

SECTION 02754 UNDERGROUND INFILTRATION BASIN

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

1.2 SUMMARY

- A. This item shall govern the furnishing and installation of Steel Reinforced Polyethylene (SRPE) underground detention and infiltration systems for nominal diameters 30" (750mm) through 120" (3000mm).
- B. Contractor shall furnish all labor, materials, equipment and incidentals necessary to install the SRPE system, appurtenances and incidentals in accordance with the Drawings and as specified herein.
- C. A stormwater treatment device upstream of the SRPE system is recommended as the appropriate means of pretreating for the purpose of extending the maintenance interval on the SRPE system and reducing the life cycle cost. Both engineered solutions shall be provided by a single supplier/manufacturer. Filtration by wrapping a system with geotextile is not an acceptable means of pretreatment.

1.3 REFERENCES

- A. Section 02152, Excavation, Subgrade, and Embankment
- B. Section 02701, Pipe For Storm Drains And Culverts
- C. Section 02610, Concrete for Miscellaneous Structures
- D. ASTM F2562 "Standard Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage"
- E. AASHTO Designation MP-20 Section
- F. ASTM D3350 "Standard Specification for Polyethylene Plastics Pipe and Fittings Materials"
- G. ASTM D3212 "Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals"
- H. ASTM D2321 "Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications"

1.4 SUBMITTALS

Prior to commencing the Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

- 1.5 Site layout drawings, product specifications, materials, hydraulic storage data and supported calculations of proposed alternatives shall be submitted for review at a minimum of 20 working days prior to construction.
 - A. Shop drawings shall be annotated to indicate all materials to be furnished and installed under this section, and all applicable standards for materials, required tests of materials and design assumptions for structural analysis.
 - B. Provide manufacturer's warranty information for proposed system.

PART 2 MATERIALS

- 2.1 SRPE shall be manufactured in accordance with the applicable requirements of ASTM F2562 "Standard Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage".
- 2.2 Virgin high density polyethylene stress-rated resins are used to manufacture SRPE pipe and complimentary fabricated fittings. Resins shall conform to the minimum requirements of cell classification 345464C as defined and described in the latest version of ASTM D3350 "Standard Specification for Polyethylene Plastics Pipe and Fittings Materials".
- 2.3 Pipe lengths shall be joined on site using coupling bands, bell & spigots, or welded couplers especially designed for SRPE pipe. Joints shall meet one of the performance levels as required and specified:
 - A. Soil Tight Joints (30" – 120") shall be plain ended SRPE pipe with Aluminized Type 2 (or optional Polymeric coated) CMP coupling bands and elastomeric gaskets.
 - B. High Performance (HP) Joints (30" – 72") shall be gasketed, bell and spigot joints where both the bell and spigot are reinforced with steel that is fully encased in stress-rated high density polyethylene (meeting the requirements set forth in the above Material Properties paragraph) and that have been laboratory tested to 10.8 psi in accordance with ASTM D3212 "Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals".
 - C. Welded Coupler (WC) Joints (36" – 120") shall utilize plain ended SRPE pipe joined by extrusion welded couplers. Welded couplers to be installed by manufacturer authorized service provider. Contractor is responsible for providing a clean, dry surface for welding as described in the manufacturer "SRPE Steel Reinforced PE Technology Installation Guide". The field installed welded couplers

shall be capable of successfully passing field leakage testing as described in the “SRPE Detention Post Installation Leak Testing Procedure”.

- 2.4 The manufacturer of the SRPE system shall be one that has regularly been engaged in the engineering design and production of these systems for at least eight (8) years and which has a history of successful production, acceptable to the Engineer of Record (EOR). In accordance with the Drawings, the SRPE system shall be supplied by the following manufacturer or approved equal:

Contech Engineered Solutions
9025 Centre Pointe Drive
West Chester, OH, 45069
Tel: 1 800 338 1122

- 2.5 Sampling, testing, and inspection of PE resin, metal sheets and coils used for manufacturing the SRPE system shall be in accordance with to the above applicable referenced specifications. All fabrication of the product shall occur within the United States.

PART 3 PERFORMANCE

- 3.1 The SRPE system proposal shall be sized in accordance to the design provided and approved by the Engineer of Record (EOR). Any Contractor deviating from the design shown on the plans, to include: material, footprint, etc., shall provide to the EOR a summary report on stage-storage curves, design calculations, HydroCAD modeling and engineering drawings.
- 3.2 The SRPE system shall comprise of manhole access with minimum dimensions of 24 inches diameter to provide adequate inspection and maintenance without restrictions and obstructions to entry into interior of the SRPE system. Manholes shall be provided to allow full entry into and visual inspection of the complete SRPE system, at a minimum as to allow full maintenance of the SRPE system. Cleanouts or inspection ports are not acceptable access points for maintenance and inspection nor are any other alternatives which do not allow for full entry into the system.
- 3.3 SRPE row spacing and stone base thickness cannot be altered with consultation from the manufacturer.
- 3.4 The SRPE system shall be designed for a minimum HS-20/HS-25 final live loading conditions with the minimum pipe stiffness as shown in Table 1. The SRPE system shall meet HS-20/HS25 loading requirements with a minimum cover measured from the top of pipe to the bottom of flexible pavement as shown in Table 1.

