEER 18 to 24 months after Conditional Acceptance of the Work during high groundwater conditions. The ENGINEER shall select the time for the Warranty Inspection and will give the CONTRACTOR two to four weeks notice prior to such inspection. Visually inspect each repaired or rehabilitated manhole in the presence of the ENGINEER.

B. If any repair or rehabilitation is found to be defective, make repairs necessary to eliminate or repair the defect at no additional cost to the OWNER.

C. All repair techniques and methods shall be approved by the ENGINEER prior to the initiation of any repair activities.

END OF SECTION

SECTION 02730

TEMPORARY BYPASS PUMPING

PART 1 GENERAL

1.01 DESCRIPTION

A. The work covered by this section consists of temporary bypass pumping of sanitary sewer around individual sections of sanitary sewer main within the project area.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 SANITARY SEWER BYPASS FLOWS

A. The Contractor shall submit a "Flow Diversion and By-Pass Pumping Plan" to the Owner prior to the start of construction. Under no circumstances shall sewage be allowed to flow or leak onto the ground surface, into gutters or onto streets, over sidewalks, or into storm inlets. The Flow Diversion and By-Pass Pumping Plan shall outline the Contractor's proposed method of handling all flows during all elements of construction. The plan shall show all flow inputs (connections) in the work area and how the flow from each connection will be managed. Flow inputs shall be confirmed by the Contractor during initial surveys and television inspections.

B. The Contractor shall provide complete diversion regardless of flow rate. The diversion plan for each segment shall contain at a minimum, a plan view of the diversion on a site map and the individual components of the diversion including but not limited to:

1. Pumps: type, size and placement

2. Diversion pipe: size, type, and placement

3. Power supply to pumps

4. Method of holding back the flow

5. Facilities for redundancy

C. Diversion of flows shall be accomplished by the use of pumps to a manhole downstream of the construction. The Contractor shall have adequate pumps and piping or alternative methods to divert flow to the downstream conveyance lines. The pumping or transportation capacity shall be sufficient to maintain normal flows plus additional flows that may occur during a rainstorm. Contractor shall provide all measures necessary to temporarily collect/divert flows from private services if necessary to properly install the pipe. Each impacted business should be contacted by the Contractor to insure that the least disruption as possible to the public is adhered to for the individual services.

D. Flow diversion piping shall be arranged such that the piping is protected from traffic

loads, traffic is maintained at driveways and roadways, and sidewalks are free of obstruction unless otherwise approved by the Owner. ***All sewage diversion piping shall be water-tight.***

E. The Contractor shall use critically silenced generators and pump units and shall meet or exceed the requirements of any local noise ordinances. Such approved generators and accompanying pumps shall be continuously monitored while in operation and shall be placed to minimize disturbances to residential areas. lf necessary to meet noise ordinances, sound baffles and temporary sound walls shall be installed to deflect sound from generators and bypass-pumps away from residential areas or as directed by the Owner. No variance from any local noise ordinances will be allowed unless the Contractor secures a noise variance at no additional expense to the Owner.

F. Diversion of all flows shall be maintained at all times. This could also include individual sanitary sewer services if necessary to provide a suitable environment to install the CIPP according to manufacturer's recommendations. The Contractor shall provide a qualified operator who is capable of making emergency repairs or who is able to mobilize forces to handle power, pump or other problems. This operator shall be on call 24/7 while the diversion is in operation. The Contractor shall be responsible for continuity of sewer service to each facility connected to the section of the sewer being impacted during the execution of the work. No leaks in the diversion piping shall be permitted. Diversion pipes shall be cleaned and disinfected prior to disassembly and the liquid shall be discharged into an existing sanitary sewer. Service connections or laterals shall not be disconnected or plugged during the day. Service must be restored to service connections or laterals within the normal work day.

G. Each flow diversion pump shall be powered by a dedicated power generator and shall operate as a single pumping unit. For system redundancy, the Contractor shall have on site an equivalent back-up flow pumping unit set up and fully operational for the pumping operation with capability to automatically switch over in case of failure to the primary system. In addition, an auto-dialer call out system shall be provided to notify the Contractor and the Owner's Field Operation Staff via a 24-hour number if/when the back-up flow pumping unit is utilized. Contractor is expected to visit site immediately to determine cause for primary system failure.

H. Flow diversion piping and pumps shall be free of leaks. Leaking pipes and pumps shall be replaced immediately. Sewage spills shall be cleaned up immediately. If a sewage release occurs during any sewage diversion activity, the Contractor shall be responsible for taking immediate action to cease, contain, and clean up the release, and to notify the proper authorities. The Contractor shall have sufficient equipment and materials at the work site to cease, contain and cleanup any sewage release that occurs during diversion operations and will be responsible for all costs associated with sewage spill cleanup including associated fines. The Contractor shall be responsible for cleanup, repair, property damage costs and claims.

I. No flow diversion operations may proceed unless the Contractor has, at the work site, the following items:

1. Dry granular lime, of sufficient quantities, to be spread on any release for purposes of disinfectant. A 10% bleach solution may also be used as a disinfectant. Disinfectants may not be directly applied to any surface waters, streams, creeks, etc.

2. Equipment to secure the area of sewage release and isolate the public from accessing the release site. As a minimum this shall include barricades and caution tape.

3. The equipment and materials on hand to stop the release and repair the failed item.

4. Equipment and materials to clean the site, rake up solid debris and to dispose of material properly.

J. In case of sanitary sewage release during diversion operations, the Contractor shall immediately contact the Owner notifying them of the release:

The Owner will take appropriate measures within 24 hours to report the sewage spill to the Oregon Department of Environmental Quality and any other appropriate entities if it is determined the spill was of sufficient magnitude. Even if a sewage spill or release is contained within an excavation, the spill or release must be reported to the Owner.

Failure by the Contractor to report a spill or release to the appropriate Owner's representative will result in liquidated damages in the amount of $500.00 per incident plus an amount sufficient to reimburse the Owner for any civil and administrative penalties paid by the Owner as a result of the Contractor's failure to report as described above.

K. The Contractor shall be responsible for providing the following information to the authorities in case of a spill or release:

1. Release location

2. Date and time release found or started and time stopped

3. Release flow rate and estimated total volume

4. Receiving stream, if any

5. Action taken to stop release

6. Cause of release

7. Clean-up actions taken

8. Any other information as requested by relevant authorities

END OF SECTION

SECTION 02775

CURED- IN- PLACE PIPE (CIPP)

PART 1 GENERAL

1.01 SUMMARY

A. This section specifies rehabilitation of pipelines by the installation of a resin-impregnated fabric liner.

B. Related sections: The work of the following Sections is related to the work of this Section. Other Sections, not referenced below, may also be related to the proper performance of this work. It is the Contractor's responsibility to perform all the work required by the Contract Documents.

1. Section 01300: Submittals.

1.02 REFERENCES

A. This section incorporates by reference the latest revisions of the following documents. They are part of this section insofar as specified and modified herein. In case of conflict between the requirements of this Section and the listed documents, the requirements of this Section shall prevail.

