

## 860 – BASEDRAINS

### SECTION 860

### BASEDRAINS

#### 860.1 DESCRIPTION

Construct the designated type of basedrain as shown in the Contract Documents.

#### BID ITEMS

\*Pipe Basedrains (\*\*)

\*Size, Diameter

\*\*Type

#### UNITS

Linear Foot

#### 860.2 MATERIALS

Provide materials that comply with the applicable requirements.

Concrete and Grout .....	<b>SECTIONS 401 &amp; 402</b>
Aggregates for Concrete Not On Grade .....	<b>SECTION 1102</b>
Aggregates for Backfill .....	<b>DIVISION 1100</b>

#### Basedrain Pipe

Type Designation		
F	Perforated Corrugated Metal Pipe .....	<b>DIVISION 1900</b>
H	Polyvinyl Chloride Pipe .....	<b>DIVISION 1900</b>
T	High-Density Polyethylene Pipe .....	<b>DIVISION 1900</b>

#### Basedrain Outlet Pipe

G	Corrugated Metal Pipe .....	<b>DIVISION 1900</b>
K	Polyvinyl Chloride Pipe .....	<b>DIVISION 1900</b>
S	High-Density Polyethylene Pipe .....	<b>DIVISION 1900</b>

If the type is not indicated in the Contract Documents, any of the types listed above are permitted. Provide basedrain pipes with a nominal minimum inside diameter of 6 inches, unless shown otherwise in the Contract Documents. Provide perforated or corrugated basedrain pipe with the same type of outlet pipe.

#### 860.3 CONSTRUCTION REQUIREMENTS

**a. Excavation for Pipe Basedrains.** Excavate trenches for all lateral and longitudinal interceptor drains as shown in the Contract Documents. Construct trench bottoms for perforated pipe in firm material to permit the placing of aggregate for pipe underdrains underneath the pipe.

If unstable material is encountered in the bottom of the trench, place the drain pipe on an insulating course of aggregate for pipe basedrains of sufficient thickness (maximum 3 inches) to provide proper movement of water without danger of sealing off the drain, and to maintain proper alignment and grade of the pipe. Insulating courses of aggregate are only permitted under perforated pipe.

The minimum trench width is 8 inches plus the exterior diameter of the underdrain pipe, unless shown otherwise in the Contract Documents. Basedrains shall be placed a minimum of 18 inches below the base of the pavement.

**b. Laying Basedrain Pipe.** Lay all pipes on a minimum grade of 1%, unless otherwise shown in the Contract Documents. Close all dead ends of pipe underdrains with a cap of the same material as the pipe.

Join metal pipe by means of approved coupling bands provided by the pipe manufacturer. Make all junctions and turns with wyes, tees and bends. When field cutting is required, cold or flame cut metal pipe as approved by the Engineer. Paint cut surfaces with an approved zinc-rich paint.

Lay perforations down, unless shown otherwise in the Contract Documents.

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**c. Laying Outlet Pipe.** Lay outlet pipe only on stable material with minimum of 1% grade, unless otherwise shown in the Contract Documents. Place metal outlet pipe with ends abutting and join with manufacturer's coupling bands to provide a watertight joint.

**d. Backfilling Pipe Basedrains.** Do not begin backfill without approval of the Engineer. Place backfill to prevent large cavities in the backfill and walls of the trench.

Where a portion of the trench above the basedrain backfill aggregate is to be filled with soil, use a compactable material. Place the material in layers and compact to a density equal to or greater than that required for the adjacent material, with a minimum of 90% of standard compaction of the soil used.

**e. Pipe Basedrain Outlets.** Use a concrete flume or other approved type of flume, constructed at the outlet end of pipe underdrains as shown in the Contract Documents. Use Grade 3.0 concrete to construct the outlet flume so that the flume is flush with the finished shoulder slope.

**f. Construction Near Guardrails.** Where a basedrain will be constructed in a section of highway with guardrail, adjust the placement of the outlet pipe so that guardrail posts will not be driven within 1 foot of the outlet pipe. Conduct a mandrel test after driving the guardrail posts by pushing a piece of flexible pipe through the outlet pipes to ensure the outlet was not damaged. Replace all damaged outlets.

**g. Basedrain Markers.** Erect 1 guidepost to mark each outlet flume for pipe basedrains, at the location shown in the Contract Documents. Use either a 6 inch diameter treated wood post or a 3 pound per foot galvanized or baked-on enamel metal channel post. Set guideposts according to **SECTION 827**.

(1) Wood Guideposts. Apply 2 coats of aluminum paint to the upper 18 inches of the wooden post. Apply a third coat of International Orange enamel paint to the upper 12 inches of the wooden post.

(2) Metal Guideposts. Apply 1 coat of International Orange enamel paint to the upper 12 inches of the galvanized or baked on enamel metal channel post.

**h. Video Inspection.** When specified in the Contract Documents, inspect completed basedrains immediately before placing final surfacing. Use a pipeline inspection camera to determine if the basedrain is functioning properly. Beginning at the rodent screen, push the camera through the outlet pipe and into the drain system. Push the camera into the drain until there is resistance against further movement, the end of the pipe segment is reached, or for 200 feet, and record this distance. Use the camera as a mandrel for determining locations of compressed pipes where they are found. Document all observed failures, including blockages, rips, separations, backfill in the pipe, crushed pipe, and any other flaws that could prevent the basedrain from functioning properly. Record all digital observations and data and submit a report to the Engineer. Correct any deficiencies at the Contractor's expense.

Provide certification that the installed basedrain system is functioning properly before formal acceptance of the project.

For the video inspection, provide a video camera complying with the following requirements:

- high resolution, high sensitivity, waterproof and color;
- ability to pan and tilt to a 90° angle with the axis of the pipe and rotate 360°;
- capable of negotiating the various angle fittings used in the edge drain system;
- with sufficient lighting to provide a true color picture of the entire periphery of the diameter of the pipe; and
- with attachments that will maintain the camera's position in the center of the pipe.

Provide a portable control unit of the video camera complying with the following requirements:

- capable of adjusting the iris, focus, and light level intensity;
- has a color monitor (8-inch minimum) with a minimum standard resolution of 720 x 480 pixels to track the camera's progress through the inspections;
- have 2 video input/output jacks for video recording, as well as digital playback verification through the built-in monitor; and
- have audio input to allow for dubbing of the video to incorporate comments as necessary.

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Provide a video camera system complying with the following requirements:

- has sufficient cable/push rod to conduct inspections to a length of 500 feet, and a distance counter to monitor the length of the inspection; and
- have a color video printer that will produce color prints of any observations of interest during the course of the inspection;
- include a digital video recorder (minimum quality 4-head industrial grade VHS type) with audio dubbing still frame and slow speed capabilities; and
- has software capable of generating a report that shows each defect, along with its location measured from the inspection entrance, and a still frame image of the fault.

Provide an experienced video technician to operate the video camera system.

### 860.4 MEASUREMENT AND PAYMENT

The Engineer will measure pipe basedrains by the linear foot.

The Engineer will measure and pay for guideposts used for basedrain markers according to **SECTION 827**, and the quantities will be included in the quantity of guideposts shown in the Contract Documents.

Payment for "Pipe Basedrains" at the contract unit prices is full compensation for the specified work.