

# Erosion Control Breakout Session



Barney Blackburn, PE, CPESC, CPSWQ

Soil & Water Engineering Supervisor

# Response for Erosion Control Revisions

- New Items Added to Form 1675
  - Special Sediment Control Fence
  - Coir Fiber Mat
  - Coir Fiber Baffles
  - Permanent Soil Reinforcement Mat
  - Safety Fence
- Response Quantity Increased

# Response for Erosion Control Policy

- Form 1675 Incorporated into NPDES Form
- Paid only when Subcontractor Mobilizes
  - Installation
  - Replacement
- Communication between NCDOT and Prime Contractor **VERY IMPORTANT**

# Safety Fence & Boundary Flagging

- Flagging Allowed inside footprint of the project
- Safety Fence Quantity Decreased
- Example Drawings available at:
  - Construction Stakeout Manual  
[http://www.ncdot.org/doh/operations/dp\\_chief\\_eng/constructionunit/formsmanuals/](http://www.ncdot.org/doh/operations/dp_chief_eng/constructionunit/formsmanuals/)
  - REU Field Operations “IMPORTANT DOWNLOADS”  
[http://www.ncdot.org/doh/operations/dp\\_chief\\_eng/roadside/fieldops/downloads/](http://www.ncdot.org/doh/operations/dp_chief_eng/roadside/fieldops/downloads/)

# Boundary Flagging



- Flagging Placed in Straight Line to Delineate Interior Jurisdictional Boundaries
- Maximum 25 ft. Spacing
- No Pay Item for Boundary Flagging

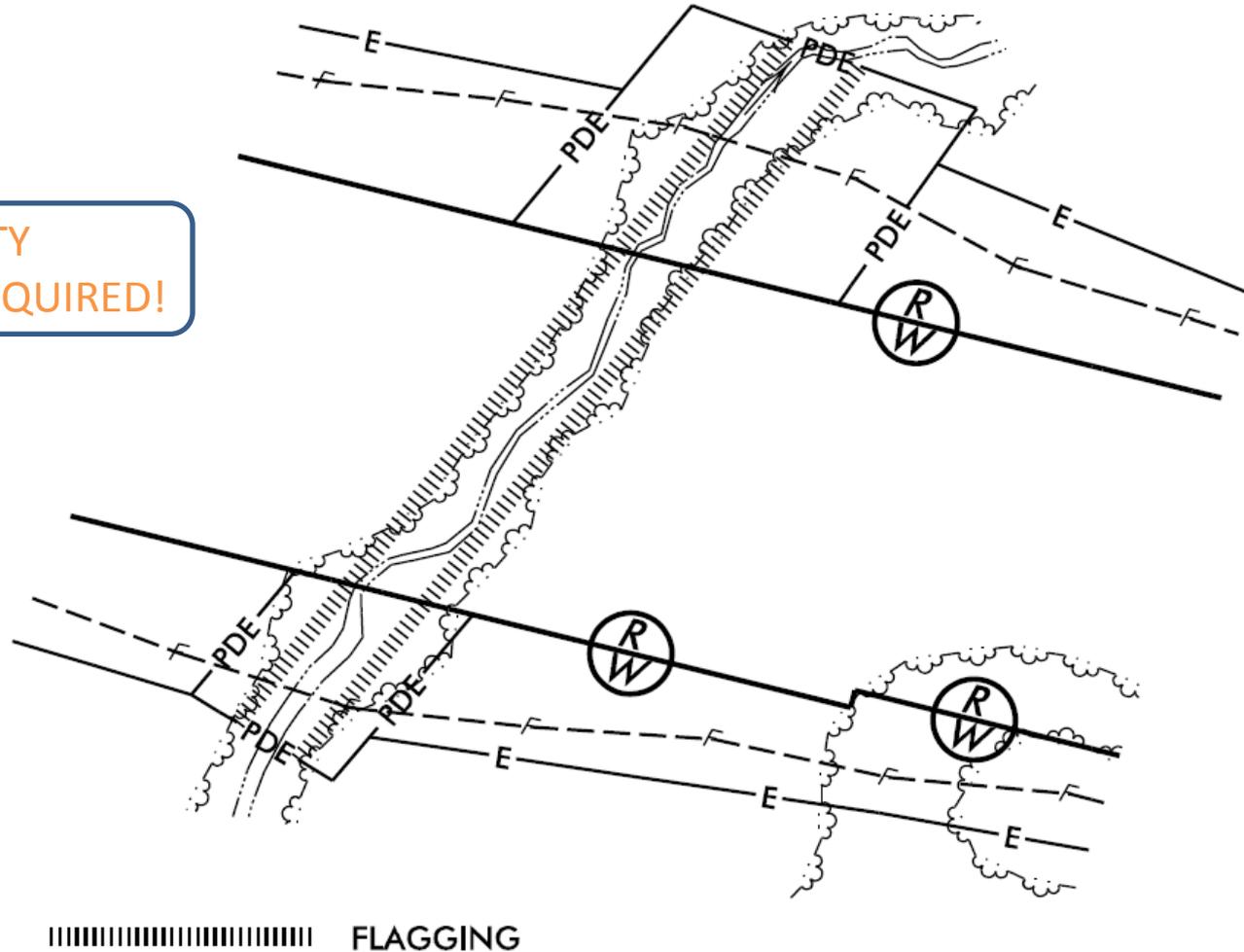
# Boundary Flagging Policy

- Boundary Flagging Delineation Incidental to:
  - *Construction Surveying*
  - *Borrow Material*
  - *Disposal of Waste and Debris*
- *Construction Surveying* Pay Item: Contractor Responsible for Installation
- No Survey Pay Item: NCDOT Responsible for Installation\* with Maintenance Responsibility by Contractor

