

# ORIGINATION FORM

Proposed Revisions to a Standard Plans Index  
(Please provide all information – Incomplete forms will be returned)

## Contact Information:

Date: May 7, 2018  
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## Standard Plans:

Index Number: 440-001  
Sheet Number (s): 1 of 1  
Index Title: Underdrain

## Summary of the changes:

Updated and Reorganized Index. Added new Sheet for General Notes.  
Deleted Design Notes. Updated Notes language.

## Commentary / Background:

Design Notes moved or covered in Drainage Manual or Drainage Design Guide, the appropriate location for the information. Remaining Notes updated to current language (first person imperative).  
Details moved to declutter the Index.

## Other Affected Offices / Documents: (Provide name of responsible personnel)

- | Yes                                 | No                                  |  |
|-------------------------------------|-------------------------------------|--|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Other Standard Plans –                 |
| <input type="checkbox"/>            | <input type="checkbox"/>            | FDOT Design Manual –                   |
| <input type="checkbox"/>            | <input type="checkbox"/>            | Basis of Estimates Manual –            |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Standard Specifications – Rick Jenkins |
| <input type="checkbox"/>            | <input type="checkbox"/>            | Approved Product List –                |
| <input type="checkbox"/>            | <input type="checkbox"/>            | Construction –                         |
| <input type="checkbox"/>            | <input type="checkbox"/>            | Maintenance –                          |

## Origination Package Includes: (Email or hand deliver package to Derwood Sheppard)

- | Yes                                 | N/A                      |   |
|-------------------------------------|--------------------------|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Redline Mark-ups                          |
| <input type="checkbox"/>            | <input type="checkbox"/> | Proposed Standard Plan Instructions (SPI) |
| <input type="checkbox"/>            | <input type="checkbox"/> | Revised SPI                               |
| <input type="checkbox"/>            | <input type="checkbox"/> | Other Support Documents                   |

## Implementation:

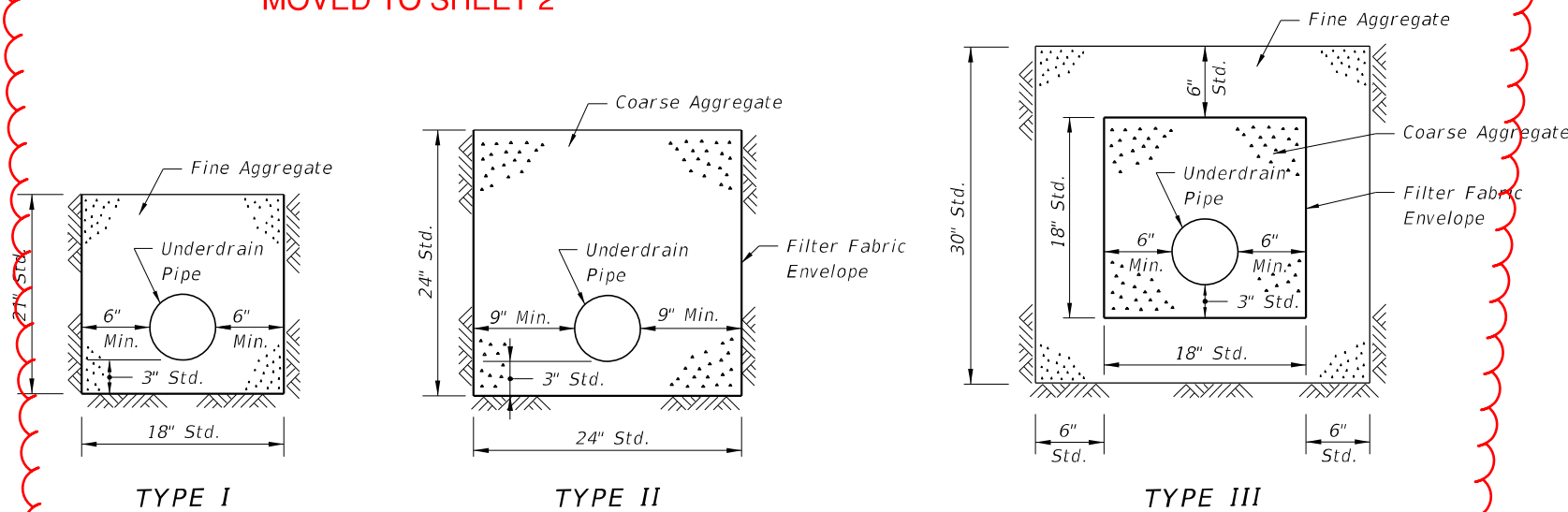
- Design Bulletin (Interim)    DCE Memo    Program Mgmt. Bulletin    FY-Standard Plans (Next Release)

