



**SPECIAL PROVISIONS
FOR
GROUNDWATER SUPPRESSION SYSTEM**

**Black Hawk County
NHSX-063-6(96)--3H-07**

**Effective Date
March 21, 2017**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150240c.01 DESCRIPTION.

- A.** This specification covers the work for constructing the Groundwater Suppression System (GWSS). The work shall include construction of groundwater interceptor trenches, conveyance piping, access manholes, regulator manholes, and modifications to the existing Edward Street Lift Station Culvert. The casing installation of Canadian Railroad undercrossing is covered under Special Provisions for Auger Boring.
- B.** The final constructed GWSS shall be continuous, and shall be capable of transporting collected groundwater along the full length of the groundwater interceptor trench.
- C.** The Contractor shall construct the GWSS in accordance with this special provision and the details shown on the plans.
- D.** The Contractor shall install the temporary shoring and dewatering for the GWSS in accordance with Special Provisions for Temporary Shoring and Temporary Dewatering System, and the plans.
- E.** Design Criteria: The structural design of access and regulator manholes shall be using the following parameters.
 - 1.** Groundwater table: elevation 845 feet.
 - 2.** Equivalent fluid pressure above groundwater table: 60 pounds per cubic foot.
 - 3.** Equivalent fluid pressure below groundwater table: 95 pounds per cubic foot.
 - 4.** Uniform Lateral surcharge pressure: 2500 pounds per square foot (from nearby MSE wall).
 - 5.** Nominal bearing resistance: 7500 pounds per square foot.

F. Qualifications.

1. The Contractor shall have a minimum of 5 years of experience and a minimum five projects of constructing sewer, water drainage, and/or water pipes. Each project shall be a minimum length of 1000 feet of pipe.
2. The Contractor's superintendent shall have at least 5 years and 2000 feet of experience in constructing sewer, water drainage, and/or water pipes.

150240c.02 MATERIALS.

A. Materials Excavated from GWSS Construction

Excavated material shall be classified as per Article 2552.02, A of the Standard Specifications.

B. Stabilization Material.

Stabilization material shall comply with stabilization (foundation) material as specified in Article 2552.02, F of the Standard Specifications.

C. Controlled Low Strength Material (CSLM).

CSLM shall comply with Article 2552.02, G, 3 of the Standard Specifications.

D. Sand Filter.

Acceptable Sand Filter products include:

1. US Silica FilPro – grade No.2.
2. Standard Sand and Silica – grade 6/20.
3. Colorado Silica Sand – grade 8/16.
4. Fairmont Santrol - product 620.
5. Red Flint Sand and Gravel - Filter Sand Product 1.20-1.60.

E. Granular Backfill.

The Granular backfill material shall be as per Section 4133 of the Standard Specifications.

F. Manhole Bedding.

Class I bedding material shall meet the requirements of Section 4118 of the Standard Specifications.

G. Pipe.

1. Use slotted pipes in groundwater interceptor trench:
 - a. The slotted pipes shall be 12 inch nominal diameter, schedule 80 PVC, and 0.05 inch slot opening with 0.25 inch spacing between slots, manufactured by Certain Teed PVC Well Casing, Charlotte Pipe and Foundry Company, Crestline Plastic Pipe Company, Johnson Well Screen, or Roscoe-Moss Company.
 - b. Pipe size shall comply with ASTM D1785.
 - c. PVC plastic shall meet ASTM D 1784, Cell Classification 12454.
 - d. Integral bell and spigot joints with elastomeric seals meeting ASTM D 3212 and ASTM F 477 shall be used.
2. **Ductile Iron Pipe.**
 - a. **Piping.**

