


## DESIGN MEMORANDUM NO 3-05

TO: Chief District Engineers  
Design Engineers  
Active Consultants

FROM: Kenneth R. Sperry   
Acting Director  
Division of Highway Design

DATE: January 25, 2005

SUBJECT: Drainage Manual-Revisions in the Erosion Control Plan Development Process

The **E**rosion **C**ontrol **P**lan (ECP) has been an essential component of the plan development process for several years as necessitated by the KPDES requirements. However, the development of the ECP has often not reflected the erosion control needs for a specific phase of construction at the time it is being performed. The ECP may often show all the required erosion control structures that will be needed for the life of the project while not addressing specific needs for a phase of construction.

Trying to develop site specific erosion control plans for any particular phase by a designer is at times an educated guess. The Contractor and Resident Engineer are in the best position to generate an effective Erosion Control Plan as a job progresses. Changes, revisions and additions are needed in order to improve the Erosion Control Plan development process to achieve the **B**est **M**anagement **P**ractices (BMP) plan.

The KPDES permit states that the BMP shall include any requirements that have been approved by local storm water programs. The project manager shall advise the design engineer of this requirement and upon completion of the ECP, verify that the appropriate local agency is in agreement with the plan. Communities that have local storm water programs include Louisville, Lexington and phase 2 communities listed at the following web address:

[http://www.kytc.state.ky.us/EnvAnalysis/Stormwaterquality/local\\_prog\\_links.htm](http://www.kytc.state.ky.us/EnvAnalysis/Stormwaterquality/local_prog_links.htm)

This information may also be obtained by contacting DOW, KPDES Branch, MS4 program at 502-564-3410.

The Erosion Control Plan Development Process shall be changed as follows:

1. Silt checks and silt traps shall no longer be shown on the ECP by the designer with the following exceptions.
2. The Erosion Control Plan provided by the designer shall show a required volume to contain sediment prior to discharging onto each adjacent downstream property owner. The required volume and the maximum disturbed acreage in that watershed used to compute the volume shall be shown at the point of containment. The disturbed area is bounded by the clearing and grubbing limits and shall be computed by the designer as the area between the proposed right-of-way limits. Deductions for undisturbed areas may be applied as described herein.

Any additional areas disturbed during construction must be measured and added to the original amount.

3. The required volume shall be computed based on 3,600 cubic feet per disturbed acre as required by the KPDES permit.
4. A silt trap shall be sized to accommodate the required volume at the point of containment prior to discharge into a stream. Multiple structures may be used to accommodate the total volume requirement. Easements shall be shown as needed to contain all silt control structures. It is recommended that the designer include a sufficient number of silt traps to eliminate or minimize the need for additional right-of-way.
5. Per KPDES requirements, a sedimentation basin is recommended if possible when the contributing disturbed drainage area is at least 10 acres. A sedimentation basin shall be designed in accordance with current standard engineering practices. Detailed site plans shall be added to the plan set which shall include a sedimentation basin detail sheet. Refer to Drainage Guidance Manual, Chapter 10 - Erosion Control for a discussion of the requirements for the design of a sedimentation basin.
6. The designer shall include in the Plans an estimate of the number of Silt Traps A, B and C required for the job. The actual number will be determined during construction by the Contractor with approval of the Engineer. A spreadsheet tool has been placed on the Division of Highway Design's homepage to assist in the calculation of volumes upstream of silt traps placed in roadway ditches or similar situations.
7. The designer shall show erosion control features, methods or practices that are deemed critical in the development of the Best Management Practices on the Erosion Control Plans.
8. As the job progresses during construction, the Erosion Control Plan shall be modified to reflect specific construction activities or phases. Additional silt control structures may be added or removed as are necessary to accommodate the required volume.
9. The required volume calculation for each silt control structure shall be determined by the Contractor and approved by the Engineer. To achieve the BMP, the required volume as shown on the ECP may be reduced by the following amounts:
  - a. Areas not disturbed (acres).
  - b. Areas that have been reclaimed and protected by erosion control blanket or other ground protection material (acres).
  - c. Areas that have been protected by silt fence (acres). Areas protected by silt fence shall be computed at the rate of 100 sq. ft. / lin. ft. of silt fence.
  - d. Areas that have been protected by silt traps (acres).

Temporary erosion control ditches shall no longer be shown on the ECP by the designer unless they are deemed essential to the project. These ditches will be added to the plans during construction as needed for each phase of construction.