Reference	Title
ASTM D543	Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
ASTM D790	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D903	Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
ASTM D1600	Standard Terminology for Abbreviated Terms Relating to Plastics
ASTM D5813	Standard Specification for Cured-in-Place Thermosetting Resin Sewer Pipe
ASTM F1216	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Inversion and Curing of a Resin-Impregnated Tube
ASTM F1743	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pull-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe

1.03 DEFINITIONS

A. Definitions are in accordance with terminology of ASTM F412, unless otherwise specified. Abbreviations are in accordance with terminology of ASTM D1600, unless otherwise specified.

1. Service connection is the point where the lateral pipe intersects with the mainline pipe, also known as the lateral interface. It can be the interface portion of a tee, wye, or cut-in connection where the lateral pipe flows into the main.

2. Host Pipe: An existing pipeline or conduit to be internally rehabilitated by installation of a pipe liner.

3. Manufacturer and/or Assembler: The entity responsible for obtaining individual components of a system and assembling into the final products which are shipped to the job site for installation.

4. Installer: Licensed contractor or subcontractor responsible for the installation of the system in the field.

1.04 QUALIFICATIONS

A. Product, Manufacturer/Assembler and Installer Qualification Requirements:

1. The Manufacturer or Assembler shall have supplied the product bid for a minimum of 50,000 linear feet of installations. Contractor shall provide a list of installation projects. Also, provide the project names, owner contacts, phone numbers, and year installed.

2. The Contractor shall have a minimum of 5 years recent experience in sewer main rehabilitation, including familiarity with CIPP processes. Contractor shall submit list of a minimum of 5 references including contact names, phone numbers, and year installed for sewer rehabilitation projects.

3. Certification showing that the Installer is currently licensed by the appropriate licensor to perform CIPP installation.

1.05 SUBMITTALS

A. Submit the following in accordance with Section 01300:

1. Catalog data and manufacturer's technical data showing complete information on material composition, physical properties, depth of installation and dimensions of system components of the tube and resin system. Include manufacturer's recommendation for handling, storage, insertion, curing, trimming, finishing and repair of damaged liner.

2. Certification showing that the Installer is currently licensed by the appropriate licensor to perform CIPP installation. Certification shall be given to the Owner prior to delivery of material to the job site.

3. Certification from the manufacture that the materials meet the requirements of these specifications and intended use. Certification of test results confirming than the liner and resin meet the minimum chemical resistance requirement according to ASTM F1216 or ASTM 1753 depending upon which installation method is used.

4. Details on all lining materials and resins. Include calculations for the volume of resin to be used for each segment including the calculated amount of excess resin necessary to account for liner material properties, changes in the resin's physical and chemical characteristics due to the polymerization and the structural condition of the gravity pipe. Color of the resin shall also be identified.

5. Flow diversion plan for the mainline including services laterals (if applicable). This will include a specific plan for each individual manhole section which identifies location of bypass pipe, method of crossing individual driveway/street intersection, pumping capacity and location of equipment within the street. Generic bypassing plans will be rejected as incomplete.

6. Detailed method for samplings, including recommended location and size of each sample, method of removal and method of liner repair including a procedure to repair the cured liner when core/plate samples are taken.

7. Detailed description of the wet out process. Include tube and resin manufactures wet out recommendations including the roller gap, material feed speed and vacuum requirements for each liner size and thickness. If wet out occurs off-site, provide certification by the person in responsible charge that the entire wet out process including handling and delivery to the site followed the defined procedures.

8. A letter identifying the cleaning methods Contractor plans to employ to remove sediment, debris, grease, scale, encrustation, mineral deposits and roots throughout the gravity pipe to be lined and in the structures to be repaired. The letter shall include a detailed explanation of the cleaning process and a schedule of activities.

9. Name of resin supplier and liner fabric supplier. Resin manufacturer installation procedures including curing and cooling temperature and time requirements and sequences. Provide detailed calculations to confirm the liner thickness for the proposed resin system. List all assumptions, design criteria and material characteristics whether they are based on the information in the specifications, plans or not.

10. Technical data showing that the cured CIPP system meets the chemical resistance and corrosion resistance requirements of this specification section.

11. Manufacturer's or Assembler's certification that the liner materials and system are in compliance with the specifications, codes, and standards referenced herein.

12. Manufacturer's or Assembler's recommendations for factory and field (whichever applies) wet out procedures including: volume of resin per unit of liner, roller gap setting, mixing ratios and procedures for resin and catalyst/hardener,

shelf life of resin, pot life of resin, required wet out procedure to ensure full saturation, and other criteria deemed necessary to ensure proper wet out of the liner.

13. Manufacturer's or Assembler's certification that all Manufacturer's or Assembler's wet out recommendations have been followed on all lengths of CIPP which have factory wet out.

14. Manufacturer's or Assembler's recommendations for storage procedures and temperature control, handling and inserting the liner, curing details and minimum equipment requirements to allow for an adequate installation.

15. Manufacturer's or Assembler's recommendations for minimum and maximum pressures, temperatures, and time durations to be used during liner inversion, cure, and cool down for each shot installed.

16. Data on Contractor's equipment to be used on site including: type and tolerance of temperature gages and thermocouples used to monitor cure temperature; type and tolerance of equipment used to generate liner inversion pressure; make model, and technical data of all equipment used to generate heat for the curing process; make, model and technical data of backup equipment used to maintain curing temperature; approximate size of vehicle(s) which carries the CIPP pipe and installation equipment.

17. Procedures for cool down and relieving static head after CIPP cure.

18. CIPP samples in accordance with Paragraph 3.04A of this section.

19. Data-logger output in printed and electronic (excel spreadsheet) formats.

20. Material Safety Data Sheets for resins, hardeners, solvents, and all other compounds or chemicals to be used on job site.

21. Hydrophillic end seal material to be used and each manhole and method of installation.

22. Name and location of the testing laboratory to perform CIPP tests. Provide certification that each test shall be performed by a laboratory with an American Association for Laboratory Accreditation (A2LA) for the specific test to be performed.

B. Closeout Documents:

1. Submit the pressure and temperature data for each segment. This includes at a minimum the temperature of the hot water, steam, and/or interior of the liner and the temperature of external thermocouples.

2. Provide CCTV inspection video

3. Material testing documentation in accordance with Paragraph 3.04

1.06 QUALITY ASSURANCE

A. The Manufacturer or Assembler shall send a representative familiar with CIPP processes to the site to observe the initial five (5) installations of each product installed by the Contractor.

1. The Manufacturer or Assembler's representative shall provide certification to the Project Representative stating that the Contractor's installation methods meet the Manufacturer or Assembler's requirements.

2. After the initial installations, the product Manufacturer or Assembler's representative shall meet with the Owner to discuss inspection items that the Owner should observe and record for subsequent installations. Inspection items include pre-installation activities, product identification, installation procedures, equipment operations, and post installation activities.