Table 1: Pipe Dimensions and Cover Limits

Nominal Pipe Size	Minimum Pipe Stiffness (Class 1)	Outside Diameter	Unit Weight**	Minimum Waterway Wall Thickness (t ₁)		Minimum Cover***		Maximum Cover	
inch	lb/in/in	in. [mm]	lbs./ft	in.	[mm]	ft.	[m]	ft.	[m]
30	28	30.9 [785]	15.5	.082	[2.08]	1	[.305]	50	[15.2]
36	22	37.1 [942]	20.8	.082	[2.08]	1	[.305]	50	[15.2]
42	20	43.2 [1097]	26.5	.082	[2.08]	1	[.305]	50	[15.2]
48	18	49.5 [1257]	29.1	.130	[3.30]	1	[.305]	30	[9.1]
54	16	55.5 [1410]	34.7	.130	[3.30]	1	[.305]	30	[9.1]
60	14	61.4 [1560]	41.6	.130	[3.30]	1	[.305]	30	[9.1]
66	14	67.8 [1722]	56.9	.220	[5.58]	1.5	[.457]	30	[9.1]
72	14	74.1 [1882]	65.6	.220	[5.58]	1.5	[.457]	30	[9.1]
84	14*	85.9 [2182]	76.3	.220	[5.58]	2	[.610]	30	[9.1]
96	10*	97.8 [2484]	87.0	.220	[5.58]	2	[.610]	30	[9.1]
108	7*	111.3 [2827]	99.7	.220	[5.58]	2.5	[.762]	25	[7.6]
120	5*	121.9 [3097]	109.0	.220	[5.58]	3	[.914]	25	[7.6]
<p>* 84", 96", 108" and 120" min. pipe stiffness is not currently defined in ASTM Specification F2562 for Class 1 pipe. Manufacturer has developed the required minimum pipe stiffness for these pipe diameters.</p> <p>** Approximate weights. Actual weight will vary with length and joint type.</p> <p>*** Minimum and maximum cover limits are for H02/H25 loading.</p>									

3.5 The SRPE system shall be designed so as the hydraulic grade line will increase evenly throughout whereas transverse movement from one storage compartment to another shall not be permitted. All storage compartments shall be connected via manifold (or connecting pipe) versus by transporting stormwater through stone.

3.6 A stormwater pretreatment device is recommended upstream of the SRPE system as follows:

- A. Infiltration: Where feasible, the selected stormwater treatment device upstream of an infiltration system shall be a filter system and have General Use Level Designation (GULD) for Basic Treatment by the Washington State Department of Ecology or demonstrate equivalent performance in independently verified field testing following a peer reviewed testing protocol, and must be sized consistent with the system producing those results.

- 3.7 Detention: Where feasible, the selected Stormwater treatment device upstream of a detention system shall be a separator system and have GULD for Pretreatment by the WADOE or demonstrate equivalent performance in independently verified field testing following a peer reviewed testing protocol, and must be sized consistent with the system producing those results.
- 3.8 Selected pretreatment stormwater device shall incorporate a physical barrier capable of capturing and retaining trash and debris (i.e.: floatable and neutrally buoyant materials) for all flows up to the treatment capacity of the device.
- 3.9 The application of wrapping a system with geotextile of any branding or material type, that allows the passage of stormwater, shall not be regarded as an acceptable treatment or pretreatment device.
- 3.10 The manufacturer of the selected Stormwater treatment device shall have been regularly engaged in the engineering design and production of systems for the physical treatment of Stormwater runoff for 15 years.
- 3.11 In order to not restrict the Owner's ability to maintain the stormwater pretreatment device, the minimum dimension providing access from the ground surface to the sump chamber shall be 20 inches in diameter.

PART 4 EXECUTION

- 4.1 The SRPE system installation shall be in accordance with ASTM D2321 "Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications" along with Table 1 and product-specific recommendations contained in manufacturer Installation Guidelines for SRPE pipe, available from local Contech representative or from www.conteches.com.
- 4.2 For SRPE system using a welded coupler (WC) joint, Contractor is responsible for providing a clean, dry surface for welding as described in the manufacturer "SRPE Steel Reinforced PE Technology Installation Guide".
- 4.3 The contractor shall follow Occupational Safety and Health Association (OSHA) guidelines for safe practices in executing the installation process in accordance with the manufacturer/supplier installation recommendations.
- 4.4 Contractor is required to participate in an on-site preconstruction meeting with the supplier prior to the scheduled delivery date of the SRPE system.
- 4.5 Contractor shall be responsible to provide training for the SRPE system to the Owner, which shall cover the basic operations and maintenance. All training materials including operations and maintenance (O&M) manuals shall be reviewed and approved by the Engineer prior to conducting the training. Training shall be

hands-on in the field, and must cover general system operations, description of the features and components of the system, basic troubleshooting, required care for equipment, preventative maintenance, corrective maintenance, and reactive maintenance.

PART 5 MEASUREMENT AND PAYMENT

5.1 METHOD OF MEASUREMENT

- A. All work under this section will not be measured for payment.

5.2 BASIS OF PAYMENT

- A. Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases. Payment will be made under:

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
02754.1A	Underground Infiltration Basin (Phases 0 through 3)	Lump Sum

END OF SECTION 02754