

**SECTION 806
MANHOLE REHABILITATION**

806-1 DESCRIPTION: This specification consists of all work, materials, labor and equipment required for manhole rehabilitation for the purpose of eliminating infiltration and exfiltration, providing corrosion protection, adjusting final grade of manhole top, repair of voids and restoration of the structural integrity of the manhole.

806-2 SUBMITTALS:

- a. Manhole rehabilitation system manufacturer's literature (cut sheets) describing the rehabilitation system and equipment components, material/chemical properties, MSDS sheets and environmental requirements for application and worker safety requirements. Provide samples of testing, certification and warranty statements.
- b. References of projects successfully completed, incorporating not less than 250 manholes in total which were successfully performed within the last 10 years. Each reference shall include the name of the agency, the name of the project, the date of the project, and an agency contact.
- c. Written certification by the manhole rehabilitation system manufacturer stating the installation Contractor is approved to install the rehabilitation system specified.
- d. Written certification from the product manufacturer that each of the proposed rehabilitation products is compatible with each other.
- e. Traffic Control shall be the responsibility of the Contractor. Any necessary lane closures shall require a permit from the Traffic Division of the DPW or the La DOTD. Copies of the permits shall be submitted to the Engineer prior to commencing Work.
- f. Submit with Each Project:
 1. Description, layout, and application sequencing plan.
 2. Rehabilitation system application requirements including material handling and storage requirements, mixing and proportioning requirements (as applicable), maximum pot life, film/coating thickness, curing, testing and certification requirements of all rehabilitation materials. Product Material Safety Data Sheets.
 3. Detailed instructions and methodology for finishing all pipe and manhole connections to rehabilitated manholes to prevent infiltration and exfiltration.
 4. Wastewater Flow Control/Bypassing Plan.
 5. Confined Space Entry Plan/Permit.
 6. Plan for capturing extraneous debris during rehabilitation processes and debris disposal.
 7. Liner and vacuum test results.

806-3 MATERIALS: The materials used shall be designed, manufactured and solely intended for sewer manhole rehabilitation. The materials shall have a proven history of performance in sewer manhole rehabilitation for a minimum of 10 years nationally, of similar age, groundwater levels and circumstance. Contractor shall comply with all manufacturers' recommendations for the approved

products.

806-3.1 Riser Rings:

- a. **Precast Concrete:** New precast concrete riser rings free from cracks, voids and other defects and shall conform to ASTM C478. Contractor shall use precast concrete riser rings of a nominal thickness of not less than four (4) inches and not more than six (6) inches for reconstruction and/or adjustment of the manhole frame and cover. Concrete riser rings shall include the protective admixtures in accordance with Section 803. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803.
- b. **Cast Iron:** New cast iron riser rings shall be of domestic origin, conform to the latest edition of AASHTO M306. Contractor shall use cast iron riser rings for reconstruction and/or adjustment of the manhole frame and cover of less than 4 inches.

806-3.2 Cone Replacement: The new precast concrete cone shall be concentric, unless otherwise specified, conforming to ASTM C478 and Section 1017-2. Concrete manhole cones shall include the protective admixtures in accordance with Section 803. Joints shall be sealed with gaskets conforming to ASTM C990 or C443. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803.

806-3.3 Manhole Frame and Cover: New manhole and Air Release Valve vault frames and/or covers shall conform to Section 1011-5 and the Contract Documents. Frames and covers shall be completely coated with an environmentally safe, water-base asphaltic coating which is nontoxic, nonflammable, colorless, and dries to a hard black finish. Manhole frames shall also be externally wrapped with an external seal wrap as specified in Section 803. Air Release Valve vault frames are not required to be wrapped with an external seal wrap

806-3.4 Stainless Steel Inserts: The insert body shall be manufactured of 304 stainless steel with a thickness of not less than 18 gauge. The dish shall have a handle of 3/16" plastic coated stainless steel cable installed on the body of the dish. The handle shall be attached with a #6 high grade stainless steel rivet. The gasket shall be made of close cell neoprene, and shall have a pressure sensitive adhesive on one side. The gas relief valve shall be designed to release at a pressure of .5 to 1.5 psi. The valve shall be made of Nitrile for prevention of corrosion from contact with hydrogen sulfide, diluted sulfuric acid and other gases associated with waste-water collection systems. Each dish shall have a factory installed five foot long, 3/16" stainless steel cable retaining tether that shall pass through a water tight grommet in the bottom of the dish with a high grade stainless steel adjustable locking device located between the bottom of the dish and lift loop at the top end of tether. The cable terminal and eye end shall be made of stainless steel.

