

Subdrain Fine Aggregate and *Subdrain Coarse Aggregate* will be measured and paid in cubic yards. Subdrain aggregate in a trench will be measured in place based on the aggregate width shown in the plans or approved by the Engineer and the actual aggregate depth as determined by the Engineer. When subdrain aggregate is not placed in a trench, aggregate will be measured in place based on the aggregate dimensions shown in the plans or as determined by the Engineer. The contract unit prices for *Subdrain Fine Aggregate* and *Subdrain Coarse Aggregate* will be full compensation for furnishing, hauling, handling, placing, compacting and maintaining subdrain aggregate.

___" *Perforated Subdrain Pipe* and ___" *Outlet Pipe* will be measured and paid in linear feet. Pipes will be measured in place as the pipe length, including fittings, to the nearest 0.1 ft with no deduction for fittings. The contract unit prices for ___" *Perforated Subdrain Pipe* and ___" *Outlet Pipe* will be full compensation for supplying, transporting and installing pipes, fittings and rodent screens and making joint connections.

Subdrain Pipe Outlets will be measured and paid in units of each. Outlets will be measured as the number of concrete pads or connections to existing drainage structures. The contract unit price for *Subdrain Pipe Outlets* will be full compensation for concrete pads including furnishing concrete, constructing pads and providing and placing markers and connecting pipes to existing drainage structures including cutting into structures, removing existing paved ditches and grouting around connections.

Payment will be made under:

| Pay Item | Pay Unit |
|----------------------------------|-----------------|
| Subdrain Excavation | Cubic Yard |
| Geotextile for Subsurface Drains | Square Yard |
| Subdrain Fine Aggregate | Cubic Yard |
| Subdrain Coarse Aggregate | Cubic Yard |
| ___" Perforated Subdrain Pipe | Linear Foot |
| ___" Outlet Pipe | Linear Foot |
| Subdrain Pipe Outlet | Each |

SECTION 816 SHOULDER DRAINS

816-1 DESCRIPTION

Construct shoulder drains and furnish and install painted pavement markers and vertical markers to locate concrete pads for the drains in accordance with the requirements of the contract.

816-2 MATERIALS

Refer to Division 10.

| Item | Section |
|--|----------------|
| Concrete Pipe and Fittings | 1044-3 |
| Corrugated Plastic Pipe and Fittings | 1044-7 |
| Corrugated Steel Pipe and Fittings | 1044-5 |
| Geotextile for Shoulder Drains, Type 1 | 1056 |
| Outlet Pipe | 1044-8 |
| Pavement Marker Paint | 1087 |
| PVC Pipe | 1044-6 |
| Portland Cement Concrete, Class B | 1000 |
| Shoulder Drain Aggregate, No. 57 Stone | 1005 |
| Steel Marker | 1072-2 |
| Steel Marker Paint | 1080-12 |

Section 816

Use Class B concrete for concrete pads. Provide Type 1 geotextile for filtration geotextiles. Material for shoulder drain pipe and fittings may be concrete, corrugated steel or corrugated plastic.

816-3 CONSTRUCTION METHODS

Excavate the trench to the width, depth, lines and grades shown in the plans unless otherwise directed.

Do not leave filtration geotextiles exposed for more than 7 days before covering with material. Overlap adjacent filtration geotextiles at least 18". Overlap geotextile closures at the top of the trench at least 6" and secure with mechanical ties. Where outlet pipes pass through geotextiles, wrap a separate piece of geotextile around the outlet pipe, flare against the side of the filled drain and secure with anchor pins.

Anchor field splices of geotextile with anchor pins to ensure that required overlap is maintained.

Perform aggregate placement operations and the pipe installation to prevent damage to filtration geotextiles. Replace damaged sections of geotextiles.

Firmly join together corrugated steel pipe sections with coupling bands, a smooth sleeve type coupler or other approved mechanical methods.

