

Erosion & Sediment Control Workshop

**Best Management Practices (BMPs) for Linear Transportation Projects**

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Erosion & Sediment Control Workshop

**Perimeter Control Devices  
Runoff Conveyance Measures  
Velocity Control Treatments  
Drain Inlet/Catch Basin Controls  
Sediment Containment Systems**

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**Perimeter Control Devices**

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### Safety Fence

- Polyethylene or polypropylene orange fencing
- Installed along the outside *riparian buffer*, *wetland*, or *water boundary* located within the construction corridor
- Installed prior to ANY land disturbance
- Conform to the ground contours
- Wood or steel posts



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### Gravel Construction Entrance

- 2-5" stone placed on filter fabric
- Approximately 50' long and 12' wide
- Allow adequate turning radius for trucks
- Minimizes tracking of soil onto pvt
- Supplement stone



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### Temporary Silt Fence

- Reduces water flow and retains sediment on-site
- Overlap splice joints 18 inches



Optional outlet using Special Sediment Control Fence (Max width=6 ft)

3-6 ft

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### Special Sediment Control Fence

- Reduces water flow and retains sediment
- Used where flows and sediment loads will be too great for silt fence



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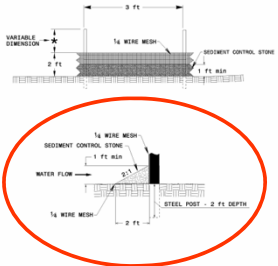
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### Special Sediment Control Fence



GENERAL NOTES:  
USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL.  
USE HARDWARE CLOTH 24 GAUGE WIRE MESH WITH 1/4 INCH MESH OPENINGS.  
INSTALL 1/4 IN. SELF FASTENER ANGLE STEEL POST 2 FT. DEEP MINIMUM.  
SPACE POST A MAXIMUM OF 3 FT.

1/4 WIRE MESH  
SEDIMENT CONTROL STONE  
WATER FLOW  
STEEL POST - 2 FT DEPTH

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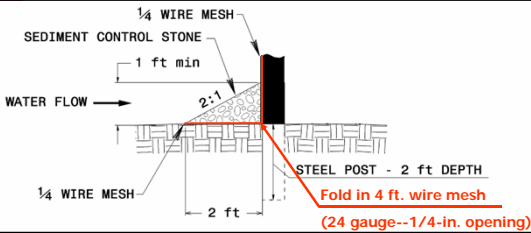
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### Special Sediment Control Fence

- Not to be placed in areas determined to be wetlands without proper permits



1/4 WIRE MESH  
SEDIMENT CONTROL STONE  
WATER FLOW  
STEEL POST - 2 FT DEPTH  
Fold in 4 ft. wire mesh (24 gauge--1/4-in. opening)

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### Special Sediment Control Fence



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### Temporary Silt Ditch

- Small ditch or channel that directs runoff from project perimeter into a basin, or rock filter dam
- 2:1 side slopes
- 1 ft deep



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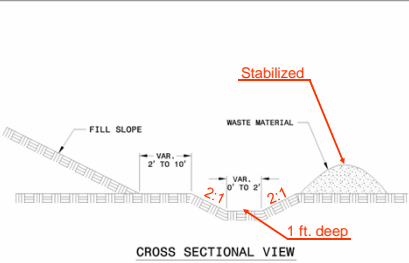
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### Temporary Silt Ditch



**CROSS SECTIONAL VIEW**

Labels in diagram: FILL SLOPE, WASTE MATERIAL, Stabilized, 1 ft. deep, 2:1, 2:1, VAR. 2' TO 10'', VAR. 0' TO 2''

Vertical text on left: HOLLOW APPROACHES, NOT TO BE USED FOR PERMANENT EROSION CONTROL MEASURES, 1630.03

Vertical text on right: FOR THE STATE OF OKLAHOMA, DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, TULSA, OKLA., 1630.03

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**TSD** → **Temporary Silt Ditch**

- **Problems**
  - Ditch too deep
  - Walls too steep
  - Runoff bypasses ditch



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**TD** → **Temporary Diversion**

- **Excavated channel that directs runoff into a sediment control structure**
- **2:1 side slopes**
- **Minimum depth 1ft 6in**