Contact the Roadway Design Office for assistance in completing this form

NEW SHEET 1 OF 3

"GENERAL NOTES - TABLE OF CONTENTS - UNDERDRAIN ASSEMBLY

MOVED TO SHEET 2



**GENERAL NOTES**

- The underdrain pipe shall be either 4" smooth or 5" corrugated tubing unless otherwise shown in the plans. The size to be furnished will be based on the nominal internal diameter of a pipe with a smooth interior wall. Except when prohibited by the plans, the special provisions or this standard, pipe with a corrugated interior wall may be provided based on the following size equivalency.
  - 4" smooth interior equivalent to 5" corrugated interior
  - 5" smooth interior equivalent to 6" corrugated interior
  - 6" smooth interior equivalent to 8" corrugated interior
  - 8" smooth interior equivalent to 10" corrugated interior
- Fine aggregate shall be quartz sand meeting the requirements of Sections 902-4 of the Standard Specifications.
- Coarse aggregate shall be gravel or stone meeting the requirements of Sections 901-2 or 901-3. The gradation shall meet Section 901, Grades 4, 467, 5, 56 or 57 stone unless otherwise shown restricted in the plans.
- Underdrain Type I, II, III and V shall be in accordance with Section 440.
- Filter fabric shall be Type D-3 (See Specifications Section 985). The internal filter fabric of Type V underdrain shall have a permittivity of 0.7 /sec. and an AOS of #40 sieve.
- When Type I is used, a filter fabric sock meeting Section 948 is required.
- See Index 120-002 for the standard location of Type I, II, and III underdrain. The location of Type V underdrain and nonstandard locations of Type I, II, and III underdrain will be as detailed in the plans.
- All filter fabric joints shall overlap a minimum of 1'. The internal filter fabric of Type V underdrain shall overlap into the coarse aggregate or the fine aggregate a minimum of 1'.
- Underdrain outlet pipes shall be nonperforated and all bends shall be made using 1/8 (45 deg.) elbows. 90 deg. bends shall be constructed with two 1/8 elbows separated by at least 1' of straight pipe. Outlet pipes stubbed into inlets or other drainage structures shall be not less than 6" above the structure flow line. Outlet pipes discharging to grassed areas shall have concrete aprons, hardware cloth, and bordering sod as shown in Index 466-001 for Edgedrain outlets.
- Pay Item shall be based on the size of the smooth interior products. The contract unit price for Underdrain, LF, shall include the cost of pipe, fittings, aggregate, sock, filter fabric, underdrain cleanouts, and concrete aprons.
 

The contract unit price for Underdrain Outlet Pipe, LF, shall be full compensation for trench excavation, pipe and fittings, concrete aprons, hardware cloth for concrete aprons, stubbing into drainage structures, backfill in place, and disposal of excess materials.

The contract unit price for Underdrain Inspection Box, EA, shall be for the number completed and accepted.

**DESIGN NOTES**

- The type of underdrain should be selected to meet design water removal rate and soil conditions. Caution is prescribed in the use of these typical sections since special designs may be required to satisfy project conditions.
- Type I underdrain is intended for minimum water removal conditions.
- Type II underdrain is intended for moderate water removal conditions. Where reactive conditions may create chemical clogging, the use of an inert material and/or elimination of the filter fabric may be necessary.
- Type III underdrain is intended for maximum water removal conditions. Filter fabric is required between the coarse aggregate or fine aggregate including those described in general notes 2 and 3. Design note 3 applies for reactive conditions.
- Type V underdrain is intended for use in detention basins or retention basins. The standard fine aggregate specified for Type V underdrain shall meet the requirements of Chapter 62-25 FAC.
- The designer should detail in the plans, the location of:
  - (a) Type V underdrain, (b) nonstandard locations of Type I, II, and III underdrain, (c) underdrain inspection boxes, (d) cleanouts for Type V underdrain, and (e) underdrain outlet pipes.
- The designer should specify the flow line elevations at the beginning, bends, junctions and ends of underdrain pipes and outlet pipes.
- The designer should evaluate whether an external filter fabric envelope is required around underdrain Types I and III. When required, fabric shall be specified in the plans.

