GREENVILLE UTILITIES COMMISSION
GREENVILLE, NORTH CAROLINA

FOUNDATION
SPECIFICATIONS FOR THE
GREENVILLE WEST SUBSTATION

PRELIMINARY – DO NOT USE FOR CONSTRUCTION

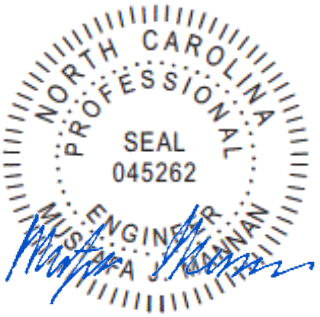
ISSUED FOR BIDS

November 28, 2018

BOOTH & ASSOCIATES, LLC

GREENVILLE UTILITIES COMMISSION
GREENVILLE, NORTH CAROLINA

OIL CONTAINMENT
SPECIFICATIONS FOR THE
GREENVILLE WEST SUBSTATION



11/28/2018

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Firm License No.: F-0221

TECHNICAL SPECIFICATIONS

1.0 General

The Oil Containment Specifications, Foundation Specifications, and Drawings are complementary, each to the other. The Greenville West Substation project includes the placement of the Oil Containment System for the 230 to 115 kV transformer which has been designed to contain accidental spills and/or tank rupture within the area surrounding the power transformer. The installation of this system involves the excavation of a large basin around the transformer foundation. The basin will be permanently formed with reinforced concrete walls and floors.

The containment basin is designed with a sloped concrete floor to allow all rainwater to collect at a single outlet. Beyond the collection basin, a sump tank containing an electric pump will be connected to this outlet to remove the accumulation of rainwater. A special sensor circuit in the pump control will disconnect the pump motor power in the event the rainwater is ever contaminated by transformer oil; otherwise, the rainwater is pumped into an open outlet pipe.

The Contractor shall be responsible for furnishing the labor and materials to install the concrete basins, and shall be responsible for the labor to complete the installation of the pumps and all associated electrical/plumbing materials for a complete system. The Contractor shall furnish the mechanical sump package as outlined in the "List of Materials for the Oil Containment System" following these specifications. The Contractor shall furnish all concrete, reinforcing steel, galvanized steel bar grating, and framing materials for the concrete basin.

2.0 Submittals

Copies of all reports shall be submitted to the Owner and Engineer within fifteen (15) days of contract award and prior to the performance of any work on the subject project. The Engineer will provide approval within ten days (10 days) of receipt of submittals. All submittals shall be provided to the Owner and Engineer as a single packet. A Submittal Log can be found in Appendix A of the Foundation Specifications.

2.1. Material Reports

Material reports shall be submitted to the Owner and Engineer certifying approved components as shown in the "List of Materials for the Oil Containment System" or as proposed alternates for the following items:

a) PVC Pipe
b) Joint Sealants
c) Reinforced Concrete Pipe
d) Grating
e) Steel Angle
f) Waterstop

2.2. Equipment Reports

Equipment submittals must include the manufacturer, model, accessory equipment, and performance specifications. Equipment cut sheets shall be submitted to the Owner and Engineer for the following equipment as specified in the "List of Materials for the Oil

Containment System":

a) Sump Pump
b) Oil Sensing Device

Alternates of equipment other than that specified in the "List of Materials for the Oil Containment System" must be submitted to the Owner and Engineer for approval.

2.3. Coordination Drawings

Fabrication drawings showing planned size, shape, location, and arrangement shall be submitted to the Owner and Engineer for the following items:

a) Grating
b) Steel Angle

Drawing shall include plan views of elements layout in the oil containment system, as well as detail drawings of the elements.

3.0 **Installation**

Installation details of the system have been included in the Drawings. Key elements of the system installation are as follows:

3.1. Excavate for the basin about the 230 to 115 kV transformer foundation over an area of approximately 45 feet x 35 feet to elevations as indicated on the drawings. If unsuitable material is encountered, the contractor shall remove the unsuitable material and backfill with well compacted washed stone or no frost structural fill in six inch (6") lifts, or concrete.

3.2. When applicable, install and compact washed stone or no frost structural fill in maximum six inch (6") uncompacted lifts to 80 percent (80%) relative density per ASTM D4253.

3.3. The stone subgrade of this basin area shall be graded for a natural drainage slope as indicated in the Drawings.

3.4. Install the concrete floors and walls to form a permanent basin in accordance with the details shown on the Oil Containment (OC) Drawings. Due care and attention must be given to the placement of conduits, ground conductors, and outlet pipes as illustrated on the Oil Containment Details, the Foundation Details, and the Conduit Plan Drawings. All concrete shall be reinforced with the number and type of steel reinforcing bars or mesh as required by these Drawings. Concrete shall be formed, placed, and cured all in accordance with the provisions of the "Foundations" section of the Technical Specifications.

3.5. When applicable, all galvanized welded steel bar grating must be bonded together in order to form a uniform, continuously grounded area. Individual sheets of welded steel bar grating and galvanized steel angle support members shall be bonded to the grounding loop inside the basin using the appropriate size connectors as shown on the details. Any other type of connector must be approved by the Owner or Engineer.