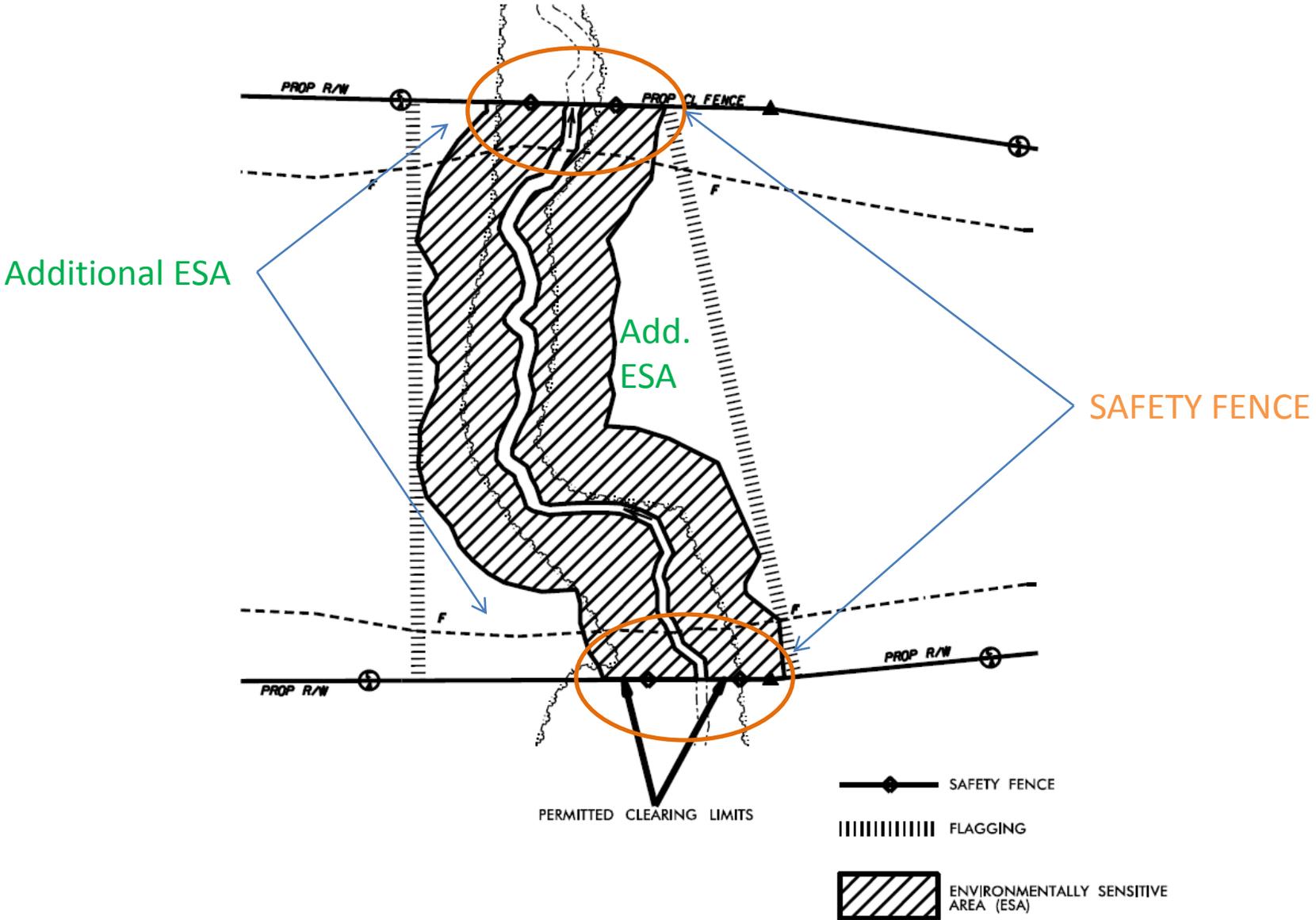
\*Install on project site only, **not** waste or borrow sites

# Jurisdictional Stream

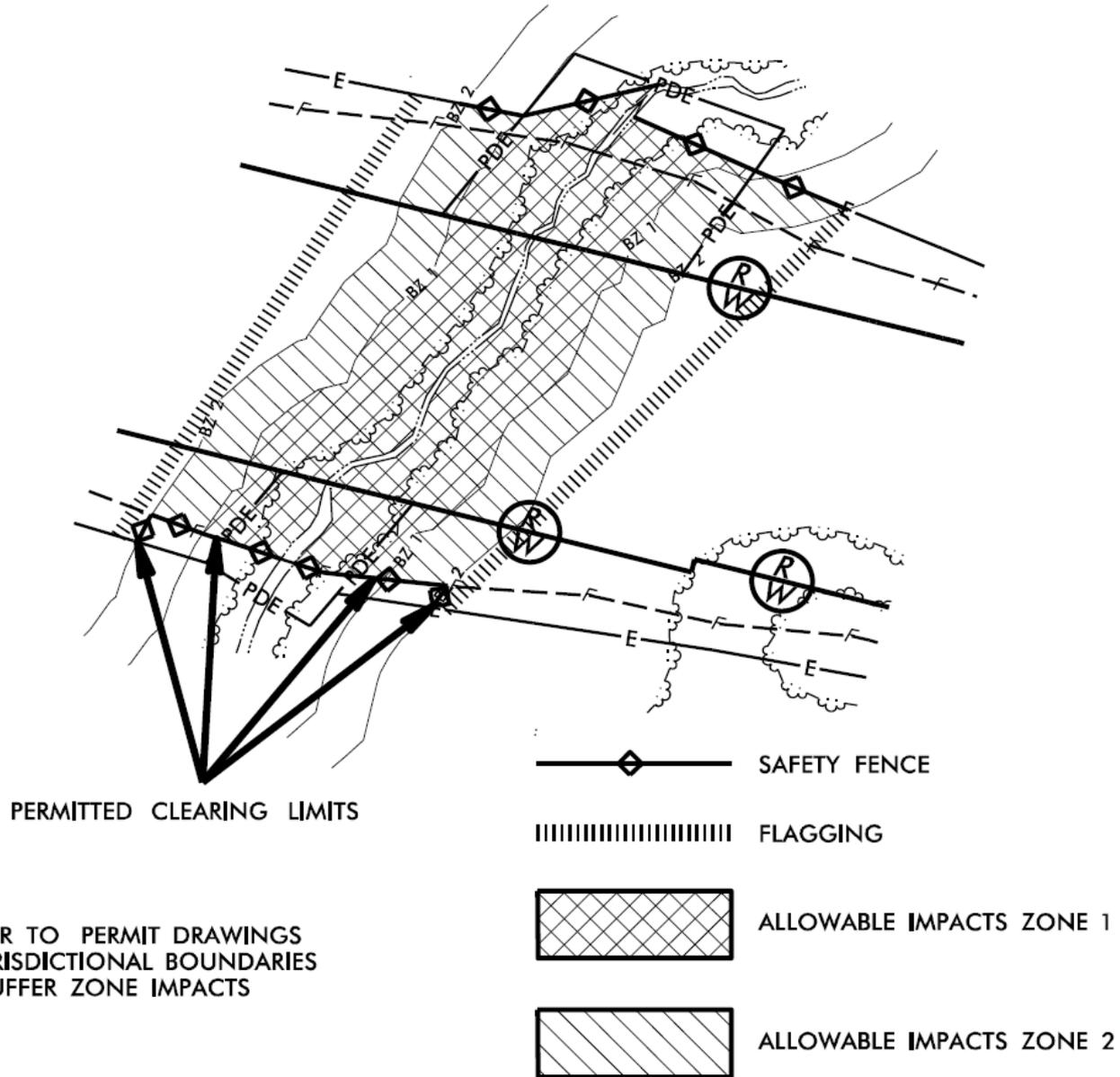
NO SAFETY  
FENCE REQUIRED!