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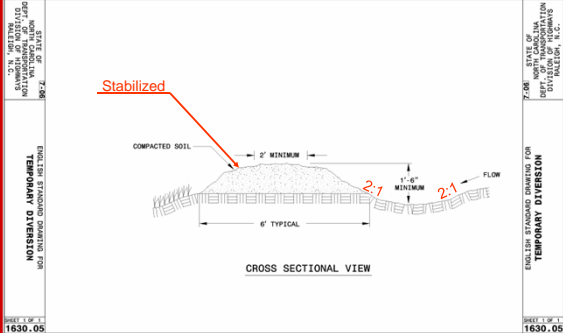
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**TD** → **Temporary Diversion**



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→TD → **Temporary Diversion**



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→TD → **Temporary Diversion**

- **Problems**
  - Channel walls too steep
  - Channel too deep
  - Channel too steep



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**Temporary Diversion**



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## Runoff Conveyance Measures

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### Temporary Slope Drain with Earthen Berm

- Carries concentrated runoff down a cut or fill slope without causing erosion
- 12 in diameter flexible pipe
- Sediment storage must be provided at top of slope near inlet or at outlet if slope drain discharges directly offsite w/o basin or trap



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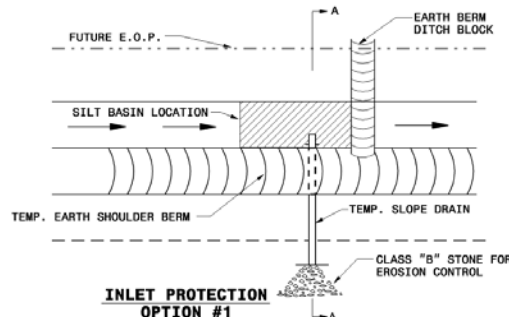
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### Temporary Slope Drain w/ Earthen Berm



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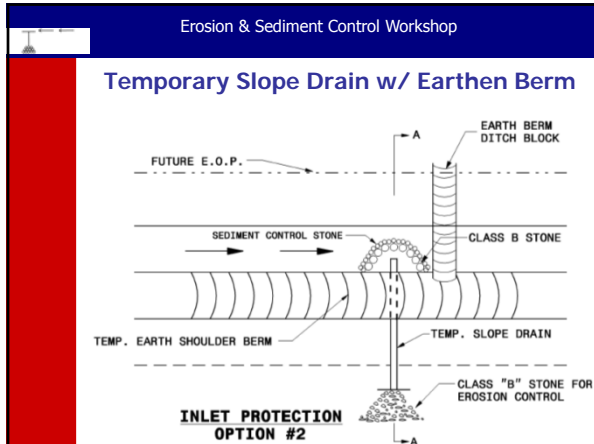
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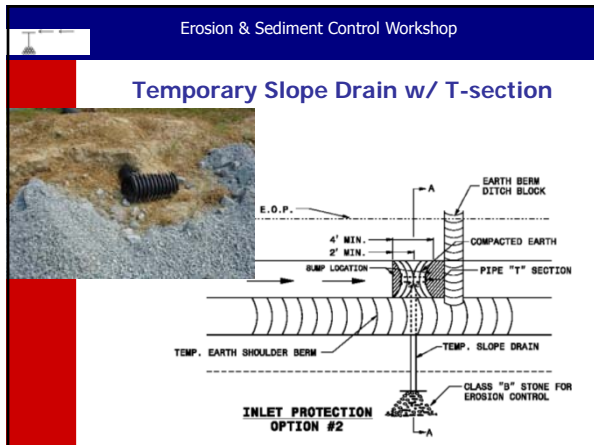
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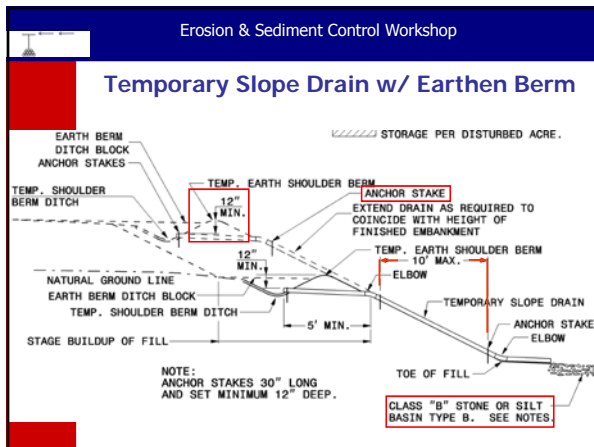
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### Temporary Slope Drain with Earthen Berm