10. Permanent ditches shall be shown on the ECP by the designer.
11. The development of the Best Management Practices plan shall be documented by the Contractor with approval of the Engineer by showing each erosion control method or device and each silt containment structure used on the project. This information shall be shown on the Erosion Control Plans and shall be documented by other state approved means.
12. The CADD standards include a line style for blue line streams. The designer will use this line style to depict all blue line streams on the project on the ECP.

In addition to the above changes, standard silt control structures have been added and changed to provide a clearer and more efficient means of silt control. These changes are summarized in the Standard Drawings as follows:

1. Straw bale silt checks are no longer acceptable. Historically, they have been installed in an inefficient manner and often did not provide effective silt control. Therefore Standard Drawing RDX-200-02, Silt Check Type I Straw Bales is discontinued.
2. Silt Check, Type II and III shall be replaced with Silt Trap Type B. Standard Drawing RDX-205 will be discontinued. Refer to attached detail sheet for Silt Trap Type B. A corresponding bid item for each device installed and cleaned shall be shown on the Plans.
3. Silt Trap Type A and B shall be replaced with Silt Trap Type A. Standard Drawing RDX-220 will be discontinued. Refer to attached detail sheet for Silt Trap Type A. A corresponding bid item for each device installed and cleaned shall be shown on the Plans.
4. An efficient means to trap silt at inlets is needed; therefore Silt Trap Type C shall be added to the Standard Drawings. It consists of interlocking layers of bagged aggregate placed around curb inlets, drop box inlets and culvert inlets to protect them from siltation. Refer to attached detail sheet. A corresponding bid item for each device installed and cleaned shall be shown on the Plans. This trap shall not be placed in blue line streams.
5. A bid item estimate for temporary erosion control ditches shall be added to the General Summary. The unit for payment shall be linear feet. Ditch size, layout, slope and capacity analysis will be by the Contractor with approval of the Engineer.

Detail sheets for Silt Trap Type A, Silt Trap Type B, Silt Trap Type C and a Sedimentation Basin have been placed on the active sepia list. Full size reproducible drawings are available on the Division of Highway Design's web page.

The above changes require a revision and clarification in the Standard Specifications. These changes are summarized in Sections 212 and Section 213 of the 2004 Standard Specifications as follows:

1. Section 212.03.03, Part E - Erosion Control Blanket  
Replace second sentence with "Install erosion control blanket on all final soil-like slopes as indicated on the Erosion Control Plans and as directed by the Engineer."

Design Comment - The ECP shall contain a recommendation by the Project Manager to indicate the location and extent of the erosion control blanket. A quantity to reflect this recommendation shall be shown on the Plans. Refer to Drainage Guidance Manual, Chapter 10 - Erosion Control.

2. Section 213.03.05, Part B - Silt Checks shall be deleted
3. Section 213.03.05, Part C - Silt Traps shall be deleted
4. Section 213.03.05, Part B - Silt Traps shall be added as follows:

Section 213.03.05 - Silt Traps. Use one of the following:

- a. Silt Trap Type A - Construct Silt Trap, Type A in natural or excavated channels. Traps may consist of pit, a berm or both. Pits shall be 2 to 4 feet deep, 20 to 30 feet long and 5 to 10 feet wide. Berms shall be no more than approximately 3 feet in height unless approved by the Engineer.
- b. Silt Trap Type B - Construct Silt Trap, Type B primarily in roadway ditches or excavated channels. Traps shall be composed of No. 2 stone or blasted rock of similar size, quality and gradation approved by the Engineer. A four inch minimum thick layer of crushed aggregate having 100% passing the 3" sieve and no more than 5% passing the No. 8 sieve shall be placed on the upstream face of the berm. This layer shall be underlain with Type 2 geotextile filter fabric.
- c. Silt Trap Type C - Construct Silt Trap, Type C at curb inlets, drop box inlets or culvert inlets. Traps shall consist of multiple rows of 18" x 30" interlocking bags composed of non-woven Type II geotextile fabric and filled with No. 57 stone. Silt Trap, Type C shall not be placed in blue line streams.

Remove and properly dispose of sediment deposited at each silt trap when greater than half full. Silt traps shall be removed upon completion of the job unless otherwise specified by the Plans or as directed by the Engineer. When no longer needed, remove silt trap and dispose of sediment and material in accordance with Section 204 of the Standard Specifications. Regrade, seed and protect or sod the disturbed area as directed by the Engineer.