# Jurisdictional Stream with ESA

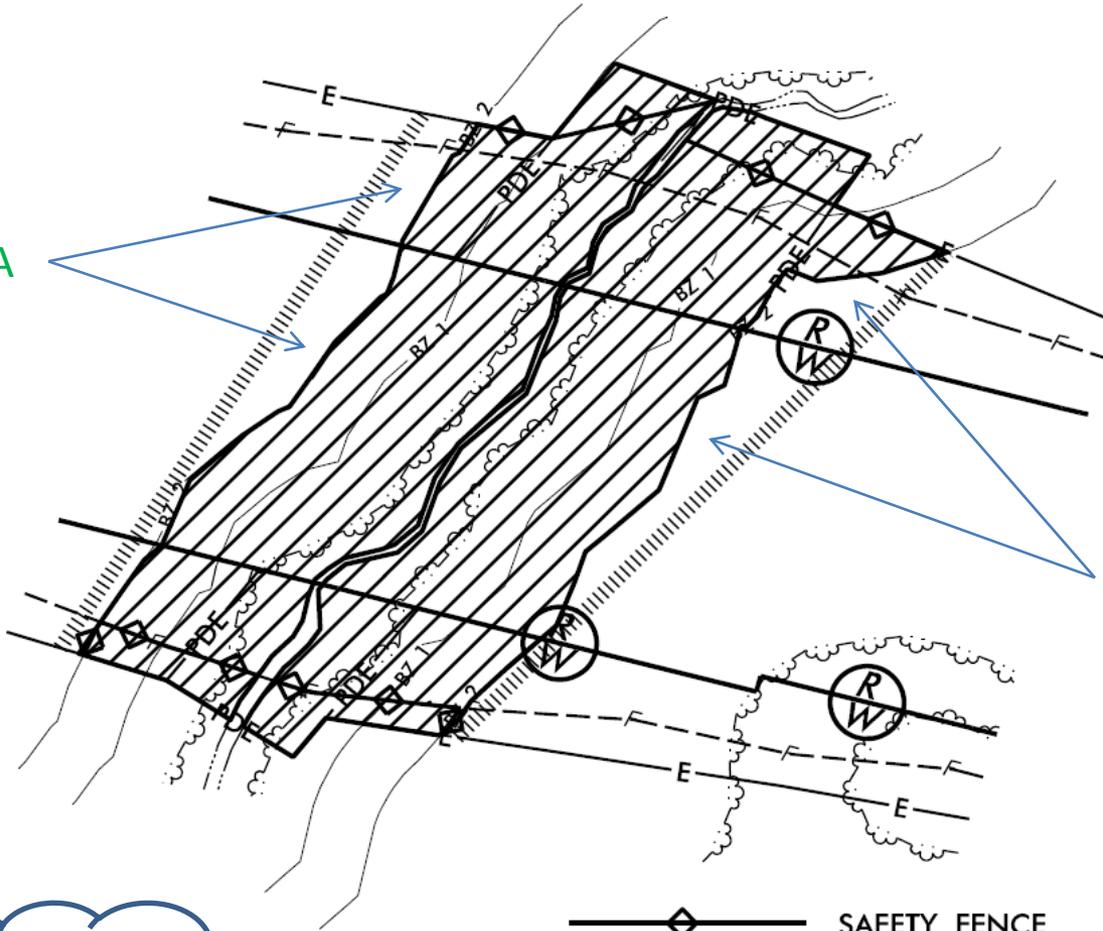


# Jurisdictional Stream with Buffers



# EC Plans with ESA + Buffer

Additional ESA



Additional ESA

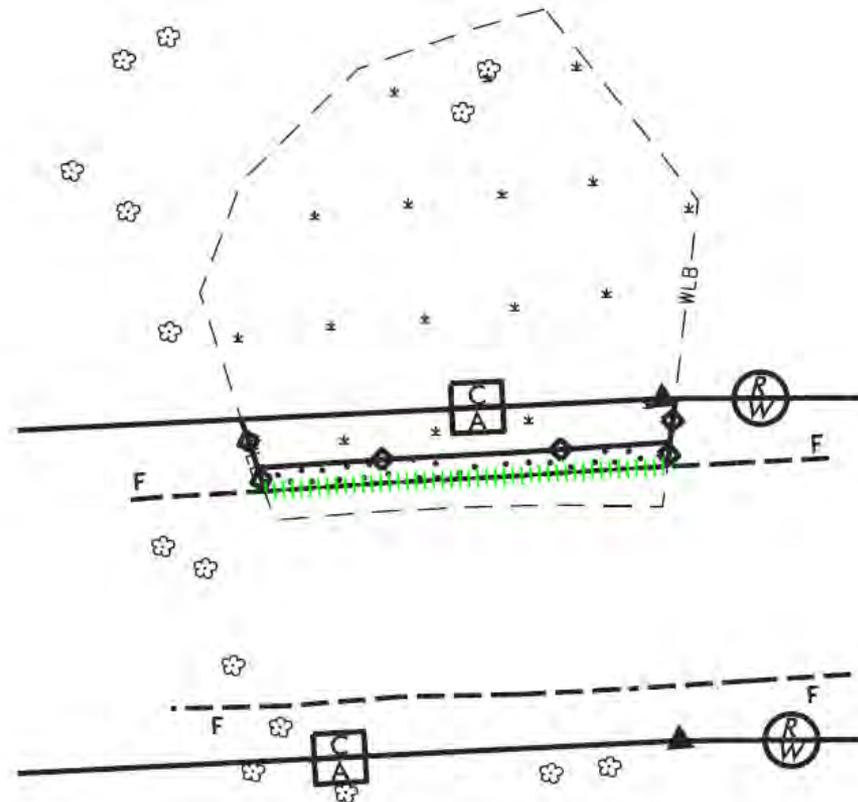
NOT ON WEB SITE!

—◆— SAFETY FENCE

||||| FLAGGING

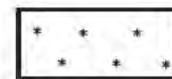
▨ ENVIRONMENTALLY SENSITIVE AREA (ESA)

# Mechanized Clearing in Wetlands



\* - REFER TO PERMIT DRAWINGS  
FOR JURISDICTIONAL BOUNDARIES

\*\* - FLAGGING COLOR DOES NOT HAVE TO BE  
GREEN, BUT MUST BE A DIFFERENT COLOR  
THAN FLAGGING FOR INTERIOR BOUNDARIES  
OF HAND CLEARING PERMITTED AREAS