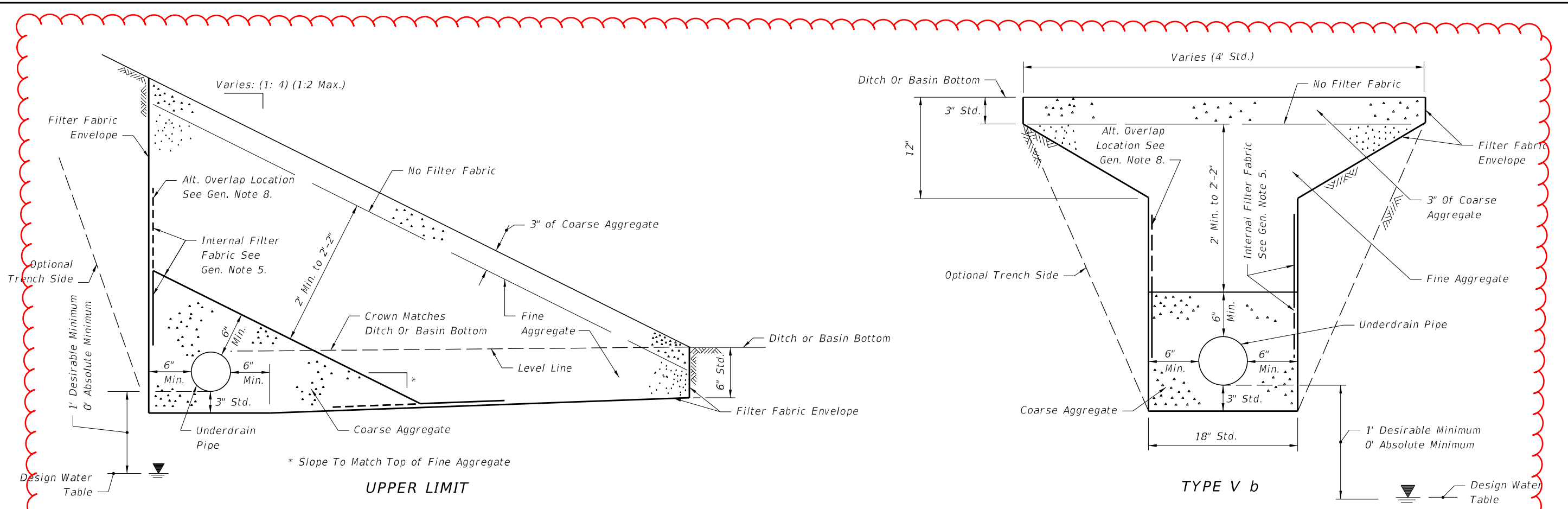
MOVED TO DRAINAGE MANUAL OR DRAINAGE DESIGN GUIDE

**UPDATED NOTES**

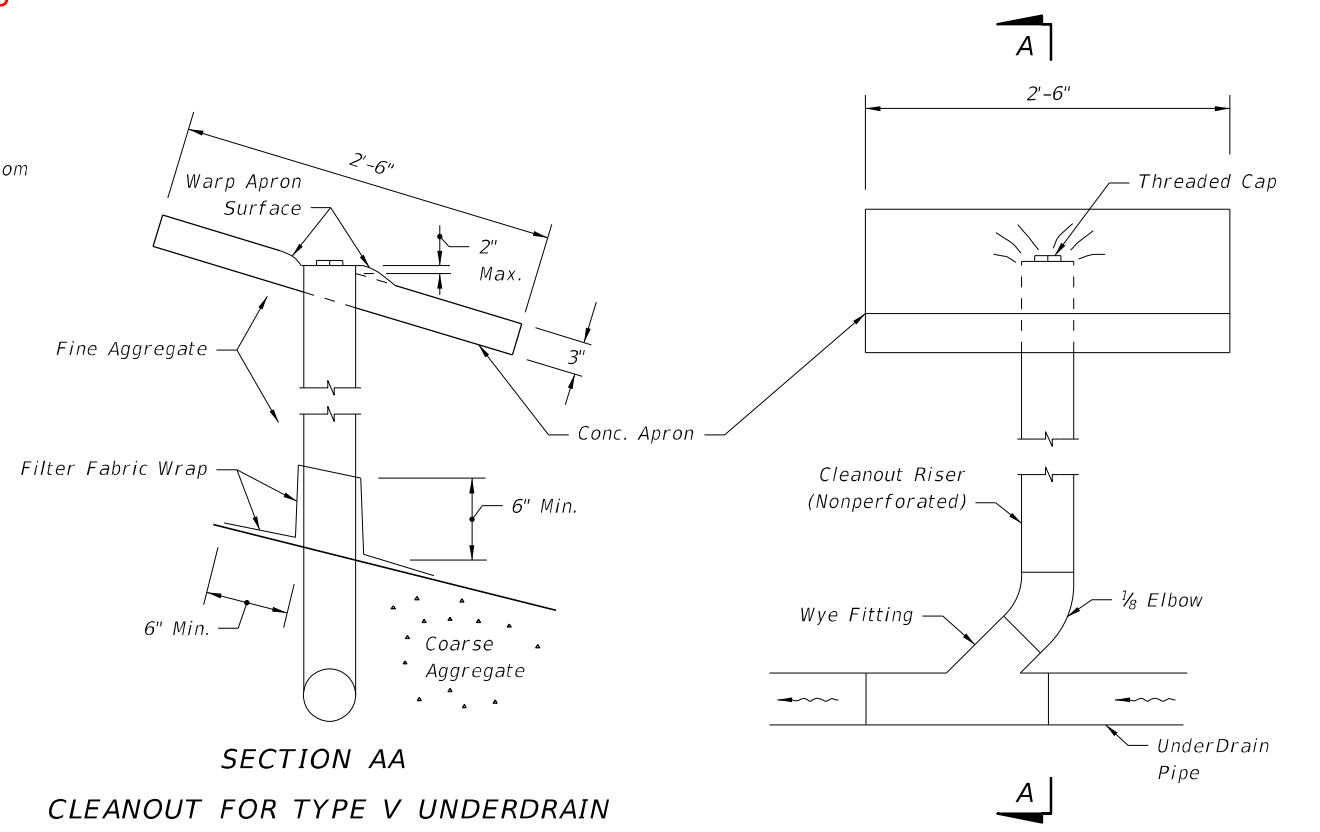
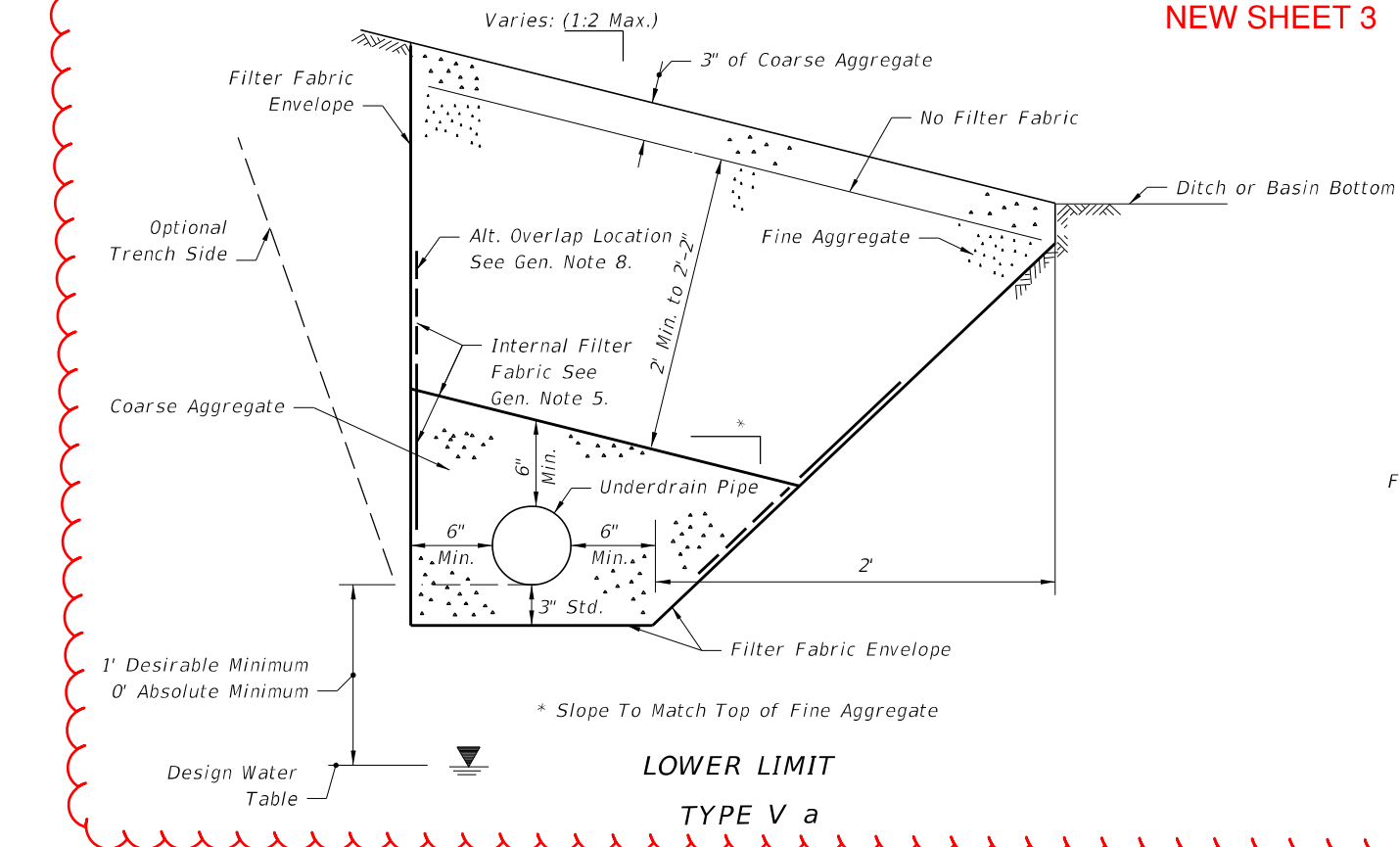
SHEET 2 OF 3