- 1) The conveyance pipes shall be ductile iron and have nominal diameter as specified in the plans.
 - 2) Pressure class shall be 250 psi minimum working pressure, conforming to Table 5 and Table 7 for Type 5 trench in AWWA C151/A21.51.
- b. Lining.**
Cement-mortar shall meet AWWA C104/A21.4 specifications.
- c. Fittings.**
Push-on: AWWA C110/A21.10, AWWA C111/A21.11, and AWWA C153/A21.53 ductile iron, 250 pounds per square inch minimum working pressure. . American Cast Iron Pipe Co., Fastite Joint; U.S. Pipe and Foundry, Tyton Joint; or Clow Water System Co., Fastite Joint.
- d. Joints.**
Push-on: 250 pounds per square inch minimum working pressure, AWWA C110/A21.10 and AWWA C111/A21.11. American Cast Iron Pipe Co., Fastite Joint; U.S. Pipe and Foundry, Tyton Joint; or Clow Water System Co., Fastite Joint.
- e. Gaskets.**
- 1) Push-on Mechanical Joints; Rubber shall conform to AWWA C111/A21.11.
 - 2) Provide manufacturer's standard gasket compatible with the pipe.
- f. Joint Lubrication:** shall meet the manufacturer's standard.

H. Precast Concrete Manholes.

Precast concrete manholes shall comply with storm sewer structure requirements in Section 2435 of the Standard Specifications, except:

1. The minimum 28 day precast concrete strength shall be 4000 pounds per square inch.
2. Reinforcing steel shall be uncoated ASTM A615, Grade 60.
3. Pipe connections to manholes shall be modular mechanical seal type connections

I. Cast-in-place Concrete Structural Component.

Cast-in-place concrete structural components including cast-in-place manhole base (if selected), end wall and pipe penetration closure collar at the existing culvert, shall comply with Section 2435 of the Standard Specifications, except the following:

1. The minimum 28 day concrete strength shall be 4000 pounds per square inch.
2. Limit the maximum water to cementitious material ratio to 0.40.
3. Reinforcing steel shall be uncoated ASTM A615, Grade 60.
4. Post installed adhesive Dowels: Adhesive for concrete doweling shall be approved by ICC Evaluation Services Report for conforming to 2009 IBC requirements for doweling of steel reinforcing bars in cracked concrete. The adhesive shall be suitable for long-term loads as well as for seismic loads, meeting requirements of ASTM C881. The adhesive shall be two-components, insensitive to moisture and designed to be used in an adverse freeze/thaw environment.
5. Hydrophilic Waterstops: Hydrophilic waterstops shall be used at construction joints where new concrete is placed against existing concrete and as shown on the plans. The material shall be a nonbentonite hydrophilic rubber compound that will swell when in contact with water.

J. Assembly of Regulator Manholes.

1. **Weir Wall.**

Fabricate plates and associated framing using stainless steel meeting AISI Type 316 specifications.

2. Cast-In-Place Anchor Bolts.

- a. Headed type, unless otherwise shown on plans.
- b. AISI Type 316 stainless.

3. Post-Installed Concrete Anchors.

a. General.

- 1) Be AISI Type 316 stainless.
- 2) Have a current ICC-ES Report indicating acceptance per IBC 2012 for anchors at structural applications in cracked concrete.
- 3) Be suitable for long-term loads.

b. Adhesive Anchors (Epoxy Anchors).

- 1) Adhesive anchors shall have a current ICC-ES Report that demonstrates compliance with ICC-ES AC308 for cracked concrete.

2) Threaded Rods.

- a) Be ASTM F593 stainless steel threaded rods with a diameter as shown on plans.
- b) Be of a length as required, to provide minimum depth of embedment.
- c) Be clean and free of grease, oil, or other deleterious material.
- d) For hollow-unit masonry, provide galvanized or stainless steel wire cloth screen tube to fit threaded rod.

3) Adhesive.

- a) Adhesive used shall be a two-component adhesive that is insensitive to moisture and designed to be used in adverse freeze/thaw environments.
- b) Cure Temperature, Pot Life, and Workability: Adhesive shall be compatible for the intended use and anticipated environmental conditions.
- c) Mixed Adhesive: The mixed adhesive shall have a nonsag light paste consistency with the ability to remain in a 1 inch diameter overhead drilled hole without runout.
- d) Adhesive used shall meet the requirements of ASTM C881/C881M.