Solvent cement the Schedule 40 PVC pipe and fittings together. Connect the HDPE pipe with watertight neoprene connectors that are suitable for gravity flow conditions. Obtain approval for all pipe fittings from the Engineer before delivery. Protect the open end of all outlet pipes with a galvanized rodent screen as shown in plans. When the pipe perforations are not distributed uniformly over the circumference of the pipe, lay perforated pipe with the perforated segments of the pipe down. When plain pipe is called for by the plans, turn the perforations up or use non-perforated pipe.

Where pipe is not placed in a trench install the amount of subdrain fine aggregate material over and around the pipe as shown in the plans.

Install outlet fittings and outlet pipes with aggregate shoulder drains. Provide shoulder drain pipes with positive drainage towards outlets. Establish positive drainage within 72 hours of beginning trenching for installation of a given section of aggregate shoulder drain. Failure to comply with this requirement may result in the Engineer restricting installation of additional sections of aggregate shoulder drain until such time as the Contractor completes appropriate outlet installations.

Compact the aggregate to a degree acceptable to the Engineer by the use of a vibratory compactor before making the geotextile closure at the top of the trench.

Carefully place the backfill material after the pipe has been laid, so that the pipe will not be disturbed by the backfilling operation. Firmly tamp all earth backfill material.

Connect the shoulder drains to existing drainage structures or to concrete pads at the outlet end of the shoulder drain. Construct the concrete pad in accordance with Section 825 and give an ordinary surface finish.

Furnish and install steel markers in accordance with the plans and use at all concrete pads.

816-4 MEASUREMENT AND PAYMENT

Shoulder Drain will be measured and paid as the actual number of linear feet that has been completed and accepted, measured to the nearest foot along the centerline of the completed shoulder drain aggregate. No measurement will be made along the outlet pipe.

___" *Shoulder Drain Pipe* will be measured and paid in linear feet of all pipe that has been incorporated into the completed and accepted work. Measurement will be made along the pipe installation, including fittings, to the nearest 0.1 ft with no deduction made for fittings.

___" *Outlet Pipe for Shoulder Drain* will be measured and paid in linear feet of all pipe that has been incorporated into the completed and accepted work. Measurement will be made along the pipe installation, including fittings, to the nearest 0.1 ft with no deduction made for fittings.

Concrete Pad for Shoulder Drain Pipe Outlet will be measured and paid in units of each for the actual number of pads completed and accepted.

Such price and payment includes, but is not limited to, furnishing, hauling and placing all pipe, fittings, shoulder drain aggregate, filtration geotextiles, concrete and other materials; making all joint connections; cutting into and making connections to existing drainage structures; grouting around the pipe where it enters existing drainage structures; pavement and vertical markers; and all excavation and backfilling.

Replacement of damaged geotextile is incidental to the work in this section.

Payment will be made under:

| Pay Item | Pay Unit |
|---|-------------|
| Shoulder Drain | Linear Foot |
| ___" Shoulder Drain Pipe | Linear Foot |
| ___" Outlet Pipe for Shoulder Drain | Linear Foot |
| Concrete Pad for Shoulder Drain Pipe Outlet | Each |

SECTION 818 BLOTTING SAND

818-1 DESCRIPTION

Furnish and uniformly spread the blotting sand, as directed to prime coat, asphalt surface treatment or asphalt curing seal.

818-2 MATERIALS

Refer to Division 10.

| Item | Section |
|---------------|---------|
| Blotting Sand | 1012-3 |

818-3 CONSTRUCTION METHODS

Apply blotting sand upon completion of the asphalt application, when directed. Provide relatively dry blotting sand. Spread uniformly, as directed, on the same day as the application of prime coat, asphalt surface treatment or asphalt curing seal. Apply at the rate of 10 lb/sy of surface area, unless otherwise directed.

818-4 MEASUREMENT AND PAYMENT

Blotting Sand will be measured and paid in tons that have actually been placed. The quantity will be measured by weighing in trucks on certified platform scales or other certified weighing devices. No deduction will be made of any moisture in the sand at the time of weighing. No measurement of *Blotting Sand* will be made when it is part of a *Drag Seal* or a *Sand Seal*.

Payment will be made under:

| Pay Item | Pay Unit |
|---------------|----------|
| Blotting Sand | Ton |