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LAST REVISION 11/01/17	DESCRIPTION: ← 11/01/19	FDOT FY 2019-20 STANDARD PLANS	UNDE RDRAIN	INDEX 440-001	SHEET 1 of 2
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**NEW SHEET 3**



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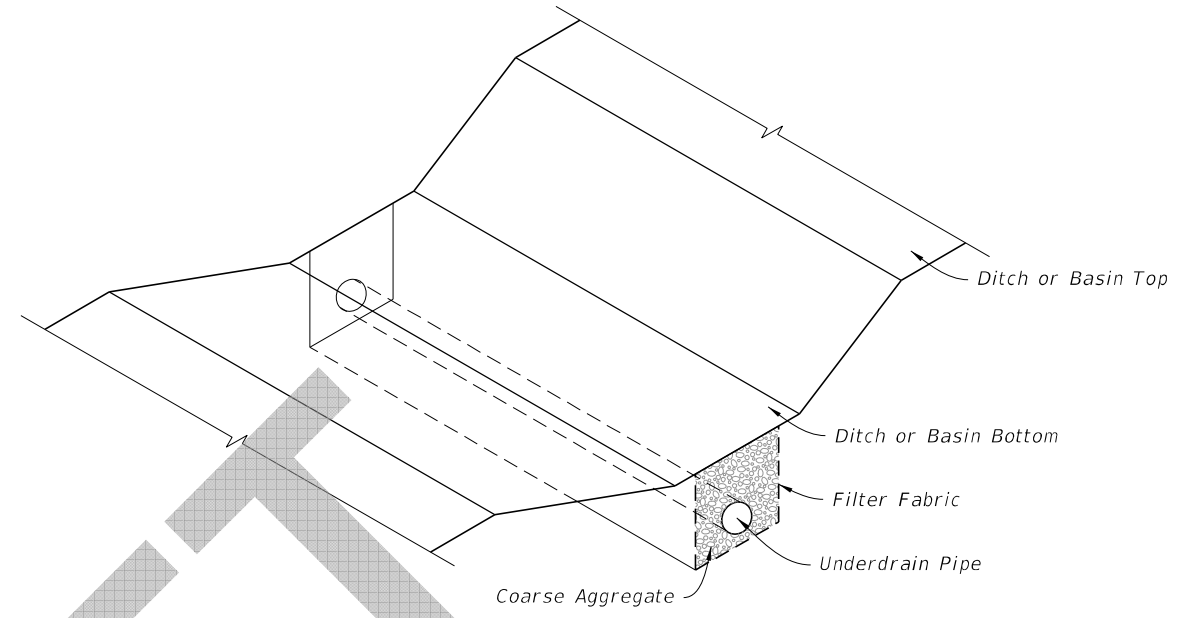
LAST REVISION 11/01/17	DESCRIPTION: 11/01/19	FDOT FY 2019-20 STANDARD PLANS	UNDERDRAIN	SHEET 3 OF 3	INDEX 440-001	SHEET 2 of 2
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**GENERAL NOTES:**