4) Packaging and Storage.

- a) The adhesive used shall be a disposable, self-contained cartridge system capable of dispensing both components in proper mixing ratio and fitting into manually or pneumatically operated caulking gun.
- b) Store adhesive cartridges and adhesive components on pallets or shelving in a covered storage area.
- c) Container markings shall include the manufacturer's name, product name, batch number, mix ratio by volume, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.
- d) Adhesive shall be disposed of when:
 - (1) Its shelf life has expired.
 - (2) It is stored in a manner not in accordance with manufacturer's instructions.

5) Approved Adhesive Manufacturers and Products.

- a) Hilti, Inc., Tulsa, OK; HIT Doweling Anchor System, HIT RE 500 SD (ESR-2322).
- b) Simpson Strong-Tie Co., Inc., Pleasanton, CA; SET-XP Epoxy Adhesive Anchors (ESR-2508).
- c) Powers Fasteners, Brewster NY, PE1000+ Adhesive anchoring system (ESR-2583).

4. Adjustable Stem Guide for Regular Manhole Drain Valve.

Stem Guides shall be constructed of ductile iron, grade 65-45-12. Stem guides fabricated by welding carbon steel shall not be permitted. Stem guides shall include a bronze bushing with an inside diameter 1/16 inch larger than the outside diameter of the extension stem and shall be retained with two stainless steel screws. The stem guide shall include an adjustable design for plumb alignment. The adjusting bolt and washer shall be type 316 stainless. Stem

guides shall be spaced so that the unsupported length between extension stems shall not exceed 6 feet.

5. Butterfly Drain Valve.

- a. Butterfly Drain Valves shall be in full compliance with AWWA C504 and meet the following requirements:
 - 1) Be suitable for throttling operations and infrequent operation after periods of inactivity.
 - 2) Have elastomer seats which are bonded or vulcanized to the body. The elastomer seats shall have adhesive integrity of bond between seat and body assured by testing, with a minimum 75 pound pull in accordance with ASTM D429, Method B.
 - 3) Be bubble-tight with rated pressure applied from either side. Valves shall be tested with pressure applied in both directions.
 - 4) Have no travel stops for disc on interior of body.
 - 5) Have self-adjusting V-type or O-ring shaft seals.
 - 6) Have metal-to-metal thrust bearing surfaces isolated from flow stream. Provide traveling nut or worm gear actuator with handwheel. Valve actuators shall meet the requirements of AWWA C504.
 - 7) Have linings and coatings in accordance with AWWA, unless otherwise indicated on the plans or specified herein.
- b. Type V500 Butterfly Valve Water Works Service 3 inches to 72 inches shall meet the following requirements
 - 1) Be in full compliance with AWWA C504, Class 150B.
 - 2) Be short body type, flanged ends.
 - 3) Have cast-iron body, cast or ductile iron disc, Type 304 stainless steel shafts, Buna-N rubber seat bonded or molded in body only, and stainless steel seating surface.
 - 4) Have epoxy lining and coating in compliance with AWWA C550.
 - 5) Approved manufacturers include the following:
 - a) Pratt; Model 2FII or Triton XR-70.
 - b) DeZurik; AWWA Valve.
 - c) Clow Valve; Stle 4500.

6. Valve Operator.

- a. All valve operators shall meet the following requirements:
 - 1) For AWWA valves, operator force shall not exceed requirements of the applicable valve standard. The Contractor shall provide gear reduction operator when force exceeds requirements.
 - 2) Operator shall be the self-locking type or be equipped with self-locking device.
 - 3) Have a position indicator on quarter-turn valves.
 - 4) Worm and gear operators one-piece design, worm-gears of gear bronze material. Worm of hardened alloy steel with thread ground and polished. Traveling nut type operator's threaded steel reach rod with internally threaded bronze or ductile iron nut.
- b. Manhole valve operators shall meet the following requirements:
 - 1) Manhole service operators on valves larger than 2 1/2 inches shall have a 2 inch AWWA operating nut. Moving parts of valve and operator shall be enclosed in housing to prevent contact with the water.
 - 2) Manhole service operators shall be grease packed and gasketed to withstand a submersion in water to 20 feet minimum.
 - 3) Manhole valves shall have extension stems, bonnets, and valve boxes cast into manhole top slab.