MECHANIZED CLEARING

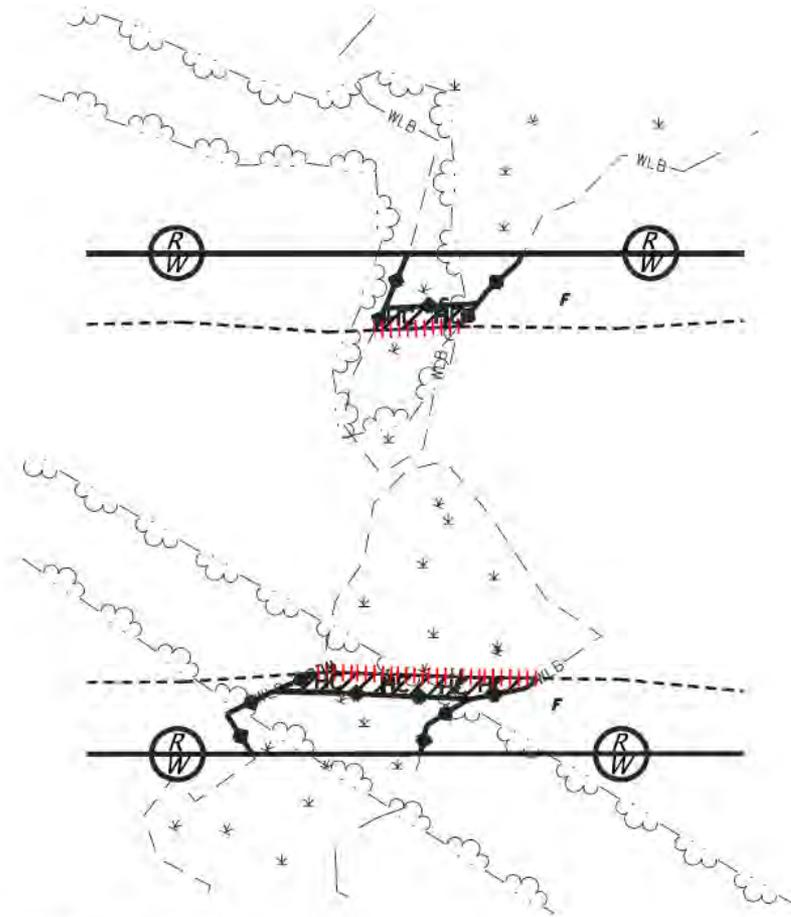


SAFETY FENCE



FLAGGING\*\*

# Hand Clearing in Wetlands



\* - REFER TO PERMIT DRAWINGS  
FOR JURISDICTIONAL BOUNDARIES

\*\* - FLAGGING COLOR DOES NOT HAVE TO BE  
RED, BUT MUST BE A DIFFERENT COLOR  
THAN FLAGGING FOR INTERIOR BOUNDARIES  
OF MECHANIZED CLEARING PERMITTED AREAS