B. The finished CIPP shall be continuous over the entire length of an insertion run between two manholes or access points and shall be free from visual defects such as foreign inclusions, dry spots, pinholes, and delamination.

C. Wrinkles in the finished CIPP liner that cause a backwater of 1/2-inch or more or reduce the hydraulic capacity of the pipe are unacceptable and shall be removed and repaired by the Contractor at the Contractor's expense. Methods of repair shall be proposed by Contractor and submitted to the Project Representative for review. No wrinkles in the CIPP are allowed within 4 feet of liner terminations at manholes. Refer to Paragraph 3.04.B for additional conformance standards.

1.07 LICENSING AND CERTIFICATION

A. The Contractor or subcontractor installing the CIPP shall have a current license agreement with the product Manufacturer or Assembler.

B. Individuals installing the CIPP shall be certified by the product Manufacturer or Assembler.

C. Lining installation shall be in accordance with the requirements of the product Manufacturer or Assembler and as directed by their Technical Representative. This includes the correction of defective work.

1.08 WARRANTY

A. The Contractor shall warrant each mainline, lateral, and side sewer lined with the specified product against defects in materials, surface preparation, lining application, and workmanship for a period of 24 months from the date of final acceptance of the project. The Contractor shall, within one month of written notice thereof, repair defects in materials or workmanship that may develop during said 24-month period. Defects shall be defined as: evidence of visible leakage of groundwater through the CIPP system, delamination of any portion of the CIPP system as visible from CCTV inspection, or separation of any part of the CIPP system from the host pipe to the extent that the CIPP system inside diameter in the separated area is 95 percent or less of the completed CIPP system inside diameter. The

Contractor shall also repair any damage to other work; damage to sewer system components, damage to buildings, houses or environmental damage caused by the backup of the sewer because of the failure of the lining system; or repairing of the same.

B. Repairs shall include removal of the existing liner and re-lining if possible, or excavation and replacement of the section of pipe where the defect occurs.

PART 2 MATERIALS

2.01 CURED IN PLACE PIPE LINER

A. The CIPP shall consist of one or more layers of flexible needled felt or an equivalent non-woven material, or a combination of non-woven and woven materials capable of carrying resin, withstanding installation pressures.

1. The CIPP shall be continuous in length and the wall thickness shall be uniform. No overlapping sections shall be allowed in the length of the liner. No overlapping sections shall be allowed in the circumference of the liner when felt liner is used.

2. The CIPP will be capable of confirming to offset joints, bells, and disfigured pipe sections. It shall be able to stretch to fit irregular pipe sections and negotiate bends.

3. The CIPP resin shall be compatible with the liner fabric, other rehabilitation systems it may contact, and the host pipe materials.

4. Seams in the CIPP shall be stronger than the non-seamed felt.

5. The CIPP shall be marked at regular intervals along its entire length, not to exceed 5 feet. Markings shall include Manufacturer's or Assembler's name or identifying symbol.

6. The CIPP liner shall be manufactured with materials from a consistent supplier. All materials of similar type shall be from a single source for the entire project.

B. The CIPP shall be fabricated to a size that, when installed, will tightly fit the internal circumference and length of the original pipe.

1. Allowance shall be made for circumferential stretching during the installation process.

2. The hydraulic capacity of the CIPP shall be greater than or equal to the hydraulic capacity of the original host pipe, based on hydraulic calculations with standard engineering roughness coefficients.

C. The liner thickness shall be 4.5 mm or greater. The thickness shall be sufficient to prevent groundwater from entering the pipe, while maintaining the maximum cross-sectional pipe area possible.

D. For liners inserted by the inversion method, the CIPP shall be coated on one side with translucent waterproof coating of:

1. Polyvinyl chloride (PVC)
2. Polyurethane
3. Polyethylene

E. For liners inserted by the pull/winch method, the CIPP shall be coated on one side with a translucent waterproof coating of:

1. Polyvinyl chloride (PVC)
2. Polyurethane
3. Polyethylene
4. Polypropylene
5. Or approved equal

F. Subject to these specifications, the following manufacturers or assemblers are acceptable:

1. Gelco Services Inc. (Salem, OR)
2. C.I.P.P. Corporation (Hudson, IA)
3. Perma-Liner Industries, Inc. (Clearwater, FL)
4. LMK Enterprises Inc. (Ottawa, IL)
5. Insituform Technologies, Inc. (Chesterfield, MO)
6. Masterliner Inc. (Hammond, LA)
7. Michels Corporation
8. Or approved equal.

G. UV-cured pipe will also be considered, if all performance requirements of this specification are met and approved by Engineer.

2.02 RESIN

A. A general purpose, unsaturated thermosetting, polyester, vinyl ester, or epoxy resin compatible with the fabric liner material, host pipe material, and other rehabilitation products that the resin may contact. No part of the properly curer liner shall be less than 100 percent saturated by resin.

B. Resin shall meet or exceed the physical properties listed in Section 2.03 and shall not be created from recycled materials.

C. Resin shall form no excessive bubbling or wrinkling during lining.

D. Resin shall be manufactured with materials from a consistent supplier. All materials of similar type shall be from a single source for the entire project.

E. The resin shall have no fillers added for the sole purpose of increasing the resin volume.

2.03 PHYSICAL PROPERTIES

A. The composite materials of the fabric liner tube and resin shall, upon installation inside the host pipe, exceed the minimum test standards specified by the American Society for Testing and Materials based upon restrained sample cured in host pipe and flat plate sample:

Physical Properties	
Flexural Strength (ASTM D790)	4,500 psi
Flexural Modulus (ASTM D790)	
Short Term	250,000 psi
Long Term	125,000 psi

B. The CIPP after installation shall be corrosion resistant to withstand exposure to sewage gases containing quantities of hydrogen sulfide, carbon monoxide, diluted sulfuric acid, and other chemical reagents typical of sewage conveyance. Chemical resistance of the installed CIPP shall meet the chemical resistance requirements of ASTM F1216.

C. The wall color of the interior pipe surface of the CIPP after installation shall be a light reflective color.

D. The hydraulic profile of the installed CIPP shall be maintained as large as possible. The CIPP shall have at a minimum the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using commonly accepted roughness coefficients for the existing pipe material taking into consideration its age and condition.

2.04 PRESSURE GROUT

A. Chemical grout designed for injection to seal leaks in manhole walls. AV-100 chemical grout as manufactured by Avanti International, or approved equal.

2.05 PIPE PENETRATIONS AT MANHOLE

A. Hydrophilic joint seal around pipe penetrations in manhole wall. Swellseal®8F by De Neef Construction Chemicals, Insignia™ Hydrophilic End Seal by LMK Technologies, Hydrotite Style DS-0520-351 or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Make all necessary provisions to ensure service conditions and structural conditions of host pipe are suitable for installation and warranty of the liner. Provisions shall include, but are not limited to temporary sewer bypassing, temporary service interruption of side sewers tributary to the sewer main, correction of structural, and sealing of active infiltration through pressure grouting.