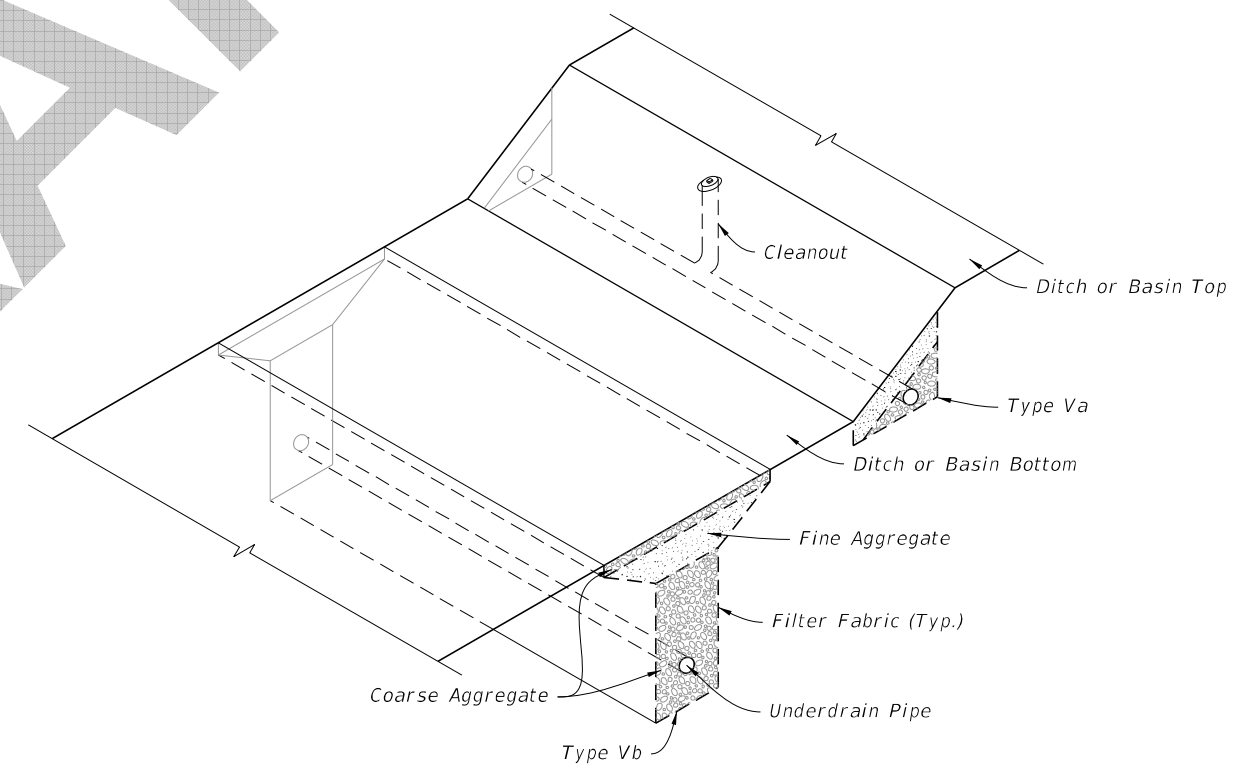
1. Install underdrain pipe that is either 4" smooth or 5" corrugated tubing unless otherwise shown in the Plans. The size to be furnished will be based on the nominal internal diameter of a pipe with a smooth interior wall. Except when prohibited by the Plans, the special provisions or this standard, pipe with a corrugated interior wall may be provided based on the following size equivalency.

- 4" smooth interior equivalent to 5" corrugated interior
- 5" smooth interior equivalent to 6" corrugated interior
- 6" smooth interior equivalent to 8" corrugated interior
- 8" smooth interior equivalent to 10" corrugated interior

- 2. Fine aggregate is quartz sand meeting the requirements of Specifications 902-4.
- 3. Coarse aggregate is gravel or stone meeting the requirements of Specification 901-2 or 901-3. The gradation is in accordance with Specifications 901, Grades 4, 467, 5, 56 or 57 stone unless otherwise shown restricted in the Plans.
- 4. Install Underdrain Type I, II, III and V in accordance with Specification 440.
- 5. Install filter fabric Type D-3 in accordance with Specifications 985. The internal filter fabric of Type V underdrain has a permittivity of 0.7 /sec. and an AOS of #40 sieve.
- 6. When Type I is used, use a filter fabric sock in accordance with Specification 948.
- 7. See Index 120-002 for the standard location of Type I, II, and III underdrain. The location of Type V underdrain and nonstandard locations of Type I, II, and III underdrain will be as detailed in the plans.
- 8. Install filter fabric joints with a overlap a minimum of 1'. Install the internal filter fabric of Type V underdrain with an overlap into the coarse aggregate or the fine aggregate a minimum of 1'.
- 9. Use nonperforated pipes for underdrain outlet and make all bends using 1/8 (45 deg.) elbows. Construct 90 deg. bends with two 1/8 elbows separated by at least 1' of straight pipe. Outlet pipes stubbed into inlets or other drainage structures must be a minimum 6" above the structure flow line. Install concrete aprons, hardware cloth, and sod for outlet pipes discharging to grassed areas as shown in Index 446-001 for Edgedrain Outlets.