- Anchor stakes placed on 10' max. spacing



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### Temporary Slope Drain

- Proper Installation—Inlet Protection



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### Temporary Slope Drain

- Proper Installation—Outlet Protection



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## Velocity Control Treatments

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## ODOT Rock Filter Dam

SECTION A  
SECTION B  
SECTION C  
SECTION D  
PLAN VIEW

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### ▷ Temporary Rock Silt Check – Type B

- Small dam with center weir
- Constructed with Class B rip-rap
- Reduces runoff velocity
- Minimizes erosion of drainage ditch

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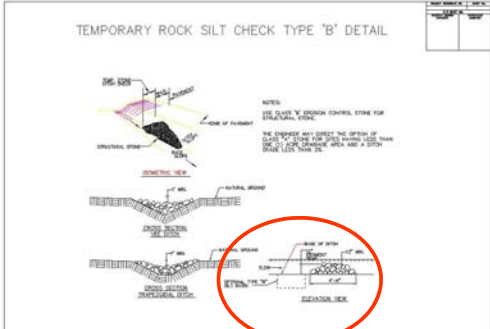
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▷ **Temporary Rock Silt Check – Type B**

TEMPORARY ROCK SILT CHECK TYPE 'B' DETAIL



NOTES:  
THE DESIGNER SHALL VERIFY THE DESIGN OF SUCH STRUCTURES FOR STABILITY UNDER DESIGN LOADS UNDER 2%.

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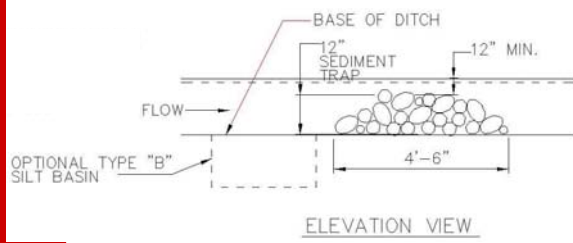
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▷ **Temporary Rock Silt Check – Type B**



BASE OF DITCH

12" SEDIMENT TRAP

12" MIN.

FLOW

OPTIONAL TYPE "B" SILT BASIN

4'-6"

ELEVATION VIEW

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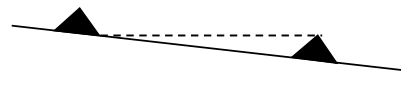
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▷ **Temporary Rock Silt Check – Type B**

**Ideal spacing - base of the upstream dam is not higher than the top of the downstream dam**



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▷ **Temporary Rock Silt Check – Type B**



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▷ **Temporary Rock Silt Check – Type B**

- **Maintenance**
  - Remove sediment when 1/2 the dam height is reached



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▷ **Temporary Rock Silt Check – Type B**

- **Problems**
  - Center of the dam should be lower than the edges
  - Properly key in dam to channel banks
  - Lacking weir section in center of structure



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### Temporary Rock Silt Check- Type A

- Small dam with weir outlet
- Constructed of Class B Rip-rap and Sediment Control Stone
- Usage
  - Outlet of slope drain
  - In ditches and channels
  - Can lead off-site
- Naturally formed storage area traps sediment



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### Wattles/Fiber Check Dams

- Substitute for Type B Rock Silt Check
- Usage adjacent to Trout Waters and other Environmentally Sensitive Areas (ESAs)
- Involve application of Polymer to aid in turbidity reduction of project runoff



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### Wattles/Fiber Check Dams



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Erosion & Sediment Control Workshop

## Wattles/Fiber Check Dams



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## Drain Inlet/Catch Basin Controls

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## Rock Pipe Inlet Sediment Trap –Type A & B

- Prevents sediment from entering pipe structure
- Receives water from more than one direction