806-3.5 Cementitious Mortar: Mortar shall be made of one part Portland cement and two parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C 150. Sand shall meet the requirements of ASTM C 144.

806-3.6 Patching Material: A quick setting fiber reinforced cementitious material shall be used as a patching material and is to be mixed and applied according to manufacturer's recommendations.

806-3.7 Hydraulic Cement: A rapid setting, high-early-strength, cementitious product specifically formulated for leak control shall be used to stop water infiltration. The material shall be mixed and applied according to the manufacturer's recommendations.

806-3.8 Chemical Grout: A chemical grout shall be used for stopping very active infiltration and filling voids.

806-3.9 Liner Materials:

- a. **Cementitious Liner Material:** Cementitious liner products shall be used to form a structural monolithic liner covering all interior manhole surfaces and shall have the following minimum requirements:

1. Compressive Strength (ASTM C109): 6,000 psi, 28days
2. Tensile Strength (ASTM C496): 600 psi, 28 days
3. Flexural Strength (ASTM C293): 1,000 psi, 28 days
4. Shrinkage (ASTM C596): 0.02% at 28 days
5. Minimum Bond (ASTM C952): 200 psi, 28 days

When used as the final rehabilitation liner material (no epoxy liner), product shall be made with calcium aluminate cement. Calcium aluminate is not required when the cementitious liner is used as the underlayment for the epoxy liner application.

- b. **Epoxy Liner Material:** 100% solids epoxy liner is to be applied where corrosion is anticipated. The epoxy liner material shall be applied over the completed cementitious liner material (without the calcium aluminate). The liner shall be spray applied or spin cast. The manufacturer of the selected epoxy liner material shall approve in writing that their epoxy liner is compatible with cementitious repair and liner material. The epoxy liner material shall have the following minimum requirements:

1. Hardness, Shore D (ASTM D2240): 85 (± 2)
2. Adhesion (ASTM D4541), Concrete: Substrate Failure
3. Abrasion: ASTM D 4060 – Requirement: No more than 180 mg loss after 1,000 cycles
4. Corrosion Resistance: Suitable for environments PH of .5 or higher

- c. **Water:** Water shall be clean and potable.

806-3.10 Internal Manhole Chimney Seal Material: An aromatic urethane rubber material or flexible epoxy mastic used to prevent leakage of water into the manhole through the frame joint area and the area above the manhole cone and shall have the following minimum requirements:

- a. Elongation (ASTM D412): 600%
- b. Tensile Strength (ASTM D412): 1,150 psi
- c. Adhesive Strength (ASTM D903): 175 lb. l/in.
- d. Tear Resistance (ASTM D1004): 155 lb. l/in.

The seal shall extend from the inside of the manhole frame down to the cone or corbel of the manhole.

806-3.11 External Manhole Seal Wrap: When work consists of adjusting manholes or cone replacements, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. The external seal wrap shall conform with Section 803 and be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

806-4 EQUIPMENT: Contractor shall utilize equipment approved by the material supplier for the specific application. Hard to reach areas, primer application and touch-up may be performed using hand tools as approved by the manufacturer. Contractor shall be trained by, or have their training approved and certified by the coating product manufacturer for the handling, mixing, application and inspection of the coating product(s) to be used as specified herein.