5. Section 213.03.05 - Parts D, E, F, G and H shall be resequenced as Parts C, D, E, F and G respectively.
6. Section 213.04.11 - Delete measurement of Silt Check pay item.
7. Section 213.04.12 - Delete measurement of Clean Silt Check pay item.
8. Section 213.04.15 - Change measurement of Temporary Silt Ditch from "as roadway excavation" to "in linear feet of ditch constructed."
9. Section 213.04.16 - Change measurement of Temporary Drainageways from "as roadway excavation" to "in linear feet of ditch constructed."

Design Memo 3-05  
Page 5  
January 25, 2005

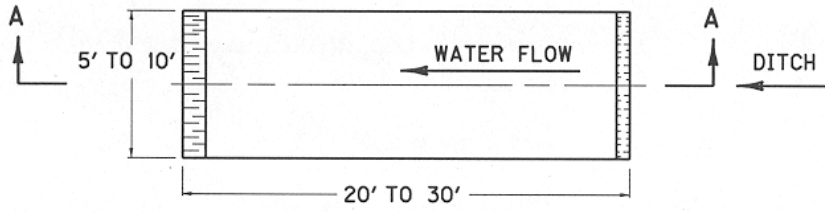
10. Section 213.05 - Delete pay code item 2705 for Silt Check.
11. Section 213.05 - Delete pay code item 2708 for Clean Silt Check.
12. Section 213.05 - Add pay code item for Temporary Silt Ditch.
13. Section 213.05 - Add pay code item for Temporary Drainageways.

KRS:RM:RT:TV

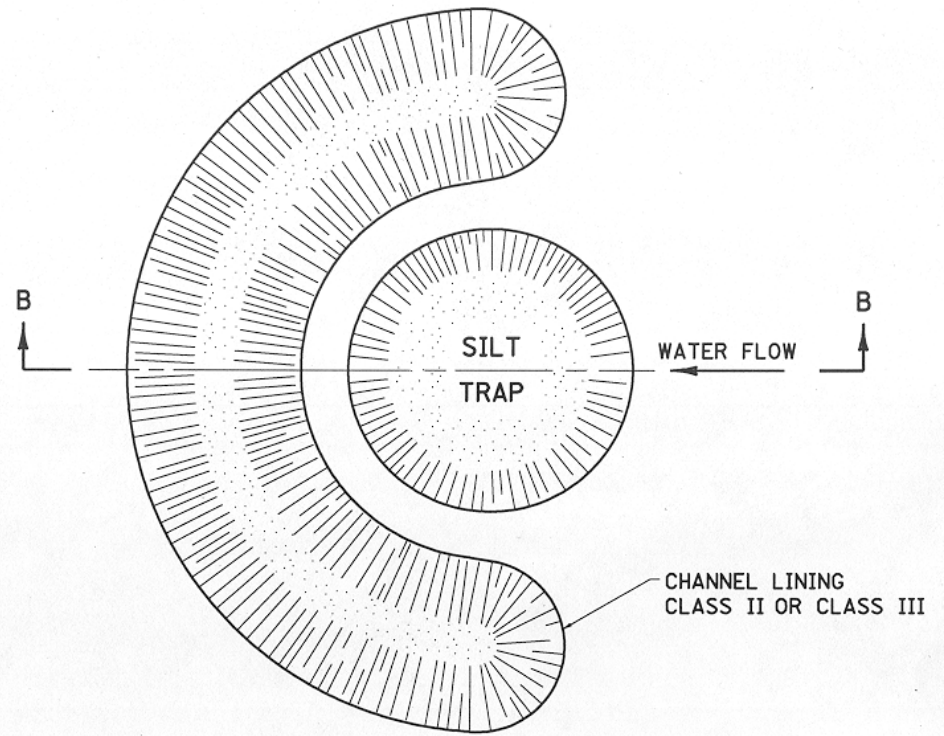
Attachments

ALTERNATE NO. 1

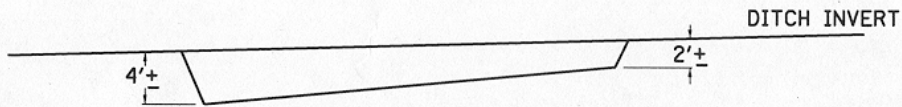
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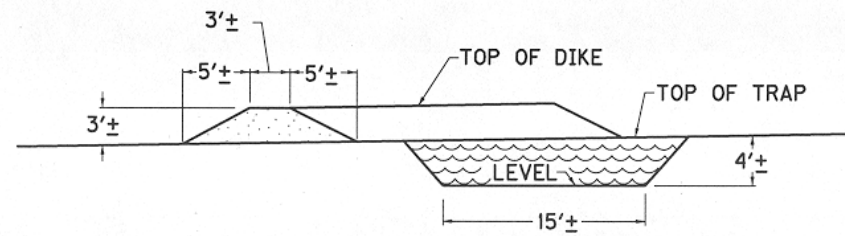
PLAN VIEW