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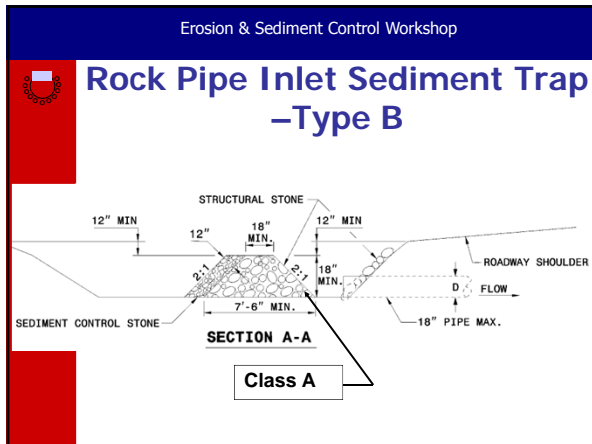
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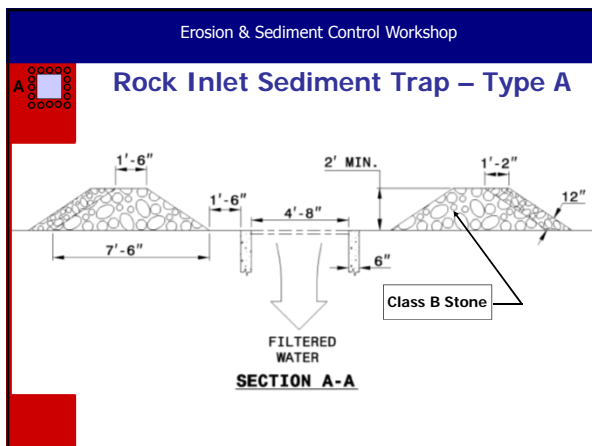
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**Rock Inlet Sediment Trap – Type C**

- Small protective structure around an inlet that receives light to moderate flow
- Slows flow creating a pool for settling of sediment
- Can be located within 30 ft of travel lane



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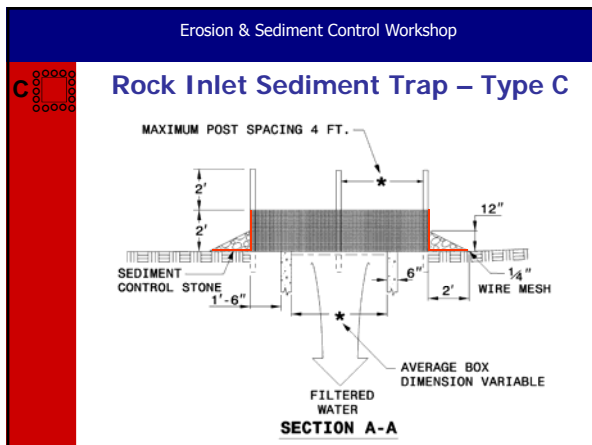
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**Rock Inlet Sediment Trap – Type C**

- Problems
  - Improper installation
  - Use of silt fence in place of stone
  - Lack of stone around structure



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**C**

## Rock Inlet Sediment Trap – Type C

- Problems






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### Summary-Rock Inlet Sediment Traps

	Type A A  1632.01	Type B B  1632.02	Type C C  1632.03
Structure Material	Class B	Class A	Hardware cloth/t-post
Sediment control stone	Yes	Yes	Yes
Dist. from travel lane	>30 ft.	<30 ft.	<30 ft.
Min. volume	3600 ft <sup>3</sup> /ac	3600 ft <sup>3</sup> /ac	3600 ft <sup>3</sup> /ac

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**BMPs must be**

- 1. installed correctly**
- 2. inspected often**
- 3. maintained as needed to work effectively.**

**BMP's should be inspected before and after rainfall events.**

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## Sediment Containment Systems

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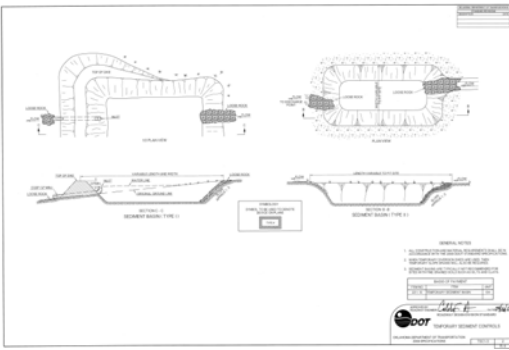
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## ODOT Sed Basin Detail



