



## **CONTRACT TECHNICAL SPECIFICATIONS**

### **Special Catch Basin MH 40-2 Rehabilitation Project, Bid No. 23-21**

These Technical Specifications are intended to supplement Division 1 through Division 9 of the 2022 Standard Specifications for Road, Bridge, and Municipal Construction, prepared by the Washington State Department of Transportation (WSDOT) and the American Public Works Associations, Washington State Chapter and amendments thereto, herein referred to as Standard Specifications. In case of conflict, these Technical Specifications shall take precedence over the Standard Specifications.

## **DIVISION 1    General Requirements**

### **1-09 MEASUREMENT AND PAYMENT**

**(Revised Section)**

Delete this section and replace with the following:

#### **1-09.1 Scope**

- A. This section defines Measurement and Payment for the Project.

#### **1-09.2 Measurement and Quantities**

- A. Measurement for all items shall be as indicated in these Specifications for unit price and Lump sum price bid items. Bid items are outlined in detail in this Section.

#### **1-09.3 Payment**

- A. Payment will be the unit price multiplied by the measured quantity. Lump sum payment will be paid at the price indicated on the Bid Form. Bid items are outlined in detail in the specifications section.
- B. No separate payment shall be made for any Work item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in the Bid Schedule for the various appurtenant items of Work.
- C. All other Work required to complete the Work specified in the contract documents, but not indicated specifically as a pay item, shall be considered necessary and incidental work.

#### **1-09.4 Schedule of Bid Items**

The following is a list of bid items for the project. The contract price for each item constitutes full compensation for furnishing all equipment, labor, materials, appurtenances, and incidentals and performing all operations necessary to construct and complete the various bid items in accordance with the Contract Documents. Payment for each item shall be considered as full compensation, notwithstanding that minor features may not be mentioned herein. Work paid for under one item will not be paid for under any other item. If a particular item of work shown on the Plans or described in Specifications is not described in a specific bid item, this item of work shall be considered as incidental to the work and the costs for this work shall be merged into the various respective bid items.

##### **A. Bid Item 1. Mobilization, Cleanup & Demobilization**

###### **1. Description**

- a. Mobilization: The work to be performed includes the movement of personnel, equipment, supplies, and incidentals to the project site; for the establishment of offices, buildings and other facilities necessary for work on the project; for premiums on bonds and insurance for the project and for all other work and operations which must be performed, or costs incurred before beginning work on the various contract items.
  - b. Demobilization: At the end of the project includes removal of tools, materials, equipment, and facilities used by the Contractor during construction; final cleanup that consists of complete restoration of the project site to pre-existing conditions. This pay-item shall also include the final clean-up if the site and restoration of all property not designated for alteration by the Contract Documents.
- 2. Measurement shall be by lump sum.
  - 3. Payment: Mobilization, Cleanup, and Demobilization will not be measured for payment. The original contract bid amount for "Mobilization, Cleanup and Demobilization" shall not be

adjusted, although the Contractor may have, for any reason, shut down the Work on the project or moved equipment away from the project and then returned.

4. Partial payments will be made as the Work progresses as follows:
  - a. When 5% of the total original contract amount is earned from other pay items, 50% of the amount bid for Mobilization, or 5% of the original contract amount, whichever is lesser, will be paid.
  - b. When 10% of the total original contract amount is earned from other pay items, 100% of the amount bid for Mobilization, or 10% of the original contract amount, whichever is lesser, will be paid.
  - c. Upon completion of all Work on the Project, payment of any amount bid for Mobilization in excess of 10% of the total original contract amount will be paid.

**B. Bid Item No. 2. Handling Existing Flows**

1. Measurement shall be by lump sum.
2. Payment: The price bid for Handling Existing Flows will include all materials, equipment, and labor required to handle existing sanitary sewer, combined sewer, and storm drain flows and installation and maintenance of all temporary connections, plugs, and bypass pumping as further described in 7-20.

**C. Bid Item No. 3. Rehabilitation of Sewer Manhole 40-2**

1. Measurement shall be by lump sum.
2. Payment: The price bid for Rehabilitation of Sewer Manhole 40-2 will include all materials, equipment, and labor required for cleaning and preparation of surfaces, removal and patching of loose and/or unsound material, repair of inverts, bench, walls, and cone, and chemical grout sealing of invert, bench, walls, and pipe connections as further described in 7-21.

**D. Add Alternate Bid Item No. 4: Cementitious Interior Sealing**

1. Measurement shall be by lump sum.
2. Payment: The price bid for Add Alternate Item: Cementitious Interior Sealing will include all materials, equipment, and labor required for spray application of a uniform cementitious layer of high quality mortar, 1/2 inch minimum thickness, to form a monolithic liner as further described in 7-21.