B. Inspect and confirm the inside diameter, alignment, condition and length of each pipe segment to be lined. Use the data and information from this inspection to verify the size of the liner and refine the installation techniques. If unknown physical conditions in the work area are discovered during the investigation that materially differ from those ordinarily encountered by industry standards, notify the Engineer.

C. Bypass Pumping

1. The Contractor shall provide bypass pumping and/or diversion for acceptable completion of the liner installation. Bypass pumping shall consist of furnishing, installing, and maintain all power, primary and standby pumps, appurtenances and bypass piping required to maintain existing flows and services. Plans show the names of most, but not all major businesses that contribute sewage flows to each line. Contractor shall investigate further the additional tenants if necessary to complete this work. Refer to Section 02730, Paragraph 3.01 for additional bypass pumping requirements. No flow that will negatively affect the liner shall be allowed in pipe during CIPP installation.

2. Bypass pumping shall be done in such a manner as to not damage private or public property, or create a nuisance or public menace. The pumped sewage shall be in an enclosed hose or pipe that is adequately protected from traffic, and shall be redirected into the sanitary sewer system. Dumping or free flow of sewage on private property, gutters, streets, or into storm sewers is prohibited. All bypass piping shall have traffic rated fully enclosed ramps specifically designed for this type installation. Use of wooden ramps for driveways will not be allowed without specific permission of the Owner. Specifically, all work within the parking lot of Clackamas Promenade shall also be protected from the public. Any accidental spillage of sewage onto the pavement surface in this area shall be thoroughly cleaned to the satisfaction of the Owner to fully protect the general public from this exposure.

3. The Contractor shall take all necessary precautions including constant monitoring of bypass pumping to insure that no private residences or properties are subjected to a sewage backup or spill. The Contractor shall be liable for all cleanup, damages, and resultant fines in the event of a spill. After the work is completed, flow shall be restored to normal.

D. Temporary Interruption of Service

1. When it is necessary to shut down a private service lateral to perform the rehabilitation work, notify all the affected parties one week prior to and again 24 hours prior to the shutdown. Gravity pipe service shall not be out of service for more than eight hours and not between 6:00 p.m. and 8:00 a.m. without approval of the District.

E. Cleaning and Inspection of Existing Sewer

1. The Contractor shall be responsible for cleaning, inspecting, confirming the inside diameter and determining the condition of each manhole-to-manhole segment to be lined. The cleaning process shall include the removal of all roots. A television inspection witnessed by Owners Representative shall be performed by the Contractor after the sewer cleaning operation, point repairs and grouting is completed. All services that will be reinstated will be identified at this time and approved by the Owner. This may require dye testing or other means necessary by the Contractor to verify whether or not the service is live. The television inspection shall be competed in the same direction each time and shall be done with a CCTV color camera recoded in DVD format. A pivot head camera shall be used for all pipelines 6-inches in diameter or greater to allow detailed lateral inspection. A copy

of the television inspection video discs from all televising operations shall be provided to the District for review prior to the liner installation. Installation of the new liner shall commence within 48 hours of the final cleaning for each section of pipe from manhole to manhole. Installations delayed beyond the 48 hour period will require Contractor to clean the interior with a pressure washing operation again and thereby starting another 48 hour window for installation. Television inspection will not be required during the subsequent cleanings unless excessive debris in the opinion of the Owner are found in the downstream manhole for each section.

F. Removal of Obstructions

1. It shall be the responsibility of the Contractor to clear the line of obstructions such as solids, offset joints, protruding service connections or collapsed pipe that will prevent linear insertion. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment (including but not limited to equipment capable of cutting, filing, shaving, etc.) or by remotely performed point repair methods acceptable to the Engineer, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Before any point repair excavation is pursued, the Contractor shall give the Engineer three (3) working days notice. Point repair excavation shall proceed only with the District's written authorization. The excavation process shall be completed by mechanical means with adequate trench shoring and dewatering of the trench as necessary. Backfill of all excavations shall be with Class C imported rock compacted to a minimum of 95% maximum density according to ASTM – T99. Pavement restoration shall match existing pavement.

G. Point Repairs

1. Clean and prepare pipe

2. Remove rolled gaskets, roots, mineral deposits, and other objects protruding into the pipe, internally with a remote controlled cutter.

H. Manholes

1. Protect all manholes to withstand forces generated by the equipment while installing the liner.

3.02 INSTALLATION

A. Resin Impregnation

1. The uncured resin in the original containers and the unimpregnated fiberfelt tube shall be impregnated by vacuum or other means prior to installation. The materials and 'wet-out' procedure shall be subject to inspection by the Owner. A resin and catalyst system that re compatible with the requirements of the method shall be used.

2. The impregnated liner bag shall be transported to and stored at the site in such a manner that it will not be damaged, exposed to direct sunlight, or result in any

public safety hazard. The impregnated liner bag shall be kept cool during shipment and storage. All materials shall be subject to inspection and review prior to installation

3. Use a volume of resin sufficient to fill all voids in the tube material at nominal thickness and diameter. Volume should be adjusted by adding excess resin for the change in resin volume due to polymerization and to allow for any migration of resin into the cracks and joints of the host pipe, per Manufacturer's or Assembler's recommendations.

4. The resin impregnated tube shall be stored in such a manner that it will not be damaged, exposed to direct sunlight, exposed to any curing environment, or result in a public safety hazard. All materials shall be subject to inspection and review prior to installation.

B. Liner Installation

1. Inversion Method

a. The impregnated tube shall be inserted through an existing manhole or other access point by means of the Manufacturer's or Assembler's recommended installation process and in accordance with ASTM F1216. The application of a hydrostatic head, compressed air, or other means shall fully extend the liner to the next designated manhole or termination point and inflate and firmly adhere the liner to the pipe wall.

b. The rate of the liner installation shall not exceed the maximum rate recommended by the manufacturer. This installed rate shall be identified in the submittal of materials as provide in Section 01300.

2. When inversion is by hydrostatic head, the Contractor shall use methods which control the installation rate, accounting for the increase in hydrostatic head in pipes which have significant elevation change.

3. A Preliner may be installed between manhole sections at the option of the Contractor.

4. Insert continuous or properly trimmed hydrophilic waterstops at each structure opening approximately three inches from structure wall. Trimmed waterstop edges shall be butted up against each other at the crown of the pipe using a 45 degree miter cut or butted up horizontally against each other for a distance of 3 inches. Vertical overlap (e.g. stacking) of the hydrophilic waterstops will not be allowed. Waterstops with any gap between the ends will not be accepted.