GENERAL NOTES:  
1. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.  
2. SEE ODOT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS.  
3. SEE ODOT STANDARD SPECIFICATIONS FOR EROSION CONTROL MEASURES.  
4. SEE ODOT STANDARD SPECIFICATIONS FOR SLOPE PROTECTION.  
5. SEE ODOT STANDARD SPECIFICATIONS FOR CURBS AND GUTTERS.  
6. SEE ODOT STANDARD SPECIFICATIONS FOR PAVEMENT.  
7. SEE ODOT STANDARD SPECIFICATIONS FOR UTILITIES.  
8. SEE ODOT STANDARD SPECIFICATIONS FOR SIGNAGE.  
9. SEE ODOT STANDARD SPECIFICATIONS FOR LIGHTING.  
10. SEE ODOT STANDARD SPECIFICATIONS FOR FENCE.  
11. SEE ODOT STANDARD SPECIFICATIONS FOR BARRIERS.  
12. SEE ODOT STANDARD SPECIFICATIONS FOR TRAILERS.  
13. SEE ODOT STANDARD SPECIFICATIONS FOR STORAGE.  
14. SEE ODOT STANDARD SPECIFICATIONS FOR MAINTENANCE.  
15. SEE ODOT STANDARD SPECIFICATIONS FOR SAFETY.  
16. SEE ODOT STANDARD SPECIFICATIONS FOR ENVIRONMENTAL PROTECTION.  
17. SEE ODOT STANDARD SPECIFICATIONS FOR PUBLIC UTILITIES.  
18. SEE ODOT STANDARD SPECIFICATIONS FOR TRANSPORTATION.  
19. SEE ODOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.  
20. SEE ODOT STANDARD SPECIFICATIONS FOR OPERATIONS.  
21. SEE ODOT STANDARD SPECIFICATIONS FOR MAINTENANCE.  
22. SEE ODOT STANDARD SPECIFICATIONS FOR SAFETY.  
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30. SEE ODOT STANDARD SPECIFICATIONS FOR ENVIRONMENTAL PROTECTION.

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## Temporary Silt Basin – Type B

- Collects sediment flowing through a drainage way
- Used with rock silt checks to slow flow



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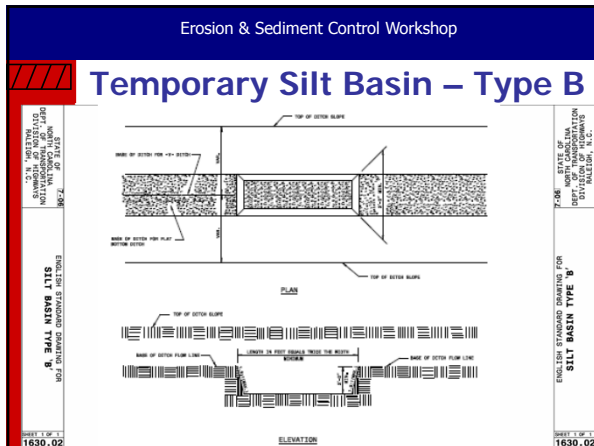
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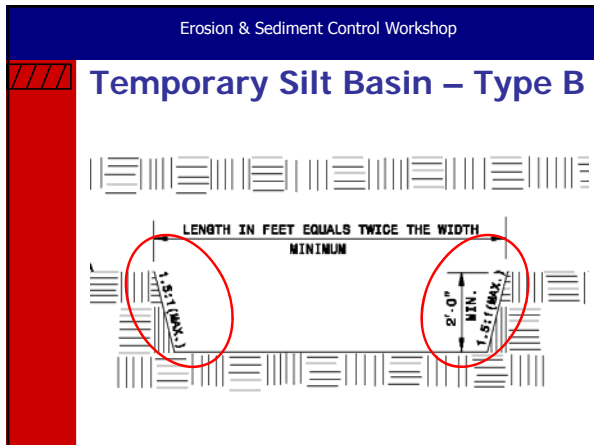
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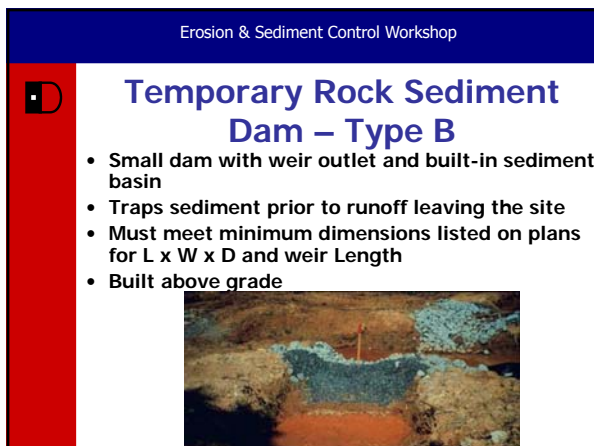
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### Riser Basin