**END OF SECTION**

## **1-11 MOBILIZATION AND DEMOBILIZATION**

**(New Section)**

This Section is added as follows:

### **1-11.1 Scope**

- A. Mobilization & Demobilization shall consists of preparatory Work, operations, and cleanup, including, but not limited to, those necessary for the movement of personnel, equipment and supplies to and from the project site; and all other Work and operations which must be performed, or costs incurred prior to beginning Work on the various items on the project site.
- B. This shall also include but is not limited to all costs for labor, equipment, and material needed for any Contractor's field office including utilities, preparation of staging areas, fencing of staging areas, all costs for office and material staging areas including Contractor parking and security, profit, interest on borrowed money, overhead, or management costs, insurance and bonds, permits, and fees.
- C. Contractor is responsible for the security of all construction material even after partial payment of project materials until Final Acceptance of the Project.

### **1-11.2 Products**

- A. Products and materials required for mobilization and demobilization are described in the various section of Division 1 and in other parts of the Contract Documents. Items included in mobilization and demobilization include, but are not limited to, photo documentation and record drawings.

### **1-11.3 Execution**

- A. Complete mobilization and demobilization as required by the various section of these specifications and other parts of the Contract Documents.

**END OF SECTION**

## **Division 7      Drainage Structure, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**

### **7-20 HANDLING EXISTING FLOWS**

**(New Section)**

This Section is added as follows:

#### **7-20.1 Scope**

- A. This section covers all materials, equipment, and labor required to handle existing sanitary sewer, combined sewer, and storm drain flows and installation and maintenance of all temporary connections, plugs, and bypass pumping.

#### **7-20.2 Execution**

- A. The Contractor shall maintain all flows in the existing system until construction or rehabilitation is complete and ready for safe operation.
- B. The Contractor may, upon Engineer approval, have the option to do part of the sections of the work at night. If night work is elected, the Contractor shall be responsible for all necessary lighting, extra equipment, and personnel needed to complete the work.
- C. The Contractor shall protect against surcharging of the existing system upstream of the work area by installing adequate bypass pumping to handle dry and wet weather flows.
- D. The Contractor shall repair any damage that occurs to existing pipes and structures to the satisfaction of the Engineer.
- E. The Contractor shall not allow sanitary flow to discharge to any salt or fresh water body by means of overflow, by-pass pumping, or any other method that may contaminate these water areas.
- F. The pump around shall occur from any sanitary sewer manhole upstream of the work to be performed. The pump discharge shall be to any sanitary sewer manhole downstream of the work to be performed. The distance to be pumped may vary depending on location.
- G. Two pumps shall be supplied, both individually capable of pumping the above stated flows (one primary, and the second back-up).
- H. The Contractor shall designate a person to oversee pumps during their operation. This person shall be on-site at all times while the temporary sewer bypass is occurring and shall continually monitor the pump operation. The individual shall be familiar with the operation of the pumps and shall be capable of switching between pumps if necessary, refueling the pumps, etc. Monitor the upstream and downstream manholes at a minimum, and checking regularly for flow backup and obstructions.
- I. The pumped sewage shall be in an enclosed hose or pipe that is protected from traffic. Pumps used for the temporary sewer bypass shall be capable of passing solids and other materials typically found in waste water flows. All bypass pumps shall be critically silenced. Flow rates through MH 40-2 for July-August is typically 30 GPM.

**END OF SECTION**

## 7-21 SEWER MANHOLE REHABILITATION

(New Section)

This Section is added as follows:

### 7-21.1 Scope

- A. This section covers rehabilitation of sewer manholes as called for herein and on the drawings. It is the intent of this specification to provide for waterproofing, sealing, and structural enhancement of existing manholes by chemical grout exterior sealing of sewer manhole cone, wall, sump, bench, inverts, holes, or pipe connections.
- B. The work shall include: elimination of infiltration by external chemical grout sealing; removal and patching of loose and/or unsound material; cleaning and preparation of surfaces; repair of invert, bench, walls, and chemical grout sealing of the invert, bench walls, and pipe connections.
- C. Add Alternate work shall include: Spray application of a uniform cementitious layer of high quality mortar to form a monolithic liner.
- D. The Contractor shall furnish all equipment, material, and labor required to perform all manhole rehabilitations described in this specification.

### 7-21.2 Quality Assurance

- A. The work described herein shall be performed by a company with not less than five (5) years of experience in providing the required services, employing experienced workers and experienced supervisory personnel. Supervisory personnel shall have not less than three (3) years of experience in providing the required services and shall be present at the jobsite during all work related to the required services.