4. Pull/Winch Method

a. The impregnated tube shall be pulled into place in accordance with ASTM F1743 within the host pipe with the aid of a power winch power winch that for felt tubes is equipped with a device to monitor the force and prevent excessive tension and tube elongation.

b. The maximum allowable longitudinal elongation, or stretch, of the material shall be one (1) percent. The longitudinal stretch of the tube shall be gauged by comparing marker on the fully inserted tube to the actual length of pipe being rehabilitated.

c. The Contractor shall use a flexible and impermeable calibration hose to inflate the tube. The calibration hose may or may not remain in the complete installation. Any dry tube or inflation hose material that enters the existing pipe that has not been previously vacuum impregnated with resin cannot be included in the structural wall of the CIPP. Hose materials remaining in the installation shall be compatible with the resin system used, shall bond permanently with the tube, and shall be translucent to facilitate post-installation inspection. Hose materials that are to be removed after curing shall be of non-bondable material.

C. Curing

1. After placement of the liner is complete, follow submitted cure schedule in curing of line. Provide a suitable recirculation system capable of delivering air, steam, water or ultraviolet light, as required by the liner system manufacturer, uniformly throughout the section to achieve a consistent cure of the resin. Maintain the curing temperature or exposure times as recommended by the liner system manufacturer. Prevent excessive temperatures that could scald or bubble the liner. The rate of temperature rise during heating shall not exceed resin manufacturer's recommendations.

2. The heat source shall be fitted with continuous monitoring thermocouples to measure and record the temperature of the incoming and outgoing water or steam supply. The Contractor shall provide an additional continuous monitoring thermocouple placed between the impregnated felt tub and the pipe crown at the remote manhole to determine the temperature during the cure. The temperature during the cure shall follow resin manufacturer's recommendation.

3. Provide standby equipment to maintain the heat source supply. The temperature during the cure shall not be less than 130 degrees Fahrenheit at the boundary between the pipe wall and the liner unless otherwise directed by the Manufacturer or Assembler to meet resin system requirements.

4. The initial cure shall be deemed to be completed when inspection of the exposed portions of the liner appear hard and sound and the remote temperature sensors indicate than an exotherm reaction has occurred. The cure period shall be of duration recommended by the resin manufacturer during which time the recirculation of the water and/or air and cycling of the heat exchanger continuously maintain the required temperature.

5. Provide for vapor tight connections in the downstream structure such that minimal vapors enter downstream pipes. Alternatively and at no additional cost to the Owner, provide styrene reducing agents, venting and downstream plugs sufficient to prevent steam, styrene, or other odors from entering downstream buildings.

D. Cool Down

1. The hardened liner shall be cooled to a temperature below 100 degrees F before relieving the static head or pressure in the lined pipe and returning normal flow back in the system.

2. Care shall be taken to ensure that a vacuum is not induced which could damage the new CIPP during the release of head on the new CIPP.

E. Sealing at the Sewer Main and Manholes.

1. After the cool down period is complete perform final trimming and sealing of the liner at access structures. Provide a watertight seal between the CIPP and the host pipe at each manhole. Trim the finished ends of the liner to within one inch of manhole wall. Provide a smooth transition between the existing structure channel invert and the liner using a cementitious coating, or other approved material to prevent settling of sediment or debris and ponding of standing water.

2. Care shall be taken to ensure that a vacuum is not induced which could damage the new CIPP during the release of head on the new CIPP.

3. Seal all holes and voids in manhole walls immediately surrounding the new liner with a hydrophilic rubber joint seal and the approved chemical grout identified in Paragraph 2.05A and 2.06A of this section. Contractor shall verify with the CIPP manufacturer the mixture applied is compatible with the liner/resin system utilized. No water shall be able to migrate between the CIPP and the host pipe, otherwise the CIPP shall be considered defective and shall be repaired or replaced at the Contractor's expense.

4. Where new CIPP can be installed through manholes, leave bottom half in place to provide continuous run through manhole channel. Seal watertight at each wall penetration as described in Paragraph 3 above.

F. A data logger shall continuously record temperature, pressure and time during heating, cure and cool down at the liner insertion, termination and intermediate points from the installed thermocouple. Temperature and pressure versus time shall be plotted on a line graph and provided to the Engineer for each lining.

3.03 SERVICE CONNECTION RESTORATION

A. Restore service connections (also known as reinstating service connections) to the lined pipe by the following method:

1. Internally reconnected by using a pivot-headed CCTV camera and a remote cutting tool to locate the service connections from inside the lined pipe, cutting a hole matching the service connection diameter which may vary from 4" to 6" nominal opening, and grouting the area where the service connection enters the lined pipe to produce a water tight seal. Grouting at mainline need not be performed if service connection rehabilitation liners are installed. Provide a nearly full-diameter hole, free from burrs or projections and with a smooth and crack-free edge. The hole shall be 95 percent minimum and 100 percent maximum of the original service connection inside diameter. The invert of the service connection shall match the bottom of the reinstated service opening. Each active service connection shall be cut completely open and shall

have smooth edges with no protruding material capable of hindering flow or catching and holding solids contained in the flow stream. This specifically includes any portion of the cuttings that remain within the lateral invert or excess grout from packer operations. Excess grout shall be defined as a thickness of grout that given its location, size and geometry, could cause a blockage. The CCTV during cutting shall be recorded on DVD and shall include a pan and tilt view of entire lateral circumference following cutting. Any resultant leaks between host pipe liner at lateral shall be grouted watertight.

2. Each lateral connection shall be sealed from the mainline by packer injection grouting. Pressure inject grout through the lateral packer into the mainline connection joint and any visible deficiencies extending approximately two feet up the existing service lateral pipe. Equipment shall be designed to monitor the injection of material and determine when any leaks are sealed to a minimum of 0.5 psi per vertical foot of depth plus 2 psi; however, test pressure shall not exceed 10psi without approval of the Engineer. Once the designated pressure is displayed on the meter of the control panel, application of air pressure will be stopped and a 15 second waiting period will commence. The void pressure will be observed during this period. If the void pressure drop is greater than 2.0 psi within 15 seconds, the lateral will be considered to have failed the air test and shall be grouted and retested. The grout shall be chemical grout AV-100 as manufactured by Avanti International or approved. Confirm lateral flow after sealing of each lateral connection. If a grout blockage exists, the Contractor shall immediately clear the lateral at no additional cost to the satisfaction of the Engineer.

3.04 TESTING

A. Material Testing

1. All material testing shall be performed by a registered independent, third-party laboratory in accordance with the applicable ASMT test methods to confirm compliance with the requirements of these specifications.

2. The Contractor shall provide certified test results of the short term properties of the cured CIPP lining material from the actual installed liner as a minimum on one location per each liner insertion setup.

3. The cured CIPP liner shall be sampled and tested for flexural strength and flexural modulus (short term). Flexural strength and modulus shall be tested in accordance with the requirements of ASTM D790. The liner shall be incompliance with the physical properties started under Paragraph 2.03A of this section. A certificate of compliance shall be provided for long term flexural modulus.