806-5 PREPARATION:

- a. Perform traffic control in accordance with the approved traffic control submittal.
- b. Store materials in accordance with manufacturer's recommendations.
- c. Schedule and perform the work in a manner that does not cause or contribute to overflows or spills of sewage from the sewer system.
- d. Install devices to prevent extraneous material from entering the sewer system and to prevent upstream line from flooding the manhole. If extraneous material or debris falls into a "live" manhole during adjustment operations, the Contractor shall remove debris at no cost to the Owner.
- e. Dispose of wastes in accordance with applicable regulations.
- f. Schedule and perform any bypass pumping that will be necessary to properly rehabilitate the manhole. Refer to section 813 for sewer flow requirements.
- g. If present in the manhole, Contractor shall remove all access steps. Removal shall consist of neatly cutting steps flush with the wall prior to any lining installation. Contractor shall be responsible for proper disposal of steps.
- h. For manholes that are located within pavement areas and require resetting or replacement of concrete riser rings, cones, and /or frames, the Contractor shall sawcut, remove, and replace a 6 ft. x 6 ft. square section of pavement and base for rehabilitation operations. Costs for removal and replacement of pavement and base beyond these limits shall be borne by the Contractor.

806-6 INSTALLATION: Prior to any lining all other miscellaneous work must be complete.

806-6.1 Cone Replacement: The Contractor shall replace existing deteriorated manhole cone section with new precast concrete cone section. A preformed gasket material shall be placed in all keyways between existing manhole riser section and cone joints. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Subsection 803-4.7. If the existing manhole is of brick construction, the cone shall be set in a full bed of mortar on the top course of bricks.

806-6.2 Riser Rings: The Contractor shall replace existing, deteriorated riser rings with new precast concrete riser rings and/or cast iron riser rings. All manholes designated to receive casting adjustment and/or alignment shall be adjusted to meet existing finished grade unless an alternative elevation is specified. A cementitious mortar shall be placed in between individual precast concrete riser rings, and precast concrete riser ring and cone joints. The mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils. An epoxy system designed for metal-to-metal adhesion shall be used to connect individual cast iron riser rings and the cast iron riser rings to the frame. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Subsection 803-4.7.

806-6.3 Frame and Cover: Existing frames and covers which must be removed to facilitate manhole and/or Air Release Valve vault rehabilitation, riser reconstruction, and/or casting alignment or grade adjustments shall be salvaged, cleaned and given two coats of an approved bituminous coating by the Contractor for replacement unless determined to be defective by Engineer. If frame and/or cover are determined to be defective, Contractor shall replace with new frame and/or cover. Replacement frames and/or covers shall be furnished and installed in accordance with the Contract Documents. Frames shall be set in full mortar bed. The mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils.

Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Subsection 803-4.7.

806-6.4 Cementitious Liner:

- a. Active leaks shall be stopped using hydraulic cement or chemical grout as necessary. Installation shall be in accordance with the manufacturer's recommendations.
- b. All manholes to be lined shall be cleaned and scarified with a minimum of 5,000 psi water jet at a minimum water temperature of 180 degrees F. The water jet shall hit the manhole wall surface at as near perpendicular angle as possible. Cleaning the manhole walls from the ground surface without the appropriate angled nozzles will not be accepted. Manhole surface build-up of debris and loose manhole construction materials shall be removed during the cleaning process.
- c. The intent of the surface preparation and cleaning work is to remove debris, films or unsound, deteriorated concrete and to provide a structurally sound, clean surface that will enable lining materials to bond to the original substrate at adhesion strengths of that specified herein, a substrate pH of 8.3 is the minimum pH that will be considered acceptable to demonstrate that the surface preparation and cleaning have been properly performed.
- d. Additional aggressive surface preparation and cleaning methods may be necessary to remove carbonated cementitious lining concrete or contaminants that remain after the cleaning performed as described above. The Contractor shall test the pH of the cleaned manhole interior surface at various locations of the manhole and when the results indicate a pH less than 8.3 then additional surface preparations and cleaning will be required. As a minimum level of effort the Contractor shall either dry sand blasting or pneumatic jackhammering with a bushing bit followed by a minimum 5,000 psi water blast.
- e. Any bench, invert or service line repairs shall be made at this time using quick setting grout or repair mortar per the manufacturer's recommendations.
- f. Invert repair shall be performed on all inverts with visible damage or where infiltration is present. After blocking flow through the manhole and thoroughly cleaning the invert, quick setting patch material shall be applied to the invert in an expeditious manner. The finished invert surfaces shall have a smooth surface and form a continuous monolithic conduit with the sewer pipe entering and leaving the manhole. The bench and invert shall form a watertight seal with the manhole walls, base and pipe seal.
- g. Wastewater flow shall be controlled by methods which prevent contact with the new bench and invert for 6-8 hours after mortar placement. If 6-8 hours set time is not possible, a fast setting, high early strength mortar shall be used with provisions for flow control until concrete has set.
- h. Fill all cracks, holes and joints what have voids using non-shrink grouts in accordance with the manufacturer's recommendations.
- i. Apply Cementitious Liner Material per the Manufacturer's recommendations. Apply Cementitious Liner material so that the final thickness is 0.5-inch minimum or per the thickness required by the manufacturer's minimum specification, whichever is greater. The material shall start at the bottom of the manhole frame and extend to the water level of the invert.
- j. Finish repair material to a hard trowel finish and then finish with a sponge float. The