### 7-21.3 References

- A. The following standards form a part of this specification as referenced:

The National Association of Sewer Service Companies (NASSCO)

Performance Specification Guideline for Manhole Rehabilitation

American Society for Testing and Materials (ASTM)

ASTM C94 Ready-Mix Concrete

ASTM C109 Comprehensive Strength

ASTM C267 Chemical Resistance

ASTM C596 Shrinkage

ASTM C666, Method A Freeze/Thaw Resistance

ASTM D4414 Standard Practice for Measurement of Wet Film Thickness for Organic Coatings

### 7-21.4 Cementitious Lining System Description

- A. Unless otherwise indicated herein, sewer manhole sealing shall be carried out in accordance with the current edition of the Performance Specification Guideline for Manhole Rehabilitation (NASSCO).
- B. The Contractor may propose alternative processes and/or products for review and approval by the Engineer.
- C. The locations of the cementitious lining work to be completed are as shown on the drawings.

### 7-21.5 Submittals

- D. Prior to beginning the work, submit the following:

1. Qualifications of the firm/personnel who will perform the work.
2. Provide at least three (3) references of different projects in which at least 50 manholes have been rehabilitated by the firm within the past five (5) years.
3. Description of the system, equipment and material with MSDS Data Sheets proposed for sewer manhole rehabilitation.
4. Description of the system proposed for bypass pumping during the procedures to be carried out.
5. Manufacturer's warranty

**7-21.6 Warranty**

- A. The manhole rehabilitation work performed shall be warrantied against infiltration and faulty workmanship and materials for a period of one (1) year after the project is accepted by the Owner.

**7-21.7 Products**

A. Rehabilitation Materials

1. All products used for lining, sealing, patching, and cleaning shall be environmentally safe. The contractor shall submit MSDS Data Sheets for all materials used.

B. Sealing of Invert, Stopping Active Leaks, and Exterior Chemical Sealing

1. The contractor shall use a chemical grout that is environmentally safe for the sealing of sewers. The chemical grout shall be in accordance with Part 2, Products, of the NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts).

C. Patching Mix

1. A quick-setting cementitious material shall be used as a patching mix and is to be mixed and applied according to the manufacturer's recommendation and shall have the following minimum requirements.

Compressive Strength	ASTM C-109	6 hr 1,400 psi
Shrinkage	ASTM C-596	0% AT 90% Relative Humidity

D. Infiltration Control Mix

1. A rapid-setting cementitious product specifically for leak control shall be used to stop water infiltration and shall be mixed and applied according to the manufacturer's recommendations and shall have the following minimum requirements.

Compressive Strength	ASTM C-109	1 hr 600 psi
Compressive Strength	ASTM C-109	24 hr 1,800 psi

E. Cementitious Liner Mix

1. The cementitious liner mix shall be used to form a structural enhancing monolithic liner covering all interior manhole surfaces and shall have the following minimum requirements at 28 days:

Compressive Strength	ASTM C-109	6,000 psi
Shrinkage	ASTM C-596	0%, 90% humidity

Freeze/Thaw Resistance ASTM C-666 No visible damage after 100 cycles

2. The liner mix shall be applied in one monolithic layer.

F. Brick Materials

1. Brick shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Engineer. Bricks shall comply with ASTM C32, for Grade SS, hard brick, except that the mean of five tests for absorption shall not exceed 8 percent by weight.
2. Rejected brick shall be immediately removed from the work and brick satisfactory to the Engineer substituted.
3. Mortar shall be composed of Portland cement, hydrated lime, and sand in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 for dense hard-burned brick to 1:3/4 for softer brick. In general, mortar for Grade SS Brick shall be mixed in the volume proportions of 1:1/2:4-1/2; Portland cement to hydrated lime to sand.
4. Cement shall be Type II Portland cement as specified for concrete masonry.
5. Hydrated lime shall be Type S conforming to ASTM C207.
6. Sand shall comply with ASTM C144 specifications for "Fine Aggregate," except that all of the sand shall pass a No. 8 sieve.

G. Concrete

1. Cement shall be domestic Portland cement conforming to ASTM C150, Type II.
2. Fine aggregate shall be washed natural sand conforming to ASTM C33.
3. Coarse aggregate shall be well graded crushed stone conforming to ASTM C33, size No. 67.
4. No admixtures shall be used unless approved by the Engineer in writing.

H. Water

1. Water used in mixing shall be non potable.

**7-21.8 Delivery Storage and Handling**

- A. Materials shall be delivered to the site in the Manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. All materials shall be stored properly and in accordance with Manufacturer's instructions.