7. Manhole Valve Accessories.

- a. Each manhole valve shall have two galvanized T-handled operating wrenches, 4 feet long.
- b. Cast-Iron Valve Box shall be designed for traffic loads, sliding type, with minimum of 5 1/4 inch ID shaft.

- 1) Box shall be manufactured from cast iron with minimum depth of 9 inches.
- 2) Lid shall be manufactured from cast iron with minimum depth 3 inches, of a nonlocking type, marked WATER or GAS as applicable.
- 3) Extensions shall be manufactured from cast iron.
- 4) Valves measuring 4 through 12 inches shall have a two piece box and lid, valves larger than 12 inches shall have a three-piece box and lid with base sized for valve.
- 5) Valves with operating nuts shall have valve extension stems 3 feet or more below finish grade.
 - a) Approved manufacturers and products include the following: East Jordan Iron Works; cast-iron valve boxes.
 - b) Bingham & Taylor; cast-iron valve boxes.
 - c) Castings Inc; cast-iron valve boxes.

8. Stainless Steel Pipe.

a. Piping.

- 1) Stainless steel piping shall have nominal diameter to match the butterfly valve as specified in the plans.
- 2) Steel shall be schedule 40S: ASTM A778, "as-welded" grade, Type 316L, pickled and passivated.

b. Flanges.

Be of forged Stainless Steel, meeting ASTM A182/A182M, Grade F316L, ASME B16.5 Class 150 or Class 300, slip-on weld neck or raised face, and have weld slip-on flanges inside and outside.

c. Bolting.

Forged Flanges shall be type 316 stainless steel, ASTM A320/A320M Grade B8M hex head bolts, ASTM A194/A194M Grade 8M hex head nuts and ASTM F436/F436M Type 3 alloy washers at nuts and bolt heads. Flanges shall achieve 40% to 60% of bolt minimum yield stress.

d. Gaskets.

- 1) Gaskets shall be used between the stainless steel flange and the butterfly valve.
- 2) Flanged, Water, and Hot Air Services shall be 1/8 inch thick, homogeneous black rubber (EPDM), hardness 60 (Shore A), rated to 250°F, continuous and conforming to ASME B16.21 and ASTM D1330, Steam Grade.

K. Modular Mechanical Seal.

1. Modular mechanical seals shall be interconnected synthetic rubber links shaped and sized to continuously fill the annular space between pipe and wall sleeve opening.
2. **Fabrication.**
 - a. Interconnected rubber links shall be assembled with ASTM A276, Type 316 stainless steel bolts and nuts.
 - b. Pressure plates shall be reinforced nylon polymer.
3. Seals shall be sized according to manufacturer's instructions for size of pipes shown to provide a watertight seal between pipe and wall sleeve opening, and to withstand a hydrostatic head of 40 feet of water.

L. Additional Materials for Manholes.

1. Manhole Adjustment Rings shall comply with Article 4149.04, H of the Standard Specifications.
2. Manhole Casting: Ring, frame and cover material shall comply with Article 4149.04, I, 1 and 2 of the Standard Specifications.

3. Steps shall comply with Article 4149.04, L of the Standard Specifications.

150240c.03 CONSTRUCTION.