4. Minimum chemical resistance requirements shall be as stated in ASTM F1216, Section X2. Chemical solutions include Tap Water (pH 6-9), Nitric acid, Phosphoric acid, Sulfuric acid, Gasoline, Vegetable oil, Detergent and Soap at concentrations identified in Table X2.1. This test shall be required on a single installation for the project. The Engineer will determine which installation field sample shall be used for testing. If analytical results show that the finished CIPP does not meet the requirements of ASTM F1216, additional chemical resistance testing will be required at no additional cost to the Owner on another section of pipe.

B. Field Testing

1. Visual inspection of the CIPP shall be in accordance with ASTM F1743, Section 8.6.

2. After completion of all CIPP insertions, service reconnections, and finish work at the manholes the sewer shall be video recorded with Owner Representative witnessing and a copy of the tape provided to the Owner.

   a. Repair CIPP per the Manufacturer's or Assembler's recommendations if defects, including infiltration of groundwater is observed.

   b. All service connections shall be accounted for and be unobstructed. This will include any residual grout or coupons from the CIPP liner section removed.

3. Conformance Standards and Remedies must meet or exceed the following:

   a. No radially positioned (perpendicular to flow) wrinkles, fins or other discontinuities in the lower third of the pipe which exceed ½ inches in height, or more than 3 percent of the host pipe inside diameter; whichever is the least.

   b. No radial wrinkles, fins or other discontinuities in the upper two-thirds of the pipe having a height of 5 percent or more of the host pipe inside diameter, unless approved. The requirement may be waved at the option of the Owner under specific circumstances.

   c. No leakage through the liner.

   d. No separation of the liner from the existing pipe

   e. No delamination of CIPP layers.

   f. If an installed liner has unacceptable wrinkles, fins, discontinuities, leakage, delamination, pinholes, soft spots, blisters, failed tests, or other defects, remedy the defect by installing a second liner, removing and reinstalling a full-thickness liner, constructing a full pipe replacement, or installing a liner repair as approved.

   g. Any necessary replacement repair also included all surface restoration to equal or better condition before repair was begun, as approved.

END OF SECTION

SECTION 09600

PROTECTIVE COATINGS - CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION

The work described within details a complete program for use on new or existing brick, steel or concrete structures including but not limited to wet wells, manholes, pump stations, digesters, large diameter pipe or other large wastewater structures. This section details the methods, procedures, materials and equipment as required to provide a corrosion resistant coating product that restores walls to original surface smoothness to the greatest extent possible and eliminates water infiltration and exfiltration.

1.02 REFERENCES

A. ASTM D4541 - Adhesion
B. ASTM D412 - Tensile Strength (PSI)
C. ASTM D412 - Elongation (%)
D. ASTM D624 - Tear Strength (PLI)
E. ASTM D2240 - Hardness
F. ASTM D522 - Flexibility (1/8" mandrel)
G. ASTM D4060 - Taber Abrasion (mg loss)
H. SSPC SP-13 NACE No. 6 – Surface preparation of concrete.

1.03 SUBMITTALS

All materials and procedures required to establish compliance with the specifications shall be submitted for review/approval. Submittals shall include at least the following:

1. Technical Data Sheet on each product used.
2. Material Safety Data Sheet (MSDS) for each product used.
3. ASTM References.
4. Descriptive literature, bulletins and or catalogs of materials. Literature shall be adequate to fully define manufacturers recommended specifications, component physical properties and chemical resistance, manufacturers recommendations for surface preparation techniques to be followed, environment restrictions and compatibility of material recommended by manufacturer (and those specified herein or proposed by Contractor) for stopping infiltration prior to coatings.
5. Work procedures including flow diversion plan, method of repair, etc.
6. Certified statement from coatings manufacturer that the contractor/installer is a currently approved installer of the proposed coating system.
7. Material and method for repair of leaks or cracks in wastewater structures.
8. Coatings manufacturer approved testing procedure that will be followed, indicating adequacy of surface preparation steps and acceptable environmental conditions prior to applying coating system.
9. Required experience with coating system applications. Provided name of projects, date of project, material applied, approximate square feet of coatings applied on each referenced project and contact information for the referenced projects owner.
10. Final installation report on each completed manhole.

1.04 WARRANTY

Contractor shall warrant the coating against failure for a period of 10 years. “Failure” will be deemed to have occurred if the protective lining fails to (a) prevent the internal deterioration or corrosion of the structure (b) protect the manhole substrate from contamination by sanitary sewage flows or (c) prevent groundwater infiltration. If any such failure occurs within 10 years of initial completion of work on a structure, the damage will be repaired to restore the lining at no cost to the Owner within 60 days after written notification of the failure. “Failure” does not include damage resulting from mechanical or chemical abuse or act of God. Mechanical or chemical abuse means exposing the lined surfaces of the structure to any mechanical force or chemical substance not customarily present or used in connection with structures of the type involved.

1.05 QUALITY ASSURANCE

A. The manufacturer and/or applicator of the total coating system of wastewater structures shall be a company that specializes in the design, manufacture or installation of corrosion protection systems for wastewater structures. Applicator shall be competent in leak repair, surface preparation and corrosion materials application. Corrosion materials/products shall be suitable for installation in a severe hydrogen sulfide environment without any deterioration to the coating product over the lifetime of the manufactures’ warranty period.

B. The Contractor (or his subcontractor applying the coating system) shall be trained and certified by the manufacturer for the handling, mixing, application and inspection of the liner system as described herein. The Contractor (or his subcontractor applying the coating system) shall have successfully completed projects totaling a minimum of 10,000 square feet in the last 5 years using the specified coating system. In addition, the Contractor’s project superintendent shall have a minimum of 5 successfully completed projects totaling a minimum of 5,000 square feet using the specified coating system.

C. To ensure total unit responsibility, all materials and installation thereof shall be furnished and coordinated with/by one supplier/applicator who turnkeys the work and assumes full responsibility for the entire operation.

D. At completion of the work, Contractor shall provide daily reports for all efforts including but not limited to: surface preparation, substrate conditions, ambient conditions application procedures, lining materials applied, material quantities, material batch number(s), description of work completed.

E. The final rehabilitated manhole coating shall be designed to protect against all corrosive elements found in this sanitary sewer, shall be free of any infiltration, adhesion problems, coating pinholes, or any other elements that could affect the service life or operation of the manhole. Prior to application of final coatings, all infiltration shall have been completely stopped with materials fully compatible with the final coatings.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. The materials to be utilized in the lining of wastewater structures shall be designed and manufactured to withstand the severe effects of hydrogen sulfide in a wastewater environment.

B. Equipment for installation of lining materials shall be as recommended by the manufacture.

C. The coating system to be utilized for wastewater structures shall be a multi-component liner system manufactured by CCI Spectrum, Inc. (Spectrashield System) , Raven Lining Systems, Inc. Raven 405 system, Tnemec System, or approved equal.

1. SPECTRASHIELD SYSTEM

a) Coating System identified is the minimum as recommended by Spectrashield- but may need to be modified, as approved, to meet the most stringent performance criteria specified in these documents.