HAND CLEARING



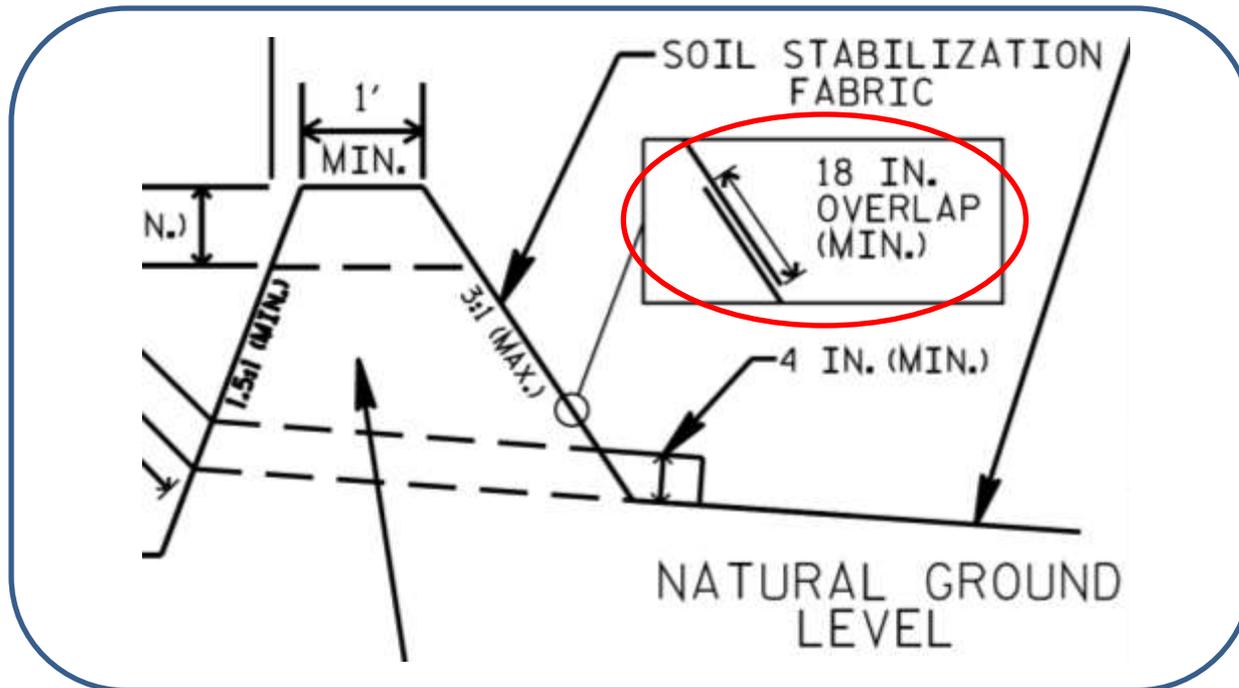
SAFETY FENCE



FLAGGING\*\*

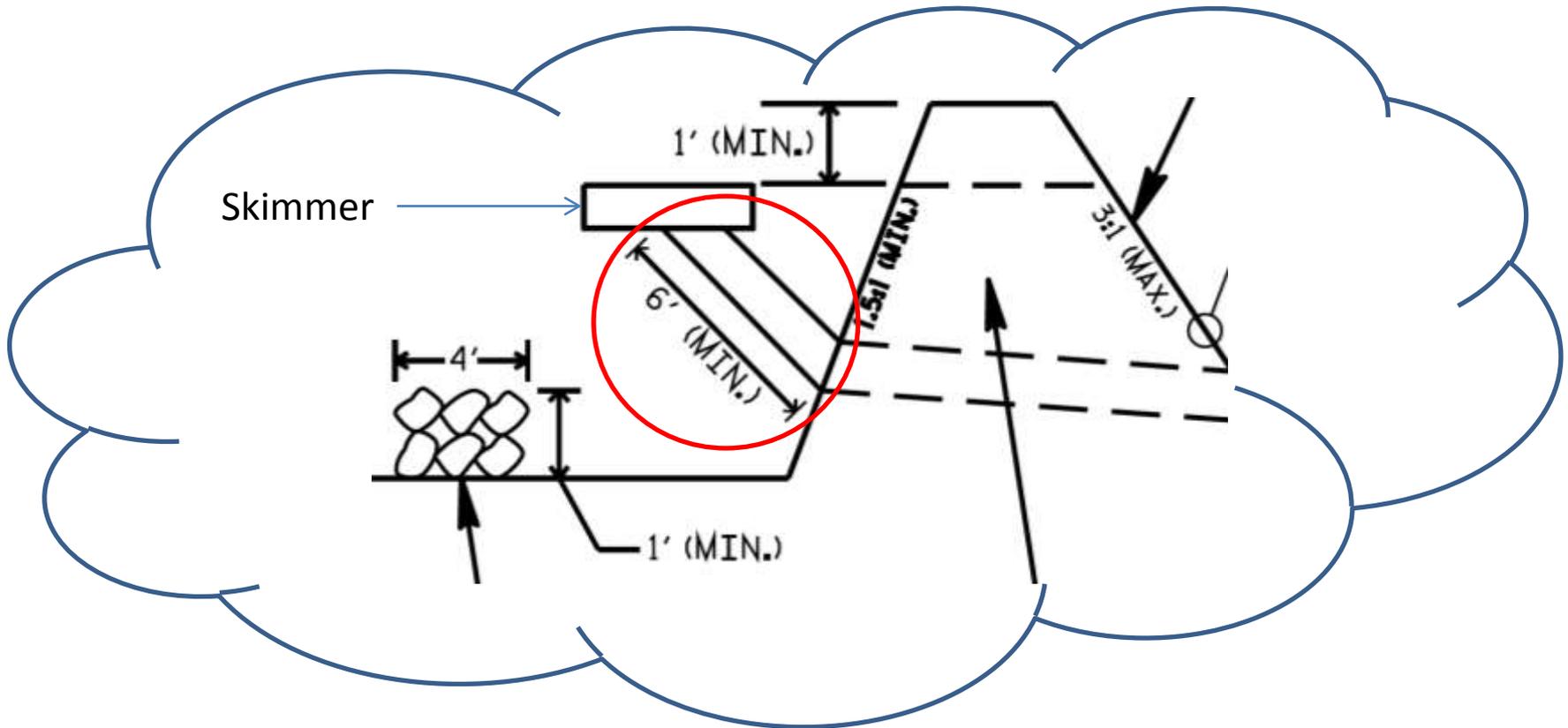
# Skimmer Basin Fabric Revisions

- Fabric for Soil Stabilization (Type 4)
- Fabric Overlap Method



# Skimmer Basin Revisions (cont.)

- Arm Pipe for Skimmer
  - 1.5" Schedule 40 PVC pipe for up to 2.5" skimmers



# Excelsior Wattle

- Design Life: 12 – 24 months
- Average Bid Cost: \$70 per wattle
- Placement: Projects with 1 year duration or less; used with and without Polyacrylamide (PAM)
- Density: 2.5 lb./ft.<sup>3</sup>

# Excelsior Wattle



# Coir Fiber Wattle



- Design Life: > 2 years
- Average Bid Cost: \$80 per wattle
- Placement: Projects with greater than 1 year duration; used with and without PAM
- Density: 3.5 lb./ft.<sup>3</sup>

# Coir Fiber Wattle



# Wattles on TIP Projects

- Either Excelsior or Coir Fiber Wattle in Contract (Detail and Special Provision)
- Symbol is the same for both wattle types:

Without PAM



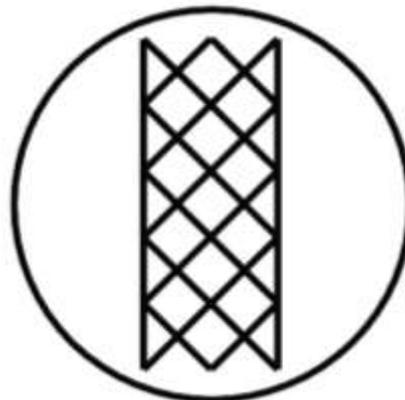
With PAM



# Silt Check Type A with Matting & PAM



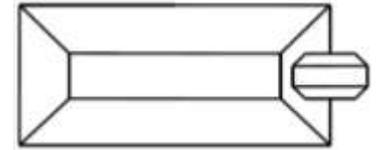
- Design Life: Duration of Project
- Average Bid Cost: \$270 (Stone, Matting, PAM)
- Placement: Projects with ditch grades of 2.5% or more



# Silt Check Type A with Matting and PAM

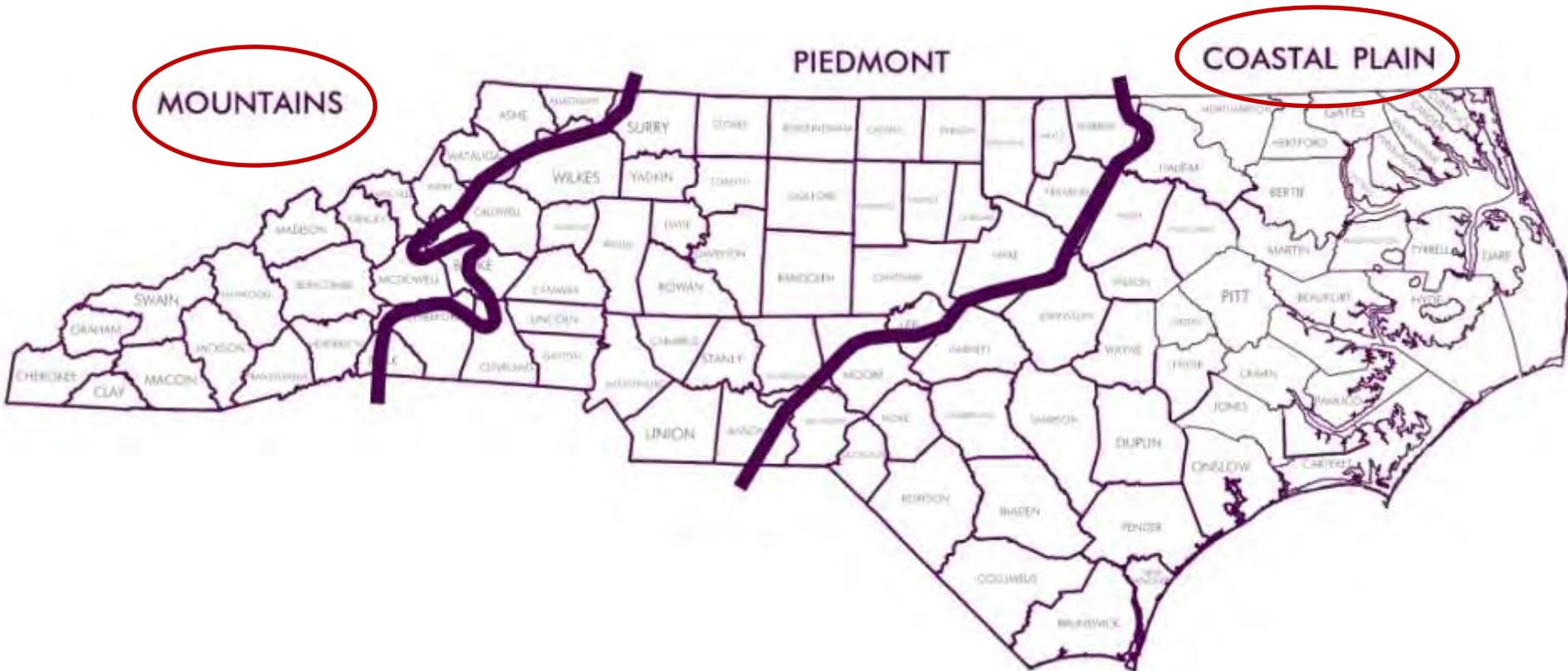


# Infiltration Basin



- Utilized in Mountains and Coastal Plain
- Hydraulic Conductivity of Soil must be 0.5 in/hr or greater at bottom elevation of basin
- Not placed in soils prone to flooding
- Cost \$1000 less than Skimmer Basin