A. Submittals.

1. The Contractor shall submit resumes showing required qualifications.
2. **Work Plan.**
 - a. The Contractor shall submit the work plan no later than 30 working days before beginning the Groundwater Suppression System construction. The Contractor shall submit the work plan to the Engineer for review and approval, and the GWSS construction shall not start until the Engineer approves the work plan.
 - b. The submitted work plan shall include the following:
 - 1) Site Visit: The Contractor shall acknowledge that the job site has been visited to verify the site conditions with regard to entrance, access, overhead lines, subsurface features, permitting, and collecting all information necessary to plan and execute the work.
 - 2) List of Proposed Equipment: Include number and sizes of cranes; number and sizes of compaction equipment; cleaning equipment; and all relevant equipment necessary to complete the Groundwater Suppression System installation.
 - 3) Details of Schedule for Construction Operations: Include a layout of the installation sequence.
3. Pipe laydown shop drawings.
4. **Concrete Structures.**
 - a. **Shop drawings.**
 - 1) Cast-in-place concrete component geometry, steel reinforcement sizes, lengths, bends and quantity.
 - 2) Precast manhole structure showing general geometry, total depth, relative elevations and orientation of all connecting pipes and connection detail between precast segments. Shop drawing shall also include manhole cover, manhole invert and manhole steps.
 - b. **Concrete mix design.**
 - 1) Concrete mix design shall contain proportions of materials and admixtures to be used on Project, signed by mix design. Indicate location of the concrete mix to be used.
 - 2) Submit documentation of average strength for each proposed mix design in accordance with ACI301. Submit manufacturer's certificate of compliance for Portland cement, supplemental cementitious material such as fly ash and slag cement, aggregates and admixtures.
 - c. **Material Data.**
 - 1) Adhesive to be used for post-installed adhesive dowels.
 - 2) Hydrophilic water stop at construction joint between new and existing concrete.
5. **Product Data.**
 - a. The manufacture's product specification and catalog for the following items:
 - 1) Hydrophilic waterstop.
 - 2) Slotted PVC pipe.
 - 3) Conveyance pipe.
 - b. Gradation report for the granular backfill, sand filter, and stabilization material.
 - c. Name and location of the source of the granular backfill material.

B. General.

1. The Contractor shall carry out the work in accordance with the approved submittals.

Construction of the GWSS shall not commence until approval of the engineer has been obtain.

2. The Contractor shall review the construction sequence defined in the plans to properly understand staging and sequencing requirements.

C. Excavation.

1. Excavation shall comply with Article 2552.03, A of the Standard Specifications.
2. Excavate to lines, grades, and dimensions shown and as necessary to accomplish work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, manhole bedding (if any), and any other construction items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.
3. Over excavation shall not be done without written authorization of Engineer.

D. Preparation of Excavation Bottom.

1. If unsuitable soils are encountered in trench bottom, the Contractor shall notify the Engineer prior to over-excavation. Unsuitable material shall be as per definition specified in Article 2102.02, D, 2 of the Standard Specifications.
2. The Engineer will determine the need for over-excavation and trench foundation stabilization prior to installation of pipes and structures.
3. If trench is over excavated, the Contractor shall place stabilization material over full width of trench in 6 inch lifts to the bottom of pipe zone. Each lift shall be compacted so as to provide a firm, unyielding support for the sand filter prior to placing succeeding lifts.
4. The Contractor shall ensure surface of excavation bottom is free of debris prior to placing any pipe or structure.

E. Shoring.

All work shall comply with Special Provisions for Temporary Shoring.

F. Dewatering.

All work shall comply with Special Provisions for Temporary Dewatering System.

G. Backfill for Groundwater Interceptor Trench and Conveyance Pipe.

1. Do not use power driven impact type compactors for compaction until at least 4 feet of material is placed over top of pipe.
2. Sand filter: Placement of sand filter material shall comply with Article 2552.03, E, 2 of the Standard Specifications with the following stipulation:
 - a. Pipe bedding placement requirements shall apply to sand filter placement of this project.
 - b. Backfill material shall be as per plans and this special provision.
3. Granular backfill: Mechanically compact each lift to not less than 95% of Standard Proctor Density prior to placing succeeding lifts.
4. CLSM: Place CLSM for conveyance pipe segments specified in the plans. Secure pipe against displacement or flotation prior to placing CLSM.