PLAN VIEW



SECTION A-A



SECTION B-B

~NOTES~

BID ITEM AND UNIT TO BID:

CODE	PAY ITEM	PAY UNIT
2703	SILT TRAP TYPE A	EACH
2706	CLEAN SILT TRAP TYPE A	EACH

THE SIZE, SHAPE AND LOCATION OF TRAP MAY BE ADJUSTED FROM THAT SHOWN IN THE PLANS, AS DIRECTED BY THE ENGINEER.

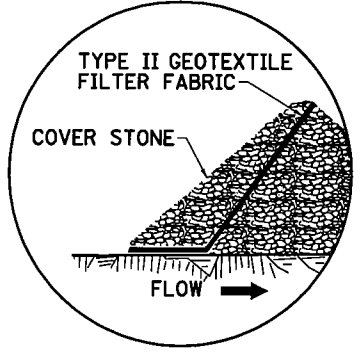
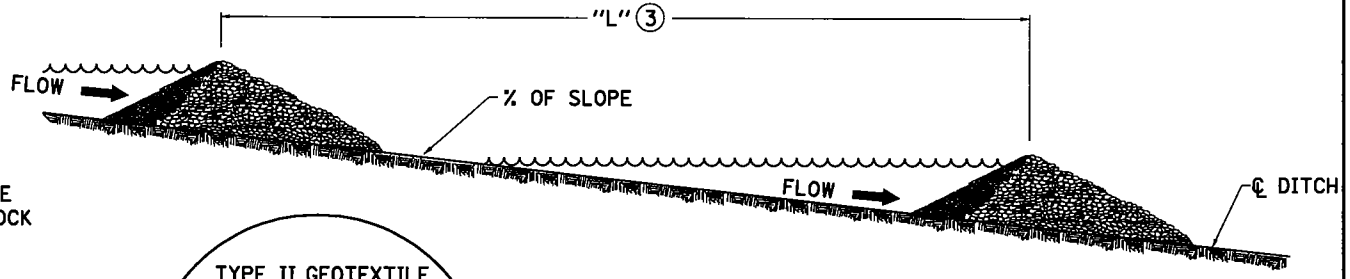
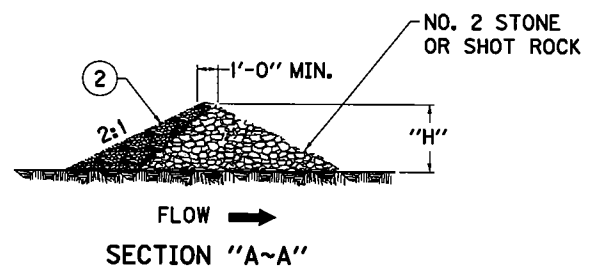
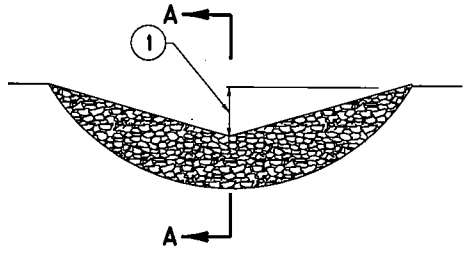
THE SILT TRAP SHALL BE CONSTRUCTED AS DIRECTED BY THE ENGINEER TO MEET VOLUME REQUIREMENTS INDICATED ON THE PLANS.

MATERIAL REMOVED IN THE PROCESS OF CONSTRUCTING SILT TRAP TYPE A SHALL BE WASTED ON SITE AT NO ADDITIONAL COST.