# Infiltration Basin Implementation



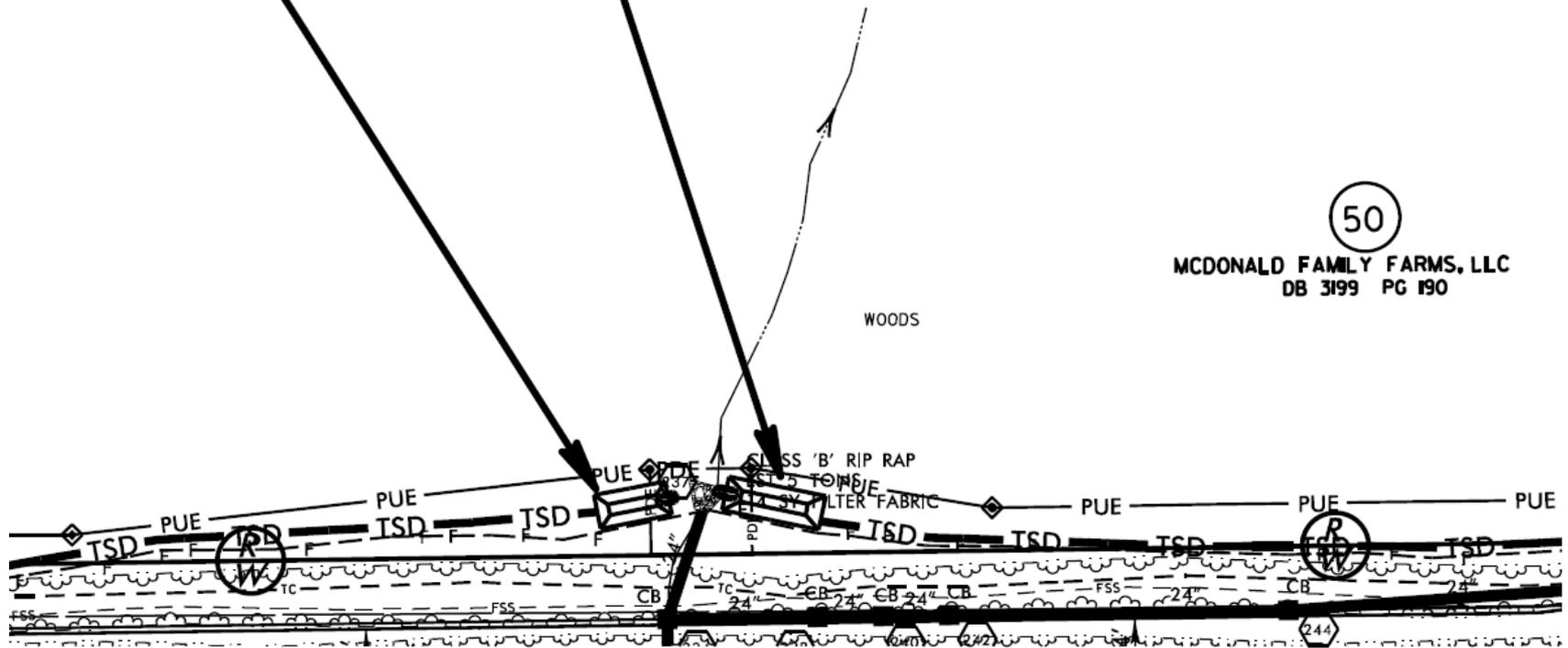
# Infiltration Basin on EC Plans

25 x 12 x 3  
4 ft. weir  
(See Infiltration  
Basin Detail)  
ID 17.1i CG

34 x 12 x 3  
4 ft. weir  
(See Infiltration  
Basin Detail)  
ID 17.2i CG

Utilized outside Fill  
Slopes with TSD

195



50  
MCDONALD FAMILY FARMS, LLC  
DB 3199 PG 190

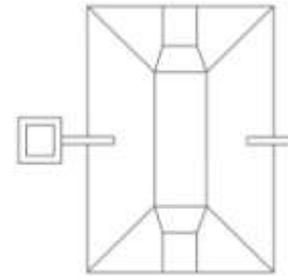
# Infiltration Basin



# Earthen Dam with Skimmer



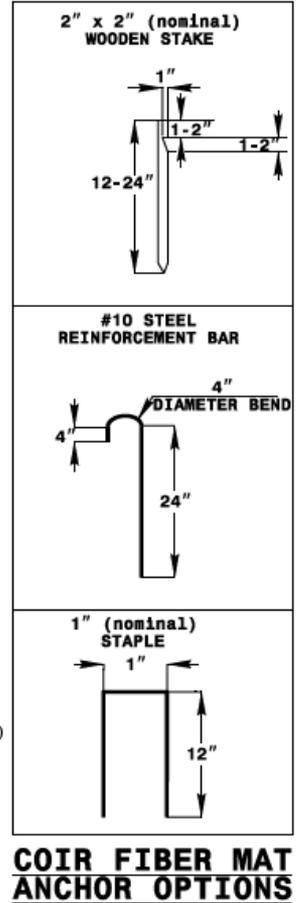
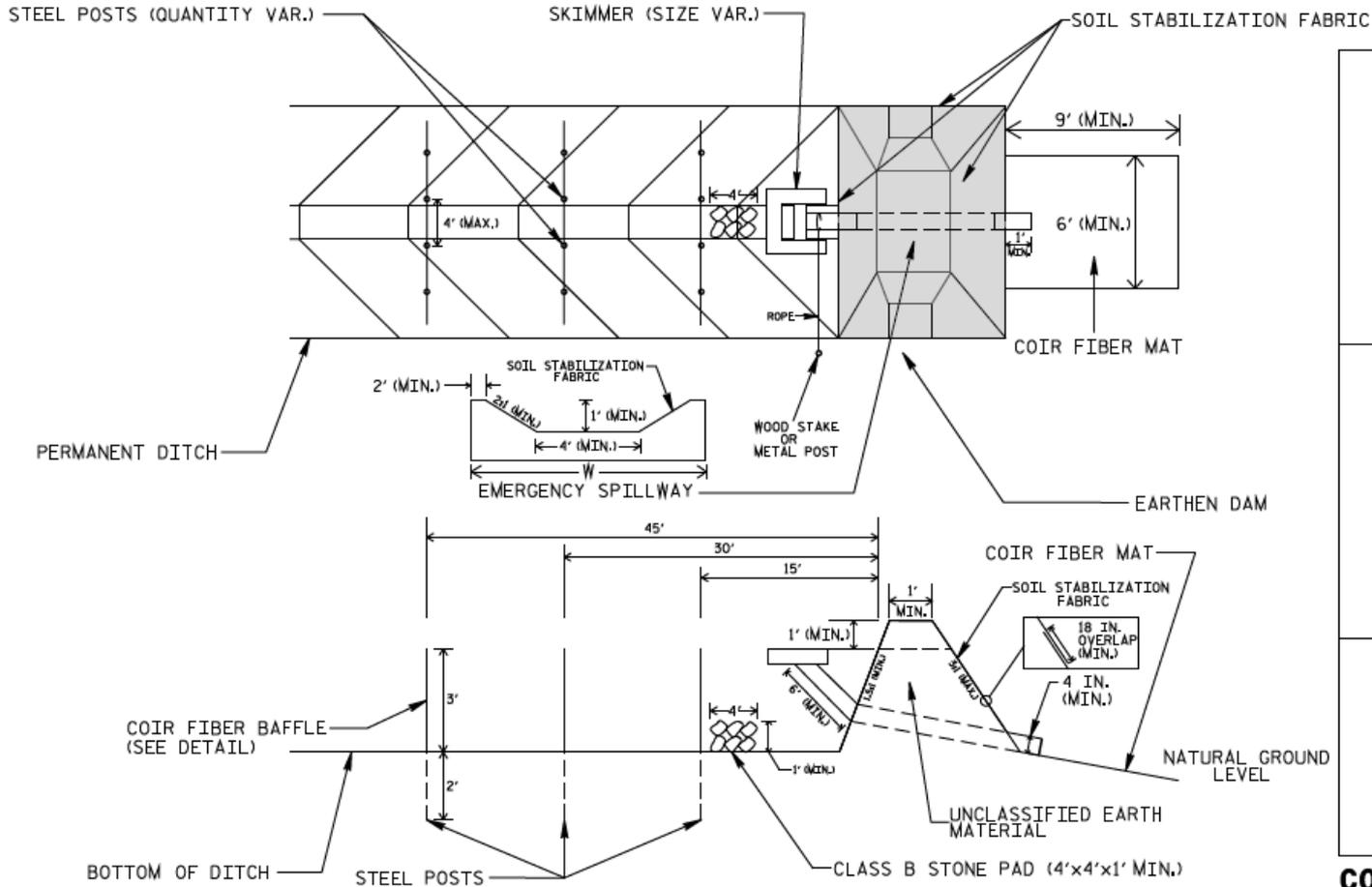
- Utilized throughout state