sponge float finish shall have a surface profile of 8-10 mils.

- k. If the cementitious lining material is not immediately coated with epoxy, apply a seal coat compatible with the repair material to aid in curing and minimize recontamination of the substrate prior to application of the epoxy liner material.

806-6.5 Epoxy Liner:

- a. Prior to any Epoxy lining perform all work shown in Section 806-6.4 above.
- b. Remove any curing compounds, sealers or contaminates prior to epoxy lining.
- c. Apply epoxy lining material in accordance with the manufacturer's recommendations over the waterproofing/structural repair material shown in Section 806-6.4.
- d. Epoxy liner shall be 125 mils, minimum, dry film thickness.

806-6.6 Internal Manhole Chimney Sealant:

- a. Perform all work shown in Sections 806-6.4 and 6.5 (if 6.5 is required) prior to any Internal Manhole Chimney Sealant.
- b. Clean all contaminates from manhole frame by sandblasting or mechanical methods as recommended by the chimney sealant manufacturer.
- c. Install Internal Manhole Chimney Sealant in accordance with the manufacturer's recommendations. The Contractor shall contact the manufacture for thickness recommendations however; the final liner material shall be made no less than 170 mils.

806-6.7 External Manhole Seal Wrap: When Work consists of adjusting sewer manholes or cone replacement, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. Frame and cover shall be completely coated prior to installation of the external seal wrap. The external seal wrap shall be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

806-6.8 Stainless Steel Insert: If existing manhole is equipped with a non-stainless steel insert, Contractor shall remove and dispose of existing insert and furnish and install a new stainless steel insert in accordance with manufacturer's recommendations. Rivet used for attaching insert to manhole shall be installed into the casting. If existing manhole is equipped with a stainless steel insert pan to prevent intrusion of storm water, pan shall be cleaned and reinstalled by the Contractor unless determined to be defective by the Engineer. If insert is determined to be defective, Contractor shall furnish a new stainless steel insert and install in accordance with manufacturer's recommendations at the completion of manhole rehabilitation operations.

806-7 TESTING: After completion of any rehabilitation operation and backfilling (if required), the Contractor shall conduct the following tests on the manholes:

- a. Vacuum Test: Manhole shall be vacuum tested in accordance with Subsection 802-4.
- b. Visual Inspection: The Engineer and Applicator shall make a final visual inspection. Any deficiencies in the finished system shall be marked and repaired.

If an epoxy liner is applied, the following additional tests will be required:

- a. Wet Film Thickness Gage: During application a wet film thickness gage, meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic

Coatings by Notched Gages, shall be used to ensure a monolithic coating and uniform thickness during application.

- b. **Adhesion Test:** A minimum of 10% of the manholes coated shall be tested for adhesion/bond of the coating to the substrate. Testing shall be conducted in accordance with ASTM D7234-05.

806-8 MEASUREMENT:

- a. **Manhole Riser Ring (Concrete):** Measurement for precast concrete manhole riser rings shall be made on a vertical inch basis.
- b. **Manhole Riser Ring (Cast Iron):** Measurement for cast iron manhole riser rings shall be made on a vertical inch basis.
- c. **Manhole Cone Replacement:** Measurement of Work for payment of this Item shall be made at the unit price bid per vertical foot based on manhole diameter. Measurement shall be made from the bottom of cone to top of cone. Excavation, backfill, disposal of deteriorated cones and surplus excavated material is considered incidental to and, if required, shall be included in this Bid Item. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.
- d. **Reset Existing Manhole Frames and Covers:** Measurement for removing, cleaning, and resetting existing manhole and/or Air Release Valve vault frames and covers shall be the actual count (each).
- e. **Manhole Frame:** Measurement for new manhole frame shall be the actual count (each).
- f. **Manhole Frame (Oversized):** Measurement for new oversized manhole frame that is larger than the standard 25" diameter manhole frame shall be the actual count (each).
- g. **Manhole Frame (Bolt Down Watertight):** Measurement for new bolt down watertight manhole frame shall be the actual count (each).
- h. **Manhole Frame and Cover (Hinged):** Measurement for new hinged manhole frame and cover assembly shall be the actual count (each).
- i. **Air Release Valve Vault Frame:** Measurement for new Air Release Valve vault frame shall be the actual count (each).
- j. **Manhole Cover:** Measurement for new manhole cover shall be the actual count (each).
- k. **Manhole Cover (Oversized):** Measurement for new oversized manhole cover that is larger than the standard 23 ¼" diameter manhole cover shall be the actual count (each).
- l. **Manhole Cover (Bolt Down Watertight):** Measurement for new bolt down watertight manhole cover shall be the actual count (each).
- m. **Air Release Valve Vault Cover:** Measurement for new Air Release Valve vault cover shall be the actual count (each).
- n. **S.S. Manhole Insert:** Measurement for new stainless steel manhole insert shall be the

actual count (each).

- o. **Manhole Repair (Patching):** Measurement for manhole repair shall be made on a cubic foot basis as determined by the actual volume of water seal, solid filler, or waterproof grout mix used to make repairs to wall sections, bench, and invert to manhole connections. All application shall be in accordance with manufacturer's recommendations. All work under this Item is considered to be performed from the interior of the manhole. Manhole repair shall not be measured for payment when required as surface preparation for a manhole lining rehabilitation operation.
- p. **Manhole Rehabilitation (Cementitious Lining):** Measurement for payment of these Items shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5' or 6') then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5' diameter = 1.25 x vertical footage of standard; 6' diameter = 1.50 x vertical footage of standard, etc.). In like manner, structures that are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification. Manhole rehabilitation (cementitious lining) shall not be measured for payment when required as underlayment for a manhole rehabilitation (epoxy lining) operation.
- q. **Manhole Rehabilitation (Epoxy Lining):** Measurement for payment of these Items shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5' or 6') then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5' diameter = 1.25 x vertical footage of standard; 6' diameter = 1.50 x vertical footage of standard, etc.). In like manner, structures that are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification.
- r. **Internal Manhole Chimney Sealant:** Measurement for payment of this Item shall be based on the actual number of vertical inches depending on the depth of each seal applied. The depth of each seal will be measured as the distance from the manhole frame joint to the top joint of the manhole cone for which final liner material is to be applied. Fractional measurement will be rounded down to the nearest whole number as reported in inches.
- s. **Removal of Interior Manhole Steps:** Measurement of Work for payment of this Item shall be made at the unit price bid per manhole containing steps, regardless of the number of steps in each.

806-9 PAYMENT:

- a. **Manhole Riser Ring (Concrete):** Payment for precast concrete manhole riser rings

will be full compensation for all labor, materials, and equipment necessary to remove and dispose of existing deteriorated concrete manhole riser rings and replace with new precast concrete manhole riser rings; including traffic control, external seal wraps, excavation, backfill, and disposal of surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