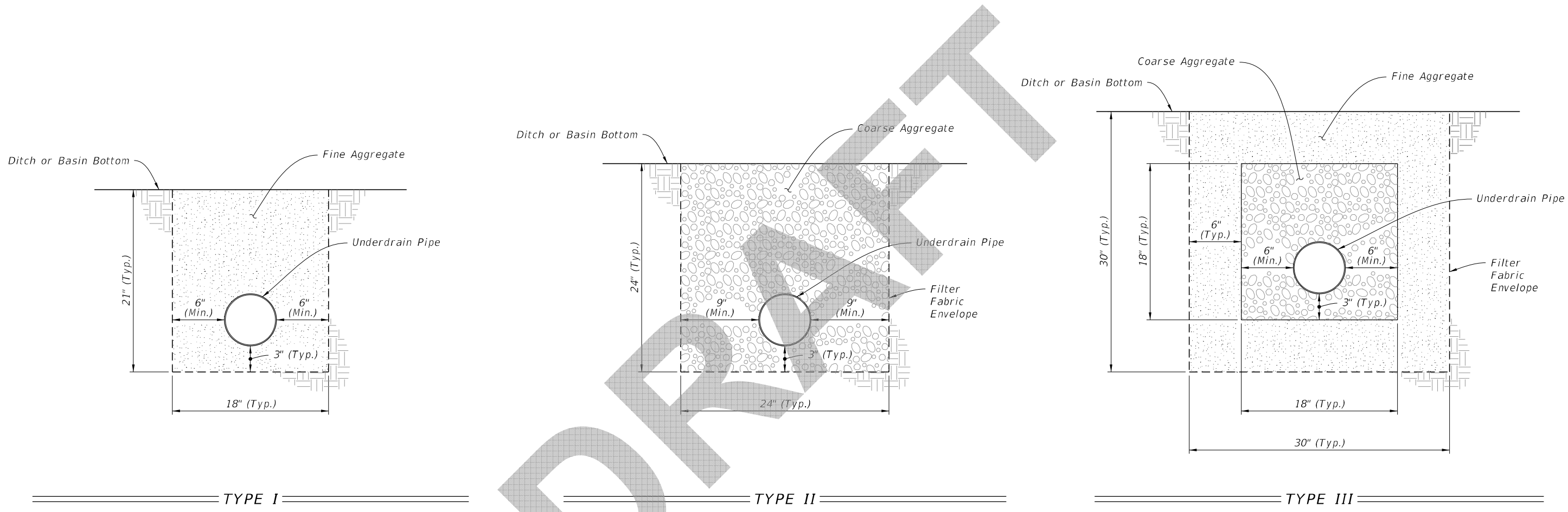
UNDERDRAIN TYPE I, II, AND III ASSEMBLY  
(Type II Shown, Others Similar)



UNDERDRAIN TYPE Va AND Vb ASSEMBLY

TABLE OF CONTENTS:	
Sheet	Description
1	General Notes and Contents
2	Type I, II, and III Underdrains
3	Type Va, Vb, and Cleanout