Installation	Material
Moisture displacement barrier	Primer
Moisture barrier	Modified Polymer
Surfacer	Polyurethane/Polymeric blend foam
Final corrosion barrier	Modified polymer

b) Modified polymer shall be sprayable, solvent free, two-component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment with the following physical properties:

Tensile Strength, PSI	>2400
Elongation, %	>300
Tear Strength, PLI	>500
Shore A Hardness	96
100% Modulus, PSI	>2400

c) Polyurethane Rigid Structure Foam, low viscosity two-component, containing flame retardants with the following physical properties:

Density, nominal, core, lbs/ft3 ASTM D-1622 @ 74° F	4-10
Compression Strength, ASTM D-1621 @74° F parallel rise; PSI	90-150
Closed Cell Content, % @ 74° F	Over 95
Shear Strength, PSI - ASTM C-273 @ 74° F	225-250

d) Total thickness of multi-component stress panel liner shall be a minimum of 500 mils.

2. RAVEN 405 SYSTEM

100% solids, solvent-free ultra-high-build epoxy spray applied monolithic liner system conforming to the following minimum physical characteristics

Product Type		Amine Cured Epoxy
VOC Content	ASTM D2584	0%
Compressive Strength	ASTM D695	>18,000 psi
Tensile Strength	ASTM D638	>7,500 psi
Flexural Modulus	ASTM D790	>500,000 psi
Adhesion to Concrete	ASTM D4541	Substrate (concrete) failure
Chemical Resistance	ASTM D534	Municipal sanitary sewer environment

a) The complete Raven 405 Coating System shall be as recommended by Raven, in conformance with these specifications, and shall be applied only to properly prepared surfaces that will insure the required adhesion. Coating System may need to be modified as needed and as approved to meet the most stringent performance criteria specified in these documents.

b) Patching, profiling and grouting mix shall be as required and recommended by the coating system manufacturer for suitability. It shall be mixed and applied according to the manufacturer's recommendations.

c) Total thickness of Raven coating system shall be a minimum of 125 mils above the fully prepared substrates highest profile point.

3. TNEMEC SYSTEM

Protective Lining shall be comprised of 1) concrete repair mortar and/or epoxy resurfacer, 2) trowel applied liner (basecoat), and 3) epoxy glaze (topcoat).

a) Wire Mesh Protective Coating: Provide Modified aromatic polyurethane primer for any exposed wire mesh within interior of manhole.

b) Cementitious Repair Mortar: Trowelable grade rapid-setting cementitious repair mortar when concrete is deteriorated greater than a depth of 1/4-inch and when recommended by the Manufacturer to restore concrete and provide level substrate for application of the protective lining; or

c) Epoxy Resurfacer: Epoxy-polymer modified cementitious resurfacer (thin overlay) applied to new or existing concrete to a depth up to 1/2-inch. Repair new or existing concrete and provide a uniform, level substrate for application of the protective lining; and

d) Trowel applied high-build epoxy liner (basecoat) to provide a chemical, permeation, and abrasion resistant protective lining against physical and chemical attack phenomena typically associated with municipal wastewater headspace conditions; and

e) Epoxy glaze coat (topcoat) to provide enhanced chemical, permeation, and abrasion resistance.

Contractor shall provide all accessory components such as polysulfide sealants, and curing compounds, as recommended by the manufacturer for maximum protective lining adhesion to substrate, and long-term service performance.

f) Modified Aromatic Polyurethane Primer:

Properties	Tnemec Series 1 Omnithane®
Minimum thickness	2.5 mills
Maximum thickness	3.5 mills
Application Working Time at 75°F	20 min

g) Epoxy modified Cementitious Resurfacer:

Properties	Tnemec Series 218 Mortar Clad
Minimum thickness	1/16 inch
Maximum thickness	½ inch
Application Working Time at 75°F	0 min
Bond Strength (ASTM D 7234)	
Applied to 1/16" Concrete	Concrete Failure/500psi
Compressive Strength (ASTM C 579)	7,100 psi
Curing Requirements (ACI 308)	
Method	Ambient Cure
Duration	15 hours
Flexural Strength (ASTM C580)	1,290 psi
Slant Shear (ASTM C882)	1,040 psi
Splitting Tensil (ASTM C496)79)	640 psi

h) Epoxy Lining, Trowel Mortar Protective Lining (basecoat):

Properties	Tnemec Series 434 Perma-Shield H_2S
Application Time at 75°F	30 min
Color	Beige
Minimum Dry Film Thickness (DFT)	100 mils
Maximum Dry Film Thickness (DFT)	125 mils
Bond Strength (ASTM D 7234)	
Bare Concrete /Series 434	Concrete Cure
Bare Concrete/ Series 217/Series 434	Concrete Cure
Bare Concrete/ Series 218/Series 434	Concrete Cure
All exceeds the cohesive strength of the concrete	
Compressive Strength (ASTM D 695)	12,331 psi

i) Epoxy Lining, Glaze Protective Lining (topcoat):

Properties	Tnemec Series 435 Perma-Glaze
Application Time at 75°F	30 min
Color	Gray
Minimum Dry Film Thickness (DFT)	15 mils
Maximum Dry Film Thickness (DFT)	20 mils
Bond Strength (ASTM D 7234)	
Bare Concrete /Series 434	Concrete Cure
Bare Concrete/ Series 217/Series 434	Concrete Cure
Bare Concrete/ Series 218/Series 434	Concrete Cure
Compressive Strength (ASTM D 695)	9,427 psi
Elongation (ASTM D 638)	14.1%
Flexural (ASTM D 790)	
Strength	3,289 psi
Modulus of Elasticity	3.0×10^5 psi

Shrinkage (ASTM C 531)	-0.06%
Tensile Strength (ASTM D 2370)	2,053psi

D. Materials specified are those that have been evaluated for the specific service. Products of Spectrashield, Raven and Tnemec Company (along with performance requirements) are listed to establish a standard of performance and quality. Equivalent materials including warranty of other manufactures may be substituted on written approval of the Engineer.

PART 3 EXECUTION

3.01 INSPECTION

A. Applicator shall take appropriate action to comply with all local, state and federal regulations including those set forth by OSHA, EPA, the Owner and any other applicable authorities.

B. Prior to conducting any work, perform inspection of structure to determine need for protection against hazardous gases or oxygen depleted atmosphere.

C. Submit plan for bypass pumping to Owner for approval prior to conducting the work. Refer to Section 02730, Paragraph 3.01 for specific information.

D. New Portland Cement structures shall have endured a minimum of 28 days since manufacture prior to commencing installation of the coating product.

3.02 SURFACE PREPARATION

A. Divert flow from channel with sanitary sewer bypass system as specified in Section 02720, Sanitary Sewer Manholes.

B. Conduct surface preparation program to include monitoring of atmosphere for hydrogen sulfide, methane, low oxygen or other gases, approved flow control equipment, and surface preparation equipment.