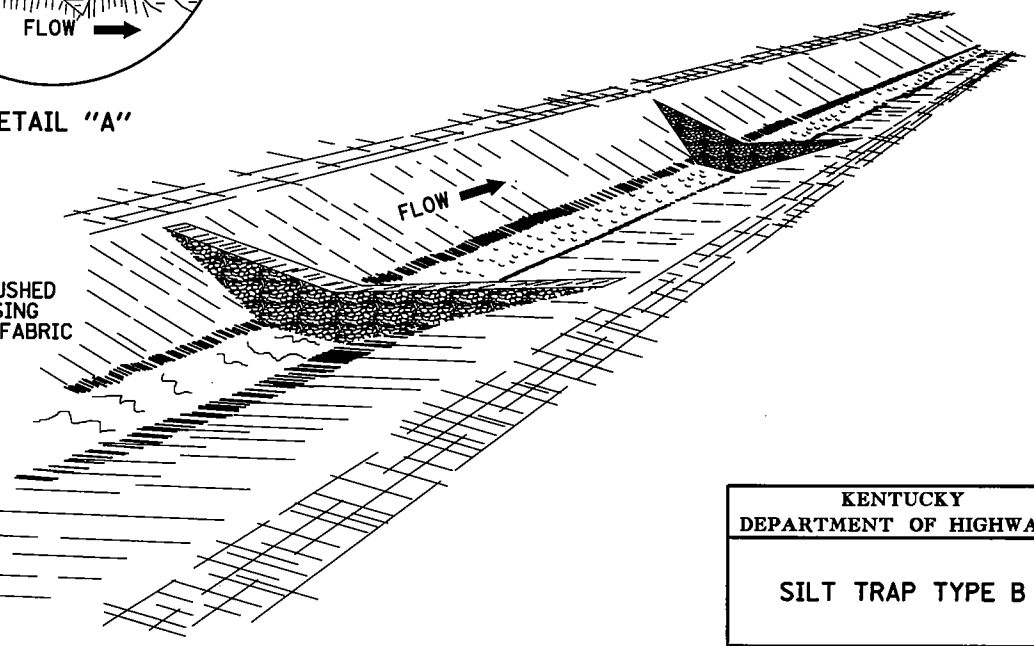
KENTUCKY  
DEPARTMENT OF HIGHWAYS

SILT TRAP  
TYPE A

SUBMITTED *J. J. Jones* DIVISION OF DESIGN DATE 2-21-05



DETAIL "A"



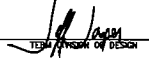
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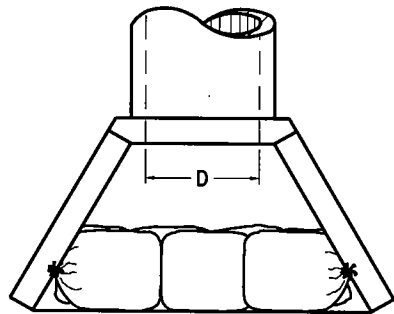
BID ITEM AND UNIT TO BID:	CODE	PAY ITEM	PAY UNIT
	2704	SILT TRAP TYPE B	EACH
	2707	CLEAN SILT TRAP TYPE B	EACH

- ① MIDDLE OF SILT TRAP SHALL BE A MINIMUM OF 1'-0" LOWER THAN SIDES SO FLOW WILL NOT BYPASS TRAP OR ERODE BANKS.
- ② UPSTREAM FACE OF SILT TRAP SHALL BE A FOUR INCH MIN. LAYER OF CRUSHED AGGREGATE HAVING 100% PASSING A 3" SIEVE AND NO MORE THAN 5% PASSING A NO. 8 SIEVE (SEE SECTION "A-A"). LINE UPSTREAM FACE WITH FILTER FABRIC UP TO BOTTOM OF THE V AND COVER FABRIC WITH STONE TO HOLD IN PLACE (SEE DETAIL "A").
- ③  $"L" = \frac{"H"}{\text{SLOPE OF DITCH}}$
- ④ SPACE SILT TRAPS AT LOCATIONS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
5. SILT TRAP TYPE A SHALL BE USED ON ALL SLOPES GREATER THAN 2%.
6. SILT TRAP TYPE A MAY BE USED ON ALL SLOPES LESS THAN 2%.

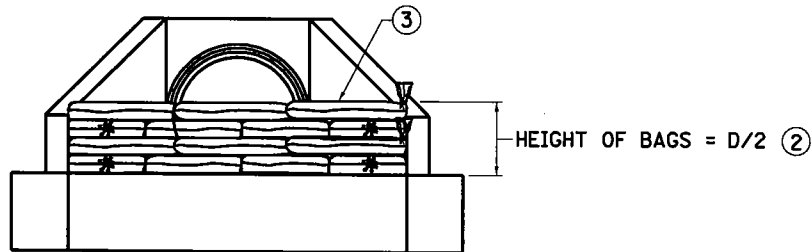
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SILT TRAP TYPE B