H. Backfill around Manholes and Edward Street Lift Station Culvert.

Backfill and compaction around manholes shall comply with Article 2435.03, A, 12 of the Standard Specifications, except:

1. Backfill around manhole below the existing grade shall be granular backfill material.
2. Backfill inside the abandoned portion of Edward Street Lift Station Culvert shall be CLSM, within the limits as per the plans.

I. Buried Pipe Installation.**1. Joints.**

- a. The Contractor shall provide concrete closure collar as shown in the plans.
- b. Concrete Encased or Embedded Pipe: Do not encase joints in concrete, unless specifically shown.
- c. The Contractor shall provide flexible joints at all concrete structures:
 - 1) Install a flexible joint 18 inches or less from face of structures; joint may be flush with face.
 - 2) Install a second flexible joint within 18 inches of the first joint.

2. Placement of Buried Pipe.

- a. Keep trench dry until pipe laying and joining are completed.
- b. Exercise care when place the pipe into trench to prevent twisting or damage to pipe.
- c. Measure for grade at pipe invert, not at top of pipe.
- d. Excavate trench bottom and sides of ample dimensions to permit visual inspection and testing of entire flange, valve, or connection.
- e. Prevent foreign material from entering pipe during placement.
- f. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.
- g. Lay pipe upgrade with bell ends pointing in direction of laying.
- h. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:
 - 1) Shorter pipe lengths.
 - 2) Special mitered joints.
 - 3) Standard or special fabricated bends.
- i. After joint has been made, check pipe alignment and grade.
- j. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.
- k. Prevent uplift and floating of pipe prior to backfilling.

3. Placement of PVC Pipe.

- a. Lay pipe snaking from one side of trench to other.
- b. Offset: As recommended by manufacturer for maximum temperature variation between time of solvent welding and during operation.
- c. Shield ends to be joined from direct sunlight prior to and during the laying operation.

4. Tolerances.

- a. Deflection from Horizontal Line, Except PVC: Maximum 2 inches.
- b. Deflection from Vertical Grade: Maximum 1/4 inch.
- c. Joint Deflection: Maximum of 75% of manufacturer's recommendation.
- d. Horizontal position of pipe centerline on alignment around curves maximum variation of 1.75 feet from position shown.
- e. Pipe Cover: Minimum 3 feet, unless otherwise shown in the plans.

J. Valve Installation.

1. General.

- a. Install valves such that handles can operate from fully open to fully closed without encountering obstructions.
 - b. Install valves in location for easy access for routine operation and maintenance.
 - c. Install valves in accordance with manufacturer's recommendations.
2. Extension Stem for Operator: Where the depth of the valve operating nut is 3 feet or greater below finish grade, the Contractor shall furnish an operating extension stem with 2 inch operating nut to bring operating nut to a point within 6 inches of finish grade.

K. Manhole Construction.

1. Subbase: For both case-in-place and precast manhole base, the Contractor shall install an 8 inch thick pad of Class I bedding material a minimum of 12 inches outside the footprint of the structure.
2. Installation of Manholes shall comply with Article 2435.03, A, 4 of the Standard Specifications.
3. Install pipe flush with inside wall of structure.
4. Joint sealant shall comply with Article 2435.03, A, 6, b of the Standard Specifications.
5. Manhole invert is not required.
6. Manhole top sections shall comply with Article 2435.03, A, 8 of the Standard Specifications.
7. Manhole adjustment rings shall comply with Article 2435.03, A, 9 of the Standard Specifications.
8. Manhole casting shall comply with Article 2435.03, A, 10 of the Standard Specifications.

L. Cast-in-place Concrete Structures.

Cast-in-place structures shall be in compliance with Article 2435.03, B of the Standard Specifications.

M. Precast Concrete Structures.

Precast concrete structures shall be in compliance with Article 2435.03, C of the Standard Specifications.