- Captures runoff before leaving site
- Perforated riser pipe drains the basin
- Overflow spillway for runoff exceeding riser capacity



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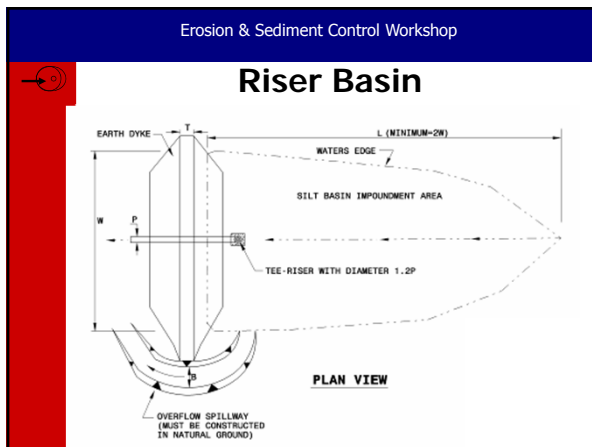
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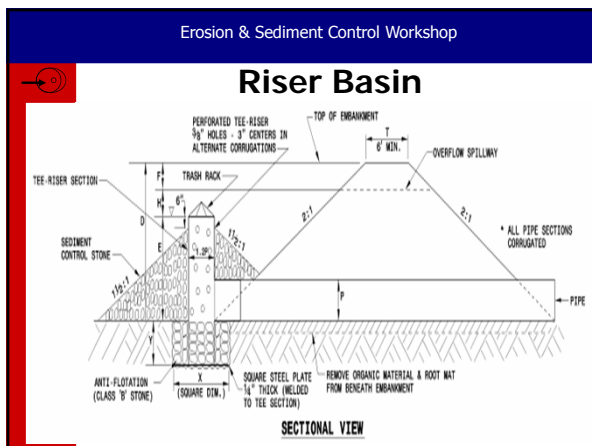
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### Riser Basin

- Serves large drainage areas with concentrated flows where other BMPs are inadequate
- Storage area of 1800 cu ft/disturbed ac



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### Riser Basin

- Common Problems
  - Outlet pipe not protected
  - Lack of maintenance
  - Steep inlet channels generating sediment
  - Drainage bypasses basin



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### Flashboard Riser Outlet

- Adjustable standing pool
- Can empty for sediment removal



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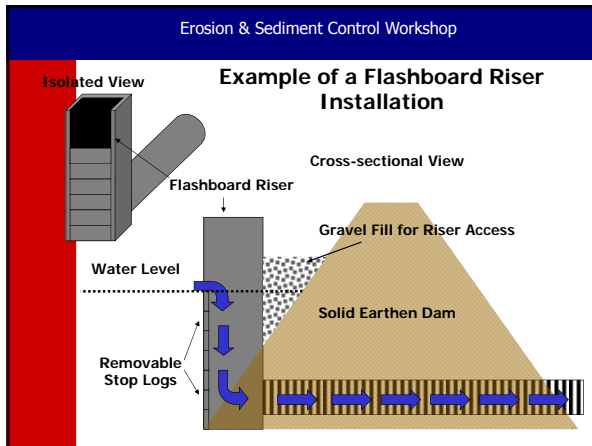
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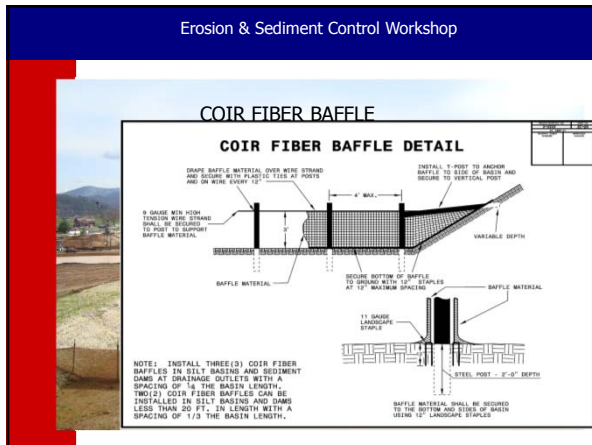
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## Porous Baffle Spacing

- **Baffles in Silt Basins at drainage turnouts and all other temporary rock sediment dams—Type-A and -B:**
  - If basin length  $\leq$  10 feet; 1 baffle. (State Forces Projects)
  - If basin length  $>$  20 feet; 3 baffles.
  - If basin length between 10 -20 feet; 2 baffles.