**7-21.9 Execution**

**7-21.9(1) Surface Protection**

- A. During progress of work, where appearance is important, adjacent areas or grounds which may be permanently discolored, stained, or otherwise damaged by dust and rebound, shall be adequately protected and, if contacted, shall be cleaned by early scraping, brushing or washing, as the surroundings permit.
- B. No street markings shall be removed or covered throughout the progress of work.

**7-21.9(2) Handling Existing Flows**

- A. The Contractor shall divert flows as required for the work and in accordance with the requirements specified in 7-20 HANDLING EXISTING FLOWS.



### **7-21.9(3) Manhole Preparation (Cleaning)**

- A. Remove all foreign material from the manhole wall and bench using a high-pressure water spray (minimum 5,000 psi). Loose and protruding brick, mortar, and concrete shall be removed using a mason's hammer and chisel and/or scraper.

### **7-21.9 (4) Patching and Chemical Grout Application**

- A. Loose material shall be removed from the area to be patched exposing a sound sub-base. Holes or voids in cone, walls, sump, bench, inverts, holes, or pipe connections shall be patched with quick-setting patching mix. Cracks not subject to movement and less than 1/16 inch in width shall be routed out to a minimum width of 1/2 inch and patched. Repair and patching of bench, walls, and internal structures is considered incidental to manhole preparation for chemical grouting and liner application. Additional surface preparation shall be as recommended by the manufacturer of the materials to be applied.
- B. Leaks shall be stopped using a chemical grout, which shall be applied as per the manufacturer's recommendations. Leaks may require weep holes drilled at the manhole base to localize the infiltration during the application, after which the weep holes shall be sealed with a chemical grout and plugged with the quick-setting infiltration control mix. Areas with evidence of previous leakage (e.g., mineral deposits) shall also be grouted.
- C. All pipe connections in brick and block manholes shall be grouted regardless of whether they are leaking or have signs of previous leakage. Grout ports shall be located near the pipe connections to ensure that the sealing material is injected at the manhole/pipe connections. Grout ports shall be located and drilled in the bench and invert for all brick and block manholes as necessary to seal the manhole base.

### **7-21.9 (5) Invert Sealing**

- A. The Contractor shall carry out all work as described in the Performance Specification Guideline for Manhole Rehabilitation, Section 3.2C (NASSCO) using sealing materials and procedures accepted by the Engineer.
- B. Grout ports shall be located and drilled in the bench and invert as necessary to seal the invert and manhole base. Grout ports shall also be located and drilled at the manhole/pipe connections.
- C. A quick setting patch mix shall be troweled uniformly not to exceed 1/2-inch, onto the damaged invert extended out onto the base of the manhole.

### **7-21.9 (6) Cementitious Interior Sealing (Add Alternate)**

- A. Interior lining of the manholes shall be conducted only after all other manhole rehabilitations have been completed.
- B. Unless otherwise indicated herein, the Contractor shall carry out all work as described in the Performance Specification Guideline for Manhole Rehabilitation, Section 3.2 (NASSCO) using lining materials and procedures accepted by the Engineer.
- C. Manhole Preparation shall be completed prior to the placement of the cementitious liner.
- D. No application shall be made if ambient temperature is below 40 F. Sealant shall not be placed when it is anticipated that the temperature during the following 24 hours will drop below 32 F.
- E. Pipes and/or service connections shall be temporarily plugged prior to the application of the cementitious manhole interior liner. A flash coat of the liner material shall be applied three (3) inches into each service connection. Temporary plugs shall be removed once the liner has cured

sufficiently to prevent erosion of the new liner.

- F. Thickness shall be verified with a wet gauge at random points of the new interior surfaces as required by the Engineer. Minimum thickness of one-half (½) inch is required.
- G. Application shall be with low velocity, continuous flow equipment to prevent the adverse effects of rebound. A smooth trowel finish shall be applied.
- H. The Contractor shall prohibit debris from entering the invert by either covering the invert or plugging during application.
- I. A minimum of four (4) hours cure time or more as required by the product manufacturer shall be allowed before returning to active flow. A minimum of an additional two (2) hours cure time shall be added if the rehabilitated manhole is subject to flow from force mains.

#### **7-21.9 (7) Digital Photographs**

- A. The Contractor shall take a digital photograph of the interior of each manhole, before and after rehabilitation, in JPEG format. Filenames shall contain manhole designations (e.g. "MH-40-2"). Digital photographs shall have a minimum resolution of four (4) megapixels.

#### **7-21.10 Field Testing/Inspection**

- A. Inspect in accordance with the Performance Specification Guideline for Manhole Rehabilitation (NASSCO)
- B. The Contractor shall repair any defects found until there are no visible leaks.
- C. All inspecting, testing, and reworking within the warranty period shall be provided at no additional cost to the Owner.

**END OF SECTION**