N. Cleaning, Inspection, and Testing of Structures.

Cleaning, inspection, and testing shall be in compliance with Article 2435.03, F of the Standard Specifications, except that Sanitary Sewer Manhole Testing does not apply this project.

150240c.04 METHOD OF MEASUREMENT.

A. Excavation.

Measurement for Excavation, in cubic yard, will be the quantity shown in the contract documents.

B. CLSM.

Measurement for CLSM, in cubic yard, will be the quantity shown in the contract documents.

C. Sand Filter.

Measurement for Sand Filter, in cubic yard, will be the quantity shown in the contract documents.

D. Granular Backfill Material.

Measurement for Granular Backfill Material, in cubic yard, will be the quantity shown in the contract documents.

E. Groundwater Interceptor Trench.

Measurement for Groundwater Interceptor Trench, in feet, will be the quantity shown in the contract documents.

F. Conveyance Pipe, 12 Inch.

Measurement for Conveyance Pipe, 12 Inch, in feet, will be the quantity shown in the contract documents.

G. Conveyance Pipe, 16 Inch.

Measurement for Conveyance Pipe, 16 Inch, in feet, will be the quantity shown in the contract documents.

H. Access Manholes.

Each type and size of access manhole will be counted.

I. Regulator Manholes.

Each type and size of regulator manhole will be counted.

J. Modification to the Existing Edward Street Lift Station Culvert.

Each modification of the existing Edward Street Lift Station Culvert will be counted.

150240c.05 BASIS OF PAYMENT.

A. Excavation.

1. Payment for Excavation will be at the contract unit price per cubic yard.
2. Payment is full compensation for:
 - All excavation, including both soil and rock, for the GWSS installation, and
 - Preparation of Excavation Bottom, including over excavation, and furnishing and placement of stabilization material.
 - Removal and disposal of excavated material to a location outside of the project limits.

B. CLSM.

1. Payment for CLSM will be at the contract unit price per cubic yard.
2. Payment is full compensation for furnishing and placing CLSM outside of Edward Street Lift Station Culvert area.

C. Sand Filter.

1. Payment for Sand Filter will be at the contract unit price per cubic yard.
2. Payment is full compensation for furnishing and placing sand filter.

D. Granular Backfill Material.

1. Payment for Granular Backfill Material will be at the contract unit price per cubic yard.
2. Payment is full compensation for furnishing and placing granular backfill material up to the existing ground.

E. Groundwater Interceptor Trench.

1. Payment for Groundwater Interceptor Trench will be at the contract unit price per linear foot.
2. Payment is full compensation for furnishing and installing slotted pipe.

F. Conveyance Pipe, 12 Inch.

1. Payment for Conveyance Pipe, 12 Inch, will be at the contract unit price per linear foot.
2. Payment is full compensation for furnishing and installing all conveyance pipes of the project, including the conveyance pipes inside the auger bored casing.

G. Conveyance Pipe, 16 Inch.

1. Payment for Conveyance Pipe, 16 Inch, will be at the contract unit price per liner foot.
2. Payment is full compensation for furnishing and installing all conveyance pipes of the project, including the conveyance pipes inside the auger bored casing.

H. Access Manholes.

1. Payment will be at the contract unit price for each type and size of manhole.
2. Payment is compensation for furnishing and installing bedding, base, structural concrete, reinforcing steel, precast units, pipe connections, castings, and adjustment rings.

I. Regulator Manholes.

1. Payment will be at the contract unit price for each type and size of manhole.
2. Payment is compensation for furnishing and installing bedding, base, structural concrete, reinforcing steel, precast units, pipe connections, castings and all assembly.

J. Modification to the Existing Edward Street Lift Station Culvert.

1. Per each.
2. Payment is full compensation for:
 - Demolition of the existing culvert,
 - Furnishing and placing grout, waterstop, concrete, and reinforcing steel,
 - Furnishing and placing CLSM in the culvert area,
 - Coring or jack hammer the existing culvert,
 - Pipe connections, and
 - All other works associated with the modification as shown in the plans and this special provision.