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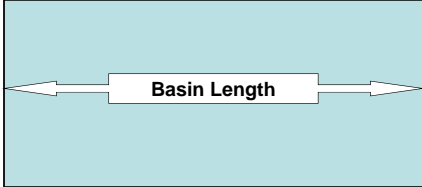
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**How many porous baffles are needed and what is their spacing if the basin is :**

A.) 8 ft long?  
B.) 18 ft long?  
C.) 48 ft long?




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**Surface Outlet (Skimmer)**

- Skimmer is a dewatering device
- Primary dewatering during a storm event occurs over the emergency spillway.
- Opening in 'C' points towards the dam




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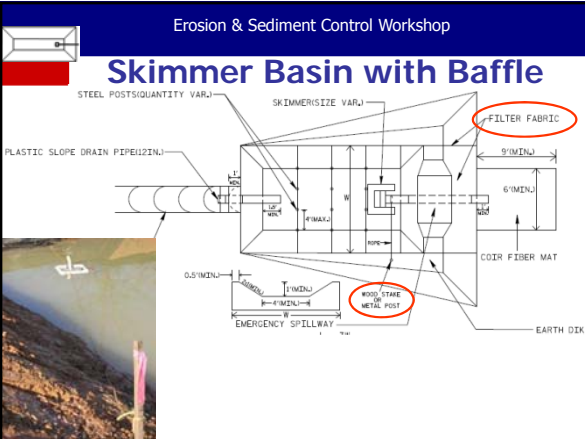
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**Skimmer Basin with Baffle**




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### Emergency Spillway

- Line with Type 2 filter fabric for drainage
- Overlap seams 18 inches
- Secure edges in 5" deep trench and compact
- Secure fabric with 6" metal staples; 3 ft spacing
- Size weir length (width) per plan
- Significant rain should activate emergency spillway



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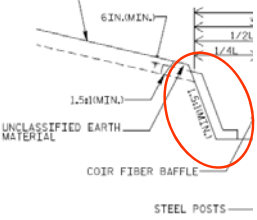

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### Skimmer Basin with Baffle



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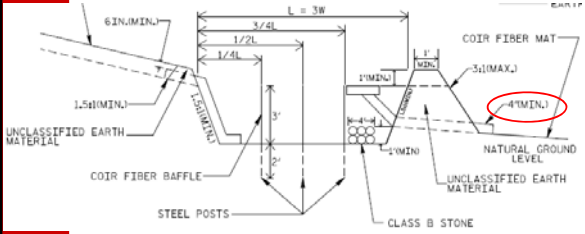
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### Skimmer Basin with Baffle



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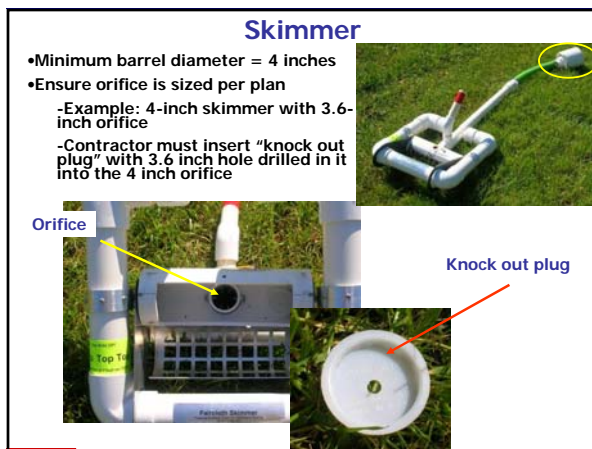
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Erosion & Sediment Control Workshop

### Maintenance

- Clean out sediment at  $\frac{1}{2}$  design capacity



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Erosion & Sediment Control Workshop

### Questions?



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