C. Surface preparation methods may include high pressure water cleaning, hydro blasting, abrasive blasting, grinding, detergent water cleaning, hot water blasting and others to meet the latest edition of SSPC-SP13/NACE No. 6 requirements. The finished effort shall be suited to provide a uniform, sound clean neutralized surface suitable for installation of the specified coating product.

D. Surface preparation method shall produce a cleaned, abraded and sound surface with no evidence of laitance, loose concrete, brick or mortar, oils, grease, chemical contaminants or debris, and shall display a surface profile suitable for application of coating product. Concrete and/or mortar damaged by corrosion, chemical attack or other means of degradation shall be removed.

E. After the defects in the structure are identified, repair all active leaks to the satisfaction of the Owner with a hydrophobic and/or hydrophilic sealant designed to stop infiltration of ground water by pressure injection as supplied by Avanti International (AV-248-LV or AV-202-LV), SealBoss (1510 or FlexGel2), or as approved. This applies to all leaks into

the manhole including any leaks between manhole and pipe wall ore even leaks from annular spaces between a host pipe and pipe liner.

F. Repairs to exposed rebar, defective pipe penetrations or inverts, etc. shall be repaired utilizing quick setting hydraulic cement as manufactured by Euclid Chemical Company, BASF, Tnemec Series 217 mortar or equal.

G. After completion of surface preparation inspect all areas to be coated for leaks, cracks, holes and any exposed rebar with the Owner and a representative from the coating supplier to verify the area is ready for application of the product.

H. The entire interior manhole surface including the flow channel shall be prepared for application of the coating system. This will include removal of the existing manhole steps from each structure identified in the plans. Rungs shall be cut flush with the exterior walls to the satisfaction of the Engineer.

I. Surface preparation shall be accepted by coating system manufacturer's authorized representative (which may be coatings applicator, if so identified in writing by coating system manufacturer) prior to application of the coating system.

3.03 COATING SYSTEM MATERIAL INSTALLATION

A. Application procedures shall conform to recommendations of the manufacturer, including materials handling, mixing, environmental controls during application, safety and spray equipment.

B. Spray equipment shall be specifically designed to accurately ratio and apply the coating system.

C. Application of multi-component coating system shall be in strict accordance with manufacturer's recommendation.

1. Final installation of Spectrashield system shall be a minimum of 500 mils or manufacture's recommended thickness to meet the required warranty described in Paragraph 1.03 of this Section. A permanent identification and date of work performed shall be affixed to the structure in a readily visible location.

2. Final installation of a Raven 405 coating system shall be the greater of 125 mils or manufacture's recommended thickness to meet the required warranty described in Paragraph 1.04 of this Section. A permanent identification and date of work performed shall be affixed to each manhole structure in a readily visible location.

3. Final installation of Tnemec system shall consist of the following: 1st System – apply Tnemec Series 1@ 3.5 mils dry covering any wire mesh exposed during surface preparation. Refer to Paragraph 3.02.C for exposed wire mesh considerations. 2nd System - apply parge coats of Tnemec Series 218 to bring the finished surface flush with original plane of concrete filling all voids from any missing aggregate. The finished surface shall be prepared to a Class A finish (+/- 1/8" smoothness) as described in the latest version of ACI 117; 3rd System - apply Tnemec Series 434 H_2S @ 100- 125 mils dry; 4th System - apply Tnemec Series 435 @ 15-20 mils dry. Contractor shall apply necessary "coats" of each individual Tnemec Series to achieve the required dry film thickness.

D. Coating products shall interface with adjoining construction materials throughout the structure to effectively seal and protect concrete substrates from infiltration and attack by corrosive elements. Procedures and materials necessary to effect this interface shall be as recommended by the primary coating products manufacturer.

E. Termination points of the coating products shall be made at the manhole frame and cover.

F. The finished surfaces shall be relatively smooth, free of ridges, wrinkles and sags. Special care shall be used to insure a smooth transition between the manhole invert and the intersecting pipeline inverts such that flow will be impaired. Should any of these conditions occur, the liner shall be repaired according to the manufacturer's standards or liner shall be rejected and removed at Contractor's expense.

G. Sewage flow shall be bypassed or diverted for application of the coating system to the full invert and interface with pipe materials.

H. Provide final written report (including photographs) to Owner detailing the location, date of repair, and description of repair done in each manhole. Daily written reports given to owner's representative are to include ambient conditions measured at the time of coating, including relative humidity, manhole wall surface temperature, dew point, ambient temperature and wet-film thickness measurements of coating to insure stated compliance for materials applied.

3.04 TESTING

A. Contractor shall notify the Engineer upon completion of surface preparation work at least 2 hours prior to application of the initial coating in order to conduct a visual inspection of surface preparation work. Acceptance of the final preparation by the Engineer does not impact the validity of the warranty by the Contractor. Contractor is fully responsible for providing a finished product that will meet or exceed the required warranty described in Paragraph 1.04 of this Section.

B. Contractor shall provide the services of an independent testing agency approved by the Owner to verify that all surfaces are coated sufficiently and no holidays or pinholes exist through to the substrate. Testing will include a high voltage test in accordance with the latest version of ASTM D 4748 (Standard Practice for Continuity Verification of Liquid or Sheet Lining Applied to Concrete Substrates) and/or NACE SPO 188.
   1. Perform test after the manufacturers minimum cure times have elapsed after application of the last coat in order to develop sufficient physical properties in the coating to withstand the high voltage arc.
   2. High voltage setting shall be sufficient to arc through a distance of one-half inch to ground.
   3. Circle all indications with a dark felt tip pen.
   4. A double application of the final corrosion protection coat will be made so as to completely cover the indicated holiday and no visible marks showing through the final coat. Retest recoated areas to confirm conformance to requirements.

C. Coating Adhesion: After coating system application and cure, measure and record the results

of a minimum of three passing adhesion tests, without glue failures, in two manholes as directed by engineer. Tests shall be per ASTM D4541 as modified herein. Utilize 20 mm test dollies and a calibrated portable pull-off adhesion tester. Document any test failure mode, whether failure is within concrete, failure is within coating or failure is at the concrete/coating interface. Failure of the dolly adhesive shall require retesting. Prior to conducting the pull test, the coating shall be scored around the dolly to just above the substrate by mechanical means without disturbing the dolly or bond within the test area. If the testing damages the coating, spot repair the test location while following manufacturer's recommendations. Failure of the coating/concrete interface with less than 20% of the substrate adhering to the coating and less than 300-psi pull-off strength, shall be deemed a coating system failure and the contractor shall remove the coating to soundly adhered edges, re-perform surface preparation procedures, and recoat the failed surfaces, at contractor's cost. Low pull-off strength values (<150 psi) will require additional testing/evaluation to determine potential adhesion defects at the sole discretion of Owner's representative.

D. All manholes shall be visibly inspected after completion of coating system and again during warranty period. No visible leakage or lack of adhesion will be allowed.

END OF SECTION