- b. **Manhole Riser Ring (Cast Iron):** Payment for cast iron manhole riser rings will be full compensation for all labor, materials, and equipment necessary to remove and dispose of existing deteriorated cast iron manhole riser rings and replace with new cast iron manhole riser rings; including traffic control, external seal wraps, excavation, backfill, and disposal of surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.
- c. **Manhole Cone Replacement:** Payment of the unit price amount bid for this Item shall be full compensation for furnishing all materials, labor, and equipment; including traffic control, excavation, backfill, external seal wraps, and disposal of deteriorated cones and surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.
- d. **Reset Existing Manhole Frames and Covers:** Payment for resetting existing manhole and/or Air Release Valve vault frames and covers will be full compensation for all materials, labor, equipment; including traffic control, external seal wraps, excavation, backfill, and disposal of deteriorated cones and surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.
- e. **Manhole Frame:** Payment for this item includes full compensation for furnishing and installing a new manhole frame, disposal of damaged manhole frame, external seal wraps, and traffic control.
- f. **Manhole Frame (Oversized):** Payment for this item includes full compensation for furnishing and installing a new oversized manhole frame, disposal of damaged oversized manhole frame, external seal wraps, and traffic control.
- g. **Manhole Frame (Bolt Down Watertight):** Payment for this item includes full compensation for furnishing and installing a new bolt down watertight manhole frame, disposal of damaged manhole frame, external seal wraps, and traffic control.
- h. **Manhole Frame and Cover (Hinged):** Payment for this item includes full compensation for furnishing and installing a new hinged manhole frame and cover, disposal of damaged manhole frame and cover, external seal wraps, and traffic control.
- i. **Air Release Valve Vault Frame:** Payment for this item includes full compensation for furnishing and installing a new Air Release Valve vault frame, disposal of damaged Air Release Valve vault frame, and traffic control.
- j. **Manhole Cover:** Payment for this item includes full compensation for furnishing and installing a new manhole cover, disposal of damaged manhole cover, and traffic control.
- k. **Manhole Cover (Oversized):** Payment for this item includes full compensation for furnishing and installing a new oversized manhole cover, disposal of damaged oversized manhole cover, and traffic control.

- l. **Manhole Cover (Bolt Down Watertight):** Payment for this item includes full compensation for furnishing and installing a new bolt down watertight manhole cover, disposal of damaged manhole cover, and traffic control.
- m. **Air Release Valve Vault Cover:** Payment for this item includes full compensation for furnishing and installing a new Air Release Valve vault cover, disposal of damaged Air Release Valve vault cover, and traffic control.
- n. **S.S. Manhole Insert:** Payment for this item includes full compensation for furnishing and installing a new stainless steel manhole insert, and traffic control.
- o. **Manhole Repair:** Payment for manhole repair will be full compensation for cleaning and preparing surfaces; drilling for access or infiltration relief purposes; and for labor, materials and equipment necessary to purchase, store, transport, mix and apply all patching and preparatory items required to complete the Work; sewer flow control, traffic control and testing.
- p. **Manhole Rehabilitation (Cementitious Lining):** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, patching and/or grouting, sewer flow control, traffic control, and testing.
- q. **Manhole Rehabilitation (Epoxy Lining):** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, patching and/or grouting, cementitious underlayment, sewer flow control, traffic control, and testing.
- r. **Internal Manhole Chimney Sealant:** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, sealant system accessories, equipment, surface cleaning and preparation, patching and/or grouting, sewer flow control, traffic control, and testing.
- s. **Removal of Interior Manhole Steps:** Payment for this item will be full compensation for labor, materials and equipment necessary to remove steps from the interior of the manhole, patch any voids created by the removal, sewer flow control, and traffic control.

806-10 PAY ITEMS:

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
8061100	Manhole Riser Ring (Concrete)	Vertical Inch
8061200	Manhole Riser Ring (Cast Iron)	Vertical Inch
80620__	__" Manhole Cone Replacement	Vertical Foot
8063000	Reset Existing Manhole Frames and Covers	Each
8063100	Manhole Frame	Each
8063101	Manhole Frame (Oversized)	Each
8063102	Manhole Frame (Bolt Down Watertight)	Each
8063103	Manhole Frame and Cover (Hinged)	Each
8063104	Air Release Valve Vault Frame	Each
8063200	Manhole Cover	Each

8063201	Manhole Cover (Oversized)	Each
8063202	Manhole Cover (Bolt Down Watertight)	Each
8063203	Air Release Valve Vault Cover	Each
8064000	S.S. Manhole Insert	Each
8065000	Manhole Repair (Patching)	Cubic Foot
8066100	Manhole Rehabilitation (Cementitious Lining)	Vertical Foot
8066200	Manhole Rehabilitation (Epoxy Lining)	Vertical Foot
8066300	Internal Manhole Chimney Sealant	Vertical Inch
8067000	Removal of Interior Manhole Steps (Per M.H.)	Each