- Need Large Cross Section and Ditch Grade of 2% or less
- Easier to install and remove than sediment basin
- Cheaper to construct than traditional basin

# EARTHEN DAM WITH SKIMMER

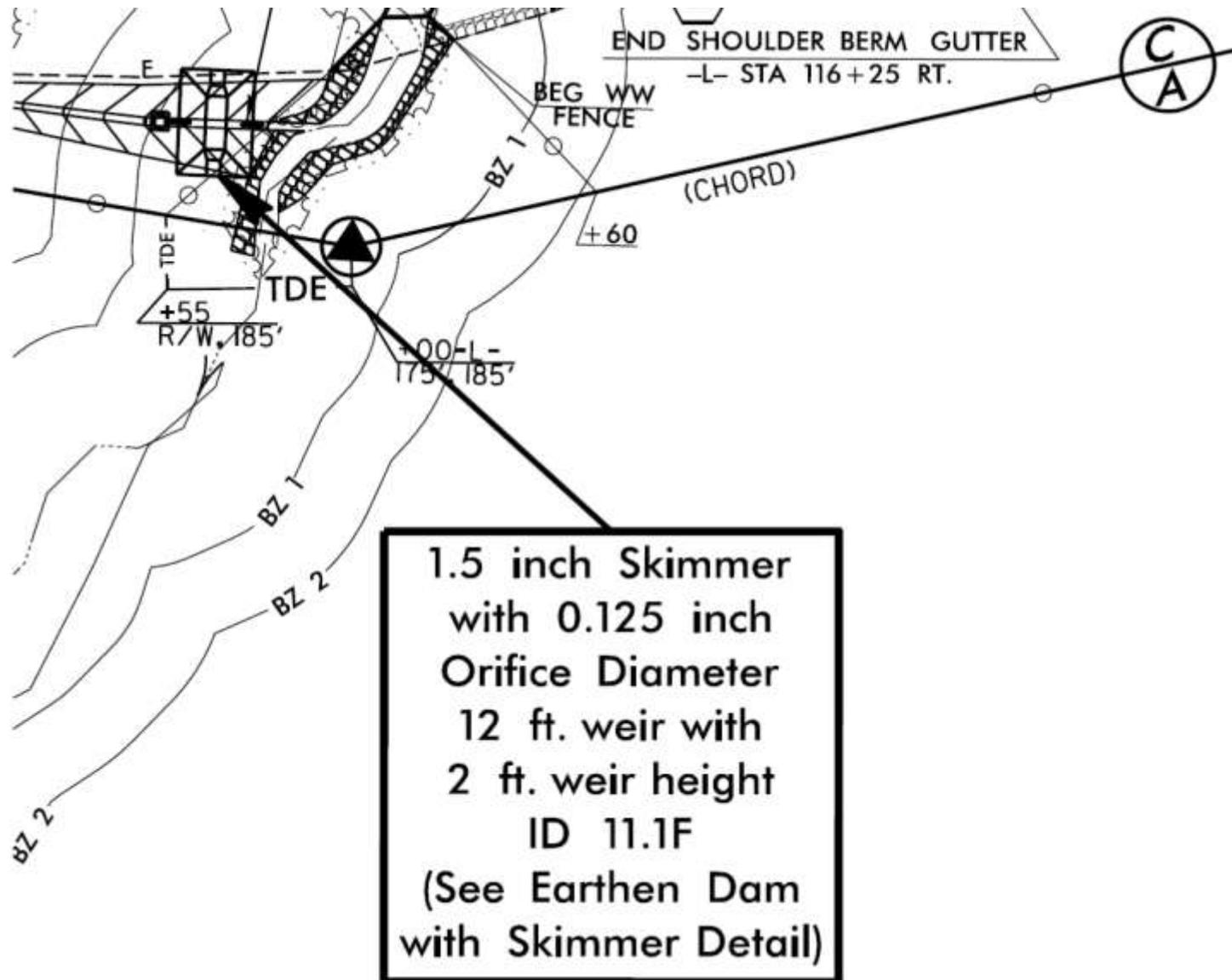
PROJECT REFERENCE NO. X-XXXX	SHEET NO. EC-2H
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



- NOTES**
1. LIMIT EARTHEN DAM HEIGHT TO 5 FT.
  2. DETERMINE EMERGENCY SPILLWAY LENGTH (FT.) USING  $Q/0.8$ , WHERE Q IS FLOW RATE (CFS) INTO BASIN.
  3. SOIL STABILIZATION FABRIC FOR EMERGENCY SPILLWAY SHALL BE ONE CONTINUOUS PIECE OF MATERIAL OR OVERLAPPED 18 IN. (MIN.).

NOT TO SCALE

# Earthen Dam with Skimmer on EC Plans



# Earthen Dam with Skimmer



# Borrow Pit Dewatering Basin



- Utilized in Divisions 1, 2, 3, 4, and 6
- Projects with 50,000 yd<sup>3</sup> of Borrow or more
- Old Line Item Quantity: Measured in CY
- New Line Item Quantity: Incidental to *Borrow Excavation*

# BORROW PIT DEWATERING BASIN DETAIL

PROJECT NUMBER	DATE
1-XXXX	EC-X
DRAWN BY	CHECKED BY
HYDRAULIC ENGINEER	HYDRAULIC ENGINEER

## GENERAL NOTES:

DETERMINE BORROW PIT DEWATERING BASIN SIZE USING  $V = 8.0203 * Q * T$ , WHERE V IS VOLUME (FT<sup>3</sup>), Q IS PUMP FLOW RATE (GPM), AND T IS DEWATERING TIME (HR). USE MAXIMUM FLOW RATE OF 1000 GPM AND A MINIMUM DEWATERING TIME OF 2 HOURS.