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TYPE I

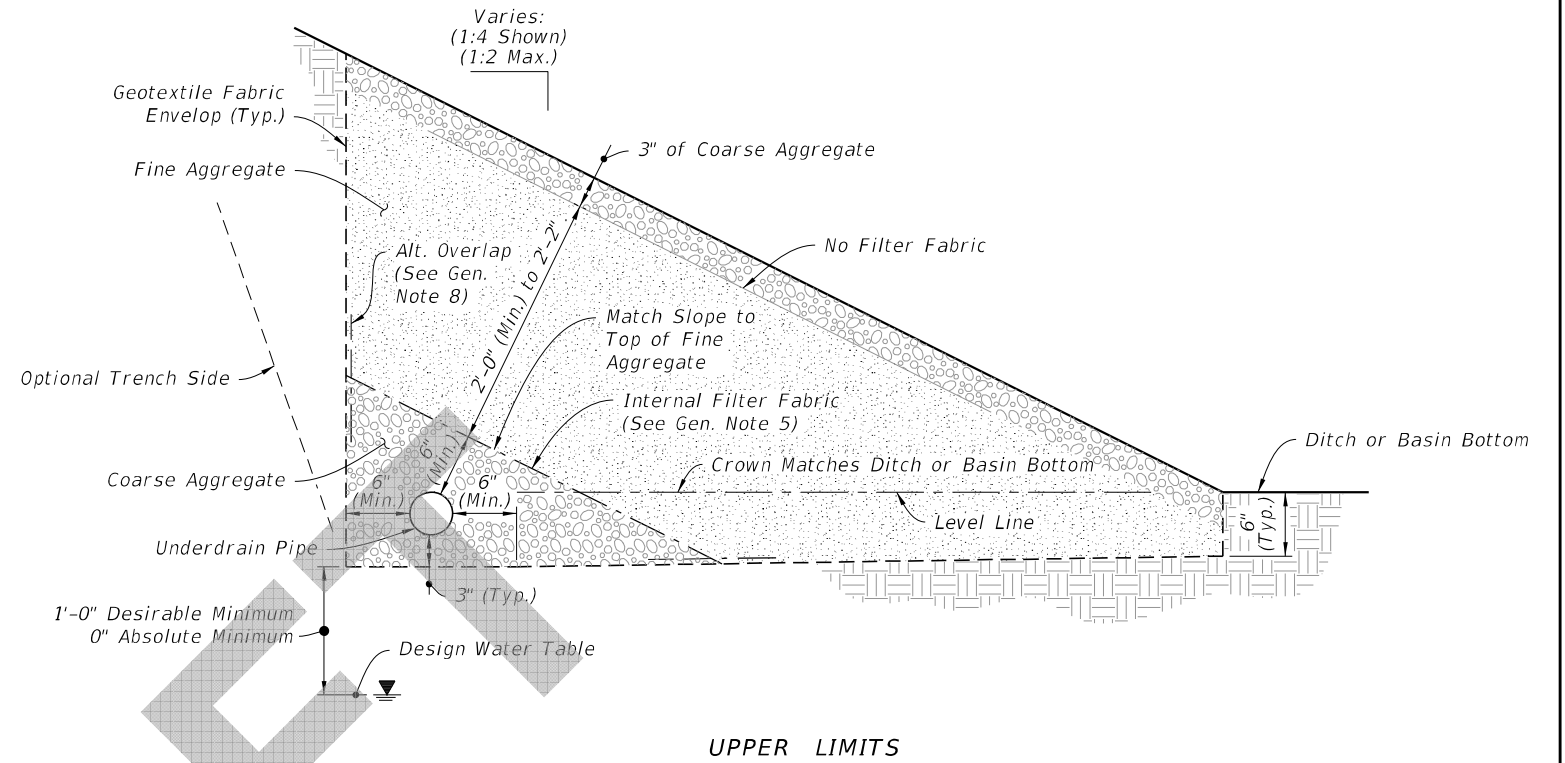
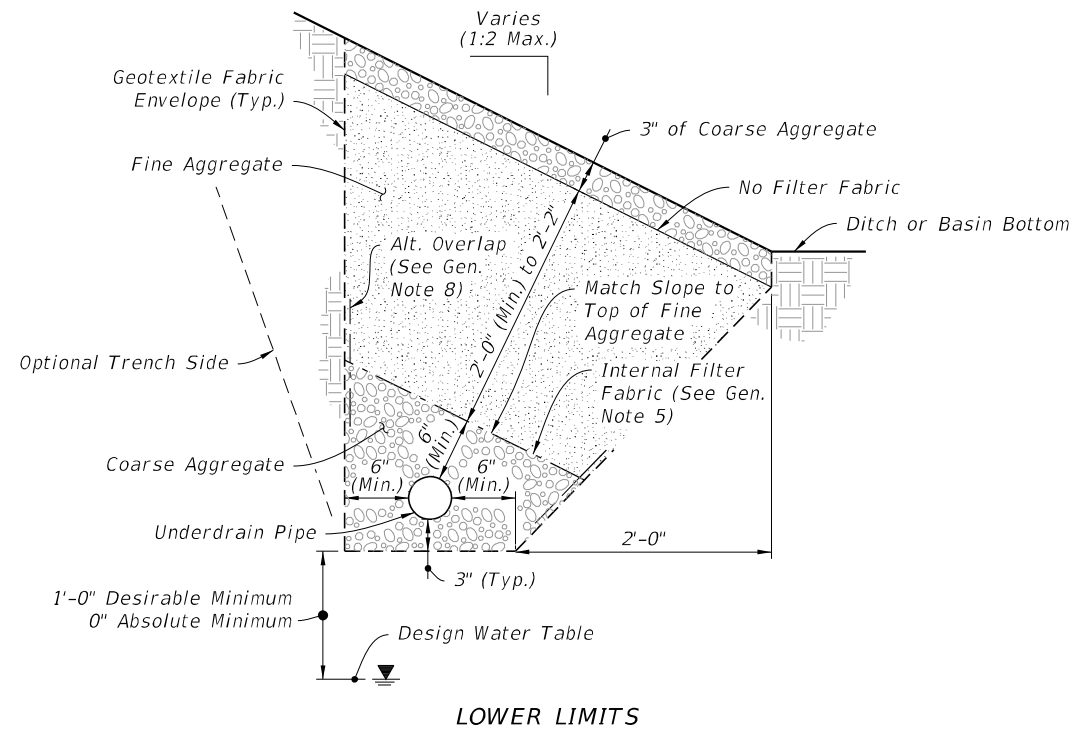
TYPE II