The oil containment basin ground loop shall be bonded to the substation power transformer ground bar locations as indicated on the Drawings.

3.6. Install the oil containment sump using a thirty-six inch (36") reinforced concrete pipe (RCP) and mechanical sump package outside the basin outlet per the Drawings at subgrade elevations as noted. The mechanical sump package includes the pump, oil-sensing device, control box, and all necessary hardware and connections. The material in the mechanical sump package shall be installed in accordance with the manufacturer's recommendations and as shown on the Drawings.

3.7. The Contractor shall restore the appropriate soil cover after placement of the sump.

3.8. Install and connect drain pipe from the basin to the sump and from the pump to the drainage outlet.

3.9. Tamp all drain system excavations after placement of pipes with specified backfill materials. Compaction density shall be suitable for heavy equipment vehicular traffic.

3.10. Connect pump control wiring to designated station service circuit.

4.0 **Testing**

After installation of the mechanical sump package and prior to the completion of the project, the system shall be checked to ensure it is in proper working order. The Contractor is responsible for notifying the Owner at least twenty-four (24) hours before testing the system, in order for a representative to be present at the time of testing.

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LIST OF MATERIALS FOR THE OIL CONTAINMENT SYSTEM

ITEM	DESCRIPTION	QUANTITY
OC1	Welded Steel Bar Grating – Galvanized with 2" x 3/16" load bearing bars at 1-3/16" o.c., McNichols Company Type GW-200, Serrated Surface (See Drawing OC2 for Panel Arrangement) Distributed by: McNichols Company 251 Wille Road #C Des Plaines, IL 60018-1861 Phone: (847) 635-5100 Fax: (847)635-1115 www.mcnichols.com	1,080 Sq. Ft.
OC2	Galvanized Steel Angle L 3" x 3" x ¼" with ½" x 1" slots at 36" o.c. maximum	397 Lin. Ft.
OC3	2" x 2" x ¼" Galvanized Steel Clips	As Required
OC4	36" Diameter Reinforced Concrete Pipe (RCP) x 8'-0" long	1
OC5	Aluminum Checker-Plate Cap, ¼" thick, to fit 36" diameter reinforced concrete pipe, with side lip and lifting handles	1
OC6	Grundfos Series Unilift AP Stainless Steel Submersible Sump Pump, Part No. AP12.40.04.1, 1/2 hp, 115 Volt ac, 10' Power Cord, No Float Switch Distributed By: Daparak, Inc. 4915 Waters Edge Drive Suite 180 Raleigh, North Carolina 27606 Phone: (919) 851-4411 Fax: (919) 859-4837 www.daparak.com	1

ITEM	DESCRIPTION	QUANTITY
OC7	Oil Smart Simplex Panel with Alarm, Oil Smart Switch 30 amp motor start relay and mounting hardware #OSSIM-30 Distributed by: See Water, Inc. 121 North Dillon Street San Jacinto, California 92583 Phone: (951)-487-8073 or (888)-733-9283 Fax: (951) 487-0557	1
OC8	PVC Pipe	
	1-1/2” Schedule 80	4 Lin. Ft. ±
	2-1/2" Schedule 80	110 Lin. Ft. ±
	4" Schedule 80	38 Lin. Ft. ±
OC9	Schedule 80 PVC Fittings	
	4" 90° Elbow (1/4 Bend, Sanitary Ell, Hub x Hub)	2
	4” Cap	1
	1-1/2” MPT x S	1
	2-1/2” x 1-1/2” Reducer	1
	2-1/2" 90° Elbow	3
	2-1/2" Union	1
	2-1/2" Couplings	As Required
OC10	2" PVC Conduit with fittings	As Required
OC11	Unistrut Mounting Frame (See Detail No. 3, Drawing OC3)	5 Lin. Ft.
OC12	3/8” x 1 ½” Stainless Steel Hex Head Bolt with nut and washer	As Required
OC13	3/8” x 3” Stainless Steel Anchors – HILTI Kwik Bolt III Distributed by: HILTI, Inc. 5400 South 122nd East Avenue Tulsa, Oklahoma 741461 Phone: (800) 879-8000 www.us.hilti.com	As Required
OC14	Drop-in Anchor for ½” Bolt	As Required

ITEM	DESCRIPTION	QUANTITY
OC15	Galvanized Hardware Cloth with ½" square openings	1 Sq. Ft.
OC16	Stainless Steel Pipe Clamps	
	For 4" pipe	1
	For 2½" pipe	1
OC17	#2 Tinned Copper	As Required
OC18	#2 Copper to #2 Copper Split Bolt Type Connector	As Required
OC19	Bronze Ground Clamp for #2 Copper	As Required
OC20	Bronze Straight Bolt Terminal #2 Copper	As Required
OC21	Clamp – Hubble Cat. No. GC5002	As Required
OC22	Not used	
OC23	Henry Synco-Flex FR Waterstop (Or approved equal)	170 Lin. Ft. ±
OC24	PVC Pipe Adhesive	As Required
OC25	Electrical Joint Compound	As Required
OC26	Rip Rap - 2” to 6”	1 Cu. Yd.
OC27	Concrete, 4,000 psi	1 Cu. Yd.