RISER SHALL BE A NON-PERFORATED, SMOOTH OR CORRUGATED MATERIAL WITH A FLASHBOARD OPTION.

CONSTRUCT THE COIR FIBER BAFFLE WITH A MATERIAL THAT MEETS THE SPECIFICATIONS OF THE COIR FIBER MAT SPECIAL PROVISION PROVIDED IN THE CONTRACT.

PROVIDE 5' STEEL POSTS OF THE SELF-FASTENER ANGLE STEEL TYPE. INSTALL STEEL POSTS WITH NO MORE THAN 3' OF THE POST APPEARING ABOVE THE GROUND.

ATTACH THE COIR FIBER MAT TO THE STEEL POSTS WITH WIRE OR OTHER ACCEPTABLE MEANS AND STAPLED INTO THE BOTTOM AND SIDE SLOPES OF THE BASIN WITH 12" STAPLES.

INSTALL TYPE 2 FILTER FABRIC ON SIDESLOPES AND BOTTOM OF BASIN AT INLET AS SHOWN IN THE DETAIL.

USE THE TYPICAL SECTION SHOWN FOR THE BORROW PIT DEWATERING BASIN AS A GUIDE. THE BASIN MAY HAVE ANY TYPE CONFIGURATION AS LONG AS SUFFICIENT VOLUME IS PROVIDED AND PROVISIONS ARE MADE FOR A NON-PERFORATED RISER.

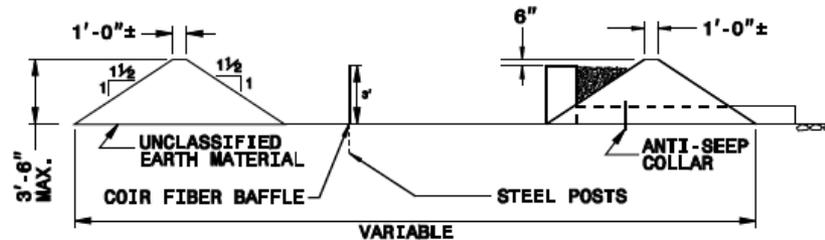
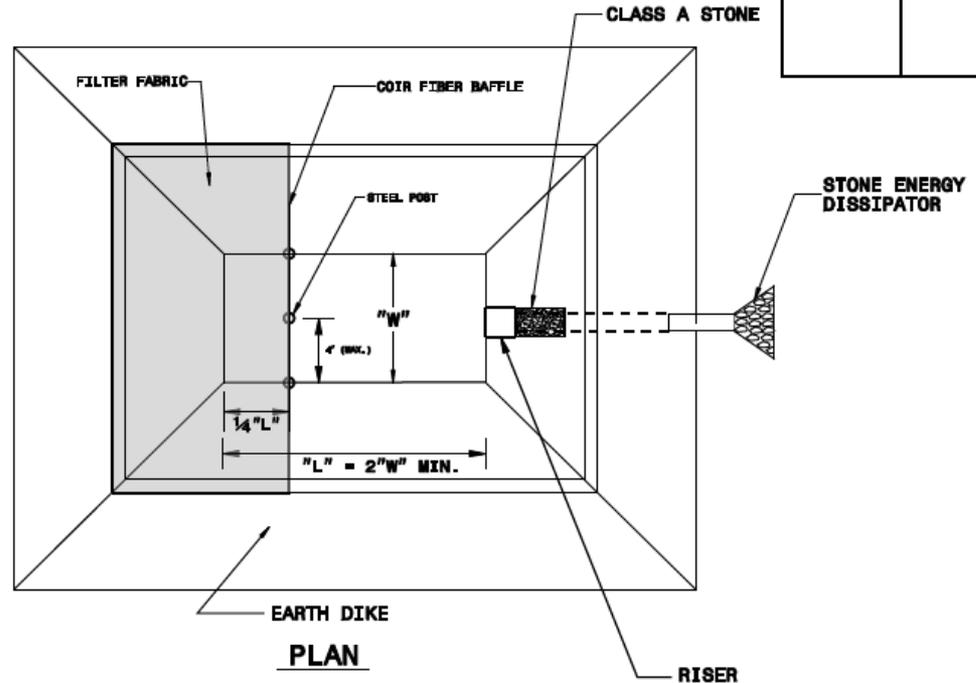
DO NOT EXCEED 3½ FT. IN HEIGHT FOR THE EARTH DIKES REQUIRED FOR BORROW PIT DEWATERING BASIN.

THE BORROW PIT DEWATERING BASIN SIZE IS VARIABLE AND DEPENDENT ON SPECIFIC SITE REQUIREMENTS AS WELL AS PROPOSED CONSTRUCTION OPERATIONS.

SUBMIT THE SIZE, LOCATION AND RISER PIPE MATERIAL FOR APPROVAL PRIOR TO CONSTRUCTION.

PUMP THE EFFLUENT INTO THE BORROW PIT DEWATERING BASIN TO A MAXIMUM DEPTH OF 6 IN. BELOW TOP OF EARTH DIKE.

PROVIDE A STONE ENERGY DISSIPATOR PAD AT THE OUTLET OF THE PUMP DISCHARGE HOSE AND OUTLET OF THE RISER BARREL IN ACCORDANCE WITH ROADWAY STANDARD DRAWING 876.02 FOR OUTLET W/O DITCH.



TYPICAL SECTION VIEW

NOT TO SCALE

# ELGs

Effluent Limitation Guidelines

2006 – Court ruled that EPA must promulgate ELGs for the construction industry by December of 2009



# Federal Register

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Tuesday,  
December 1, 2009

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Part III

## Environmental Protection Agency

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40 CFR Part 450

Effluent Limitations Guidelines and  
Standards for the Construction and  
Development Point Source Category; Final  
Rule

**PROPOSED REVISIONS**

to

Storm water NPDES

**Construction General Permit**

NCG010000

# What are ELGs? (Effluent Limitations Guidelines)

**Technology-based standards** for  
control of wastewater and  
stormwater discharges from various  
categories of industry

# **REVISION MUST BE DONE BY AUGUST 2, 2011**

- **QUICKER GROUND COVER REQUIREMENTS**
- **BASINS MUST WITHDRAW FROM SURFACE**
- **DISCHARGES MUST NOT EXCEED A  
DESIGNATED TURBIDITY LIMIT**
- **SELF-MONITORING OF STORM WATER  
DISCHARGES**



# Ground Cover

Permittees are required to, at a minimum, initiate soil stabilization measures immediately whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days.



# Active Grading



# Dewater from the Top







# Surface Dewatering Devices



# Surface Dewatering Devices



# Surface Dewatering Devices



**DISCHARGES MUST NOT  
EXCEED A  
DESIGNATED TURBIDITY  
LIMIT**

**??? NTU**

**Daily Average**

# Turbidity