TYPE III

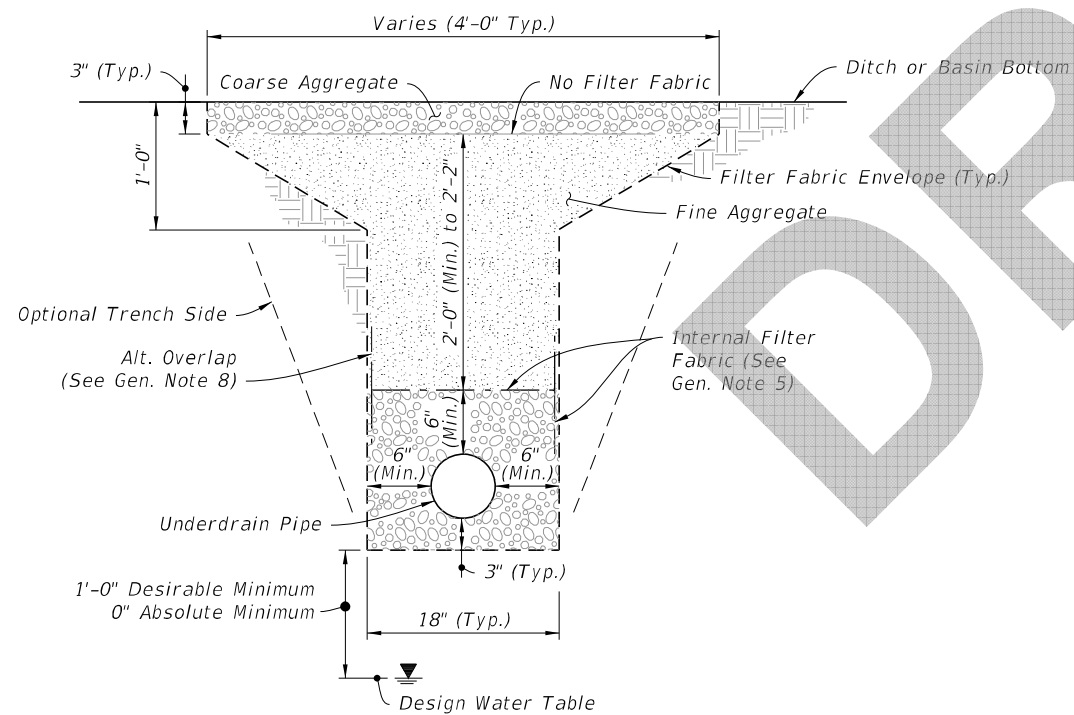
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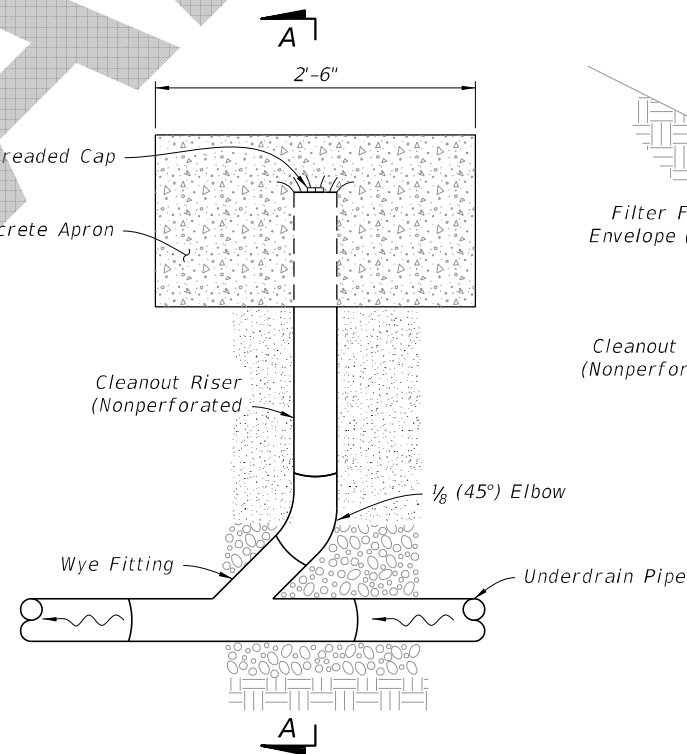
TYPE I, II, AND III



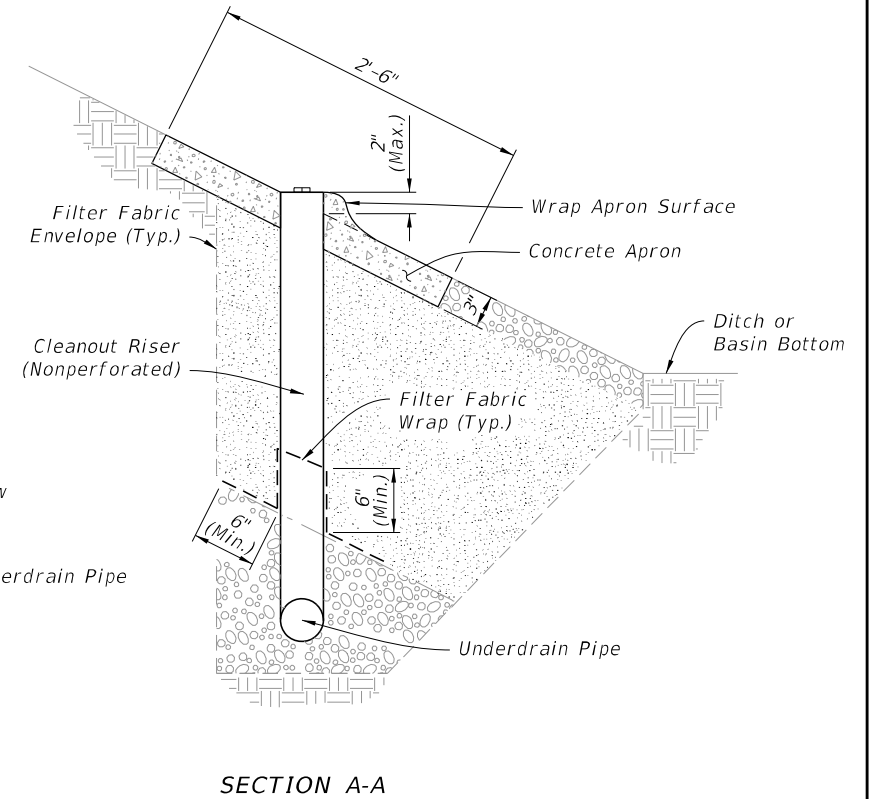
TYPE Va



TYPE Vb




TYPE V CLEANOUT



SECTION A-A

TYPE Va, Vb, AND CLEANOUT

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