Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Bonifacio Drive, Port Area Manila

BAGONG PILIPINAS

097.13 DPWH
05.21.2025

MAY 20 2025

DEPARTMENT ORDER)
)
NO. 90)
Series of 2025)
dtd 5/21/2025

SUBJECT: DPWH Standard Specification for Item 501 – Underdrains

To support the Department's commitment in updating its standard specifications and adopting effective/appropriate solutions for specific project needs, the attached Standard Specification for **Item 501 - Underdrains** is hereby prescribed for adoption in DPWH infrastructure projects that require the utilization of such on the Program of Works.

The Standard Specification shall form part of the DPWH Standard Specifications for Highways, Bridges and Airports, Volume II. Likewise, the new Pay Item is now included in the Standard Pay Item List and in the Project and Contract Management Application (PCMA).

This Order shall take effect immediately.

MANUEL M. BONOAN
Secretary

Department of Public Works and Highways
Office of the Secretary
WIN5U02151

Encl: DPWH Standard Specification for Item 501 – Underdrains

14.1.2 JDV/AGC

DPWH Standard Specification for
ITEM 501 – UNDERDRAINS

501.1 Description

This Item shall consist of constructing underdrains, using pipe and granular filter materials, underdrain pipe outlets using granular material in accordance with this Specification and in conformity with the lines and grades shown on the Plans to effectively reduce excessive moisture content of existing subgrade for stable and long-lasting pavement.

501.2 Material Requirements

501.2.1 Underdrains

The size of the underdrain pipes to be furnished shall be based on the nominal internal diameter of a pipe as shown in the Plans. All sizes shall be supported with hydrologic data analysis and hydraulic design.

Underdrain materials shall conform to the applicable requirements of Item 706, Concrete, Clay, Plastic and Fiber Pipe.

Pipe fittings shall match the pipe material type to be used.

501.2.2 Granular Backfill

Granular Backfill Filter Material – Granular backfill filter material shall be permeable and shall meet the requirements of AASHTO M 6 - Fine Aggregates for Hydraulic Cement Concrete, except that soundness tests will not be required and minor variation in grading and content of deleterious substances may be approved by the Engineer.

Table 501.1 Grading Requirements for Fine Drain Fill

Fine Aggregate Size	Percent Passing by Weight
9.5 mm	100
4.75 mm	95 to 100
2.36 mm	80 to 100
1.18 mm	50 to 85
600 µm	25 to 60
300 µm	10 to 30
150 µm	2 to 10

When the location of manufacturing plants allows, the plants will be inspected periodically by compliance with specified manufacturing methods, and material sample will be obtained for laboratory testing for compliance with material quality requirements. This shall be the basis for acceptance of manufacturing lots as to quality.

All material shall be subjected to inspection for acceptance as to condition at the latest practicable time.

501.2.3 Filter Cloth

Filter cloth shall conform to the applicable requirements of Item 715, Geotextile.

501.3 Construction Requirements

501.3.1 Pipe Installation

Trenches shall be excavated to the dimensions, depths, and grades required by the Plans or as directed by the Engineer. The excavation shall begin at the outfall and proceed toward the upper end. A minimum of 150 mm bedding layer of granular backfill material shall be placed and compacted at the bottom of the trench and a width equal to the outer diameter of underdrain pipe plus 150 mm at each side and length.

Filter cloth shall be placed as shown on the Plans and the Standard Details.

Subdrainage pipe of the type and size specified shall be embedded firmly in the bedding material.

Perforated pipe shall normally be placed with the perforations down and the pipe sections shall be joined securely with the appropriate coupling fittings or bands.

Other pipes shall be laid with the bell end upgrade and with open joints wrapped with suitable material to permit entry of water, or unwrapped as may be specified. Upgrade end sections of all subdrainage pipe installations shall be closed with suitable plugs to prevent entry of soil materials.

After the pipe installation has been inspected and approved, granular backfill material shall be placed to a height of 300 mm above the top of pipe. Care shall be taken not to displace the pipe or the covering at open joints. The remainder of the granular backfill material shall then be placed and compacted in 150 mm maximum layers to the required height. Any remaining portion of trench above the granular backfill shall be filled with either granular or impervious material, as may be specified, and thoroughly compacted.

501.3.2 Underdrain Outlets

Trenches for underdrain outlets shall be excavated to the width and depth shown on the Plans or as otherwise directed. Pipes shall be laid in the trench with all ends firmly joined by the applicable methods and means. Pipe screens shall be placed in the end of the outlet pipe. Underdrain outlet protectors shall be constructed as indicated on the plans. After inspection and approval of the pipe installation, the trench shall be backfilled in accordance with Item 103, Structure Excavation.

501.4 Method of Measurement

Underdrains and outlets shall be measured by the linear meter or lump sum for pipe of the type and size specified. Blind drains shall be measured by the linear meter or lump sum including all excavation and backfill materials required.

Granular backfill filter material, when specified in the Contract as a Pay Item shall be measured in place by the cubic meter, completed and accepted. Cross-sectional measurements will not exceed the net dimensions shown on the Plans or as directed by the Engineer. Filter cloth shall not be measured separately when specified on the Plan. Its cost shall be considered as a subsidiary item under Underdrain.

Excavation for underdrain pipe will be measured and paid for as provided in Item 103, Structure Excavation.

501.5 Basis of Payment

The accepted quantities determined as provided in Section 501.4, Method of Measurement, shall be paid for at the contract unit prices for underdrains which price and payment shall be full compensation for furnishing and installing all materials, labor, equipment, tools and incidentals necessary to complete this Item.

Payment shall be made under:

Pay Item Number	Description	Unit of Measurement
501 (1)a	**Underdrain, 100 mm dia.**	**Linear Meter**
501 (1)b	**Underdrain, 125 mm dia.**	**Linear Meter**
501 (1)**c**	Underdrain, 150 mm dia.	Linear Meter
501 (1)d	**Underdrain, 175 mm dia.**	**Linear Meter**
501 (1)e	**Underdrain, 200 mm dia.**	**Linear Meter**
501 (1)f	**Underdrain, 250 mm dia.**	**Linear Meter**
501 (1)g	**Underdrain, 300 mm dia.**	**Linear Meter**
501 (2)	Blind drain	Linear Meter
501 (3)	Granular backfill filter material for Underdrains	Cubic Meter
501 (4)	Underdrain	Lump Sum
501 (5)	Blind drain	Lump Sum