SUBMITTED  1-25-05  
DATE



PLAN VIEW



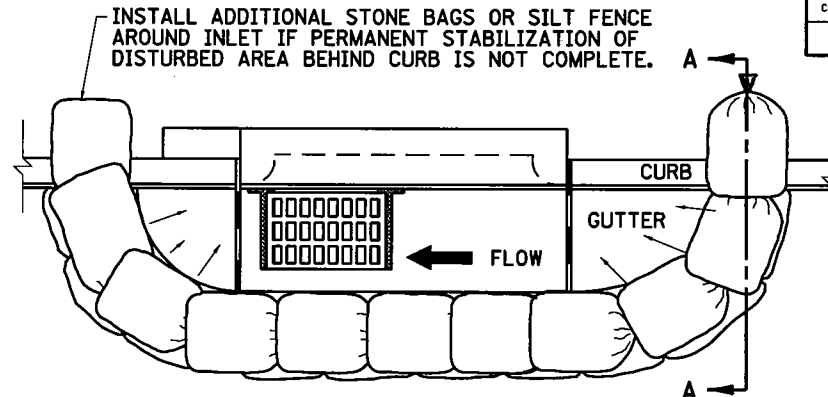
FRONT ELEVATION

~NOTES~

SILT TRAP TYPE C SHALL INCLUDE GEOTEXTILE FABRIC BAGS, NO. 57 STONE, LABOR AND ALL INCIDENTALS NECESSARY FOR ONE COMPLETE INSTALLATION. BID ITEM AND UNIT TO BID:

CODE	PAY ITEM	PAY UNIT
20496NS843	SILT TRAP TYPE C	EACH
20497NS843	CLEAN SILT TRAP TYPE C	EACH

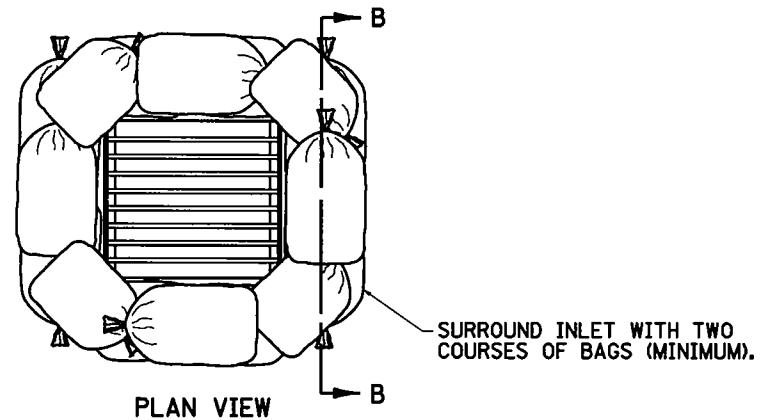
- ① INLET PROTECTION IS SUITABLE FOR USE IN BOTH PAVED AND UNPAVED AREAS.
- ② THE HEIGHT REQUIREMENT IS WAIVED IN CASES WHERE IT WILL CREATE AN UNACCEPTABLE PONDING SITUATION ON THE PAVEMENT OR ON AN ADJACENT PROPERTY.
- ③ INTERWEAVE BAG ENDS TO FILL GAPS BETWEEN BAGS.
4. CONSTRUCT 18" X 30" BAGS OF NON-WOVEN TYPE II GEOTEXTILE FABRIC CONFORMING TO SECTION 843 OF THE STANDARD SPECIFICATIONS. DOUBLE STITCH BAG SEAMS WITH 1 LB. POLYESTER THREAD. ATTACH ONE (1) TIE STRING TO EACH BAG. BAG OPENING SHALL BE ON 18" SIDE.
5. FILL BAGS WITH NO. 57 STONE BETWEEN 1/2 TO 2/3 FULL (50 LB TO 60 LB).
6. SILT TRAP TYPE C SHALL NOT BE USED IN BLUE LINE STREAMS.



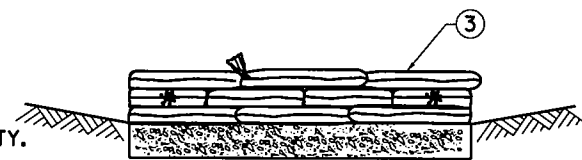
PLAN VIEW



SECTION A~A



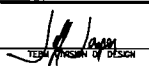
PLAN VIEW



SECTION B~B

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SILT TRAP TYPE C

SUBMITTED  1-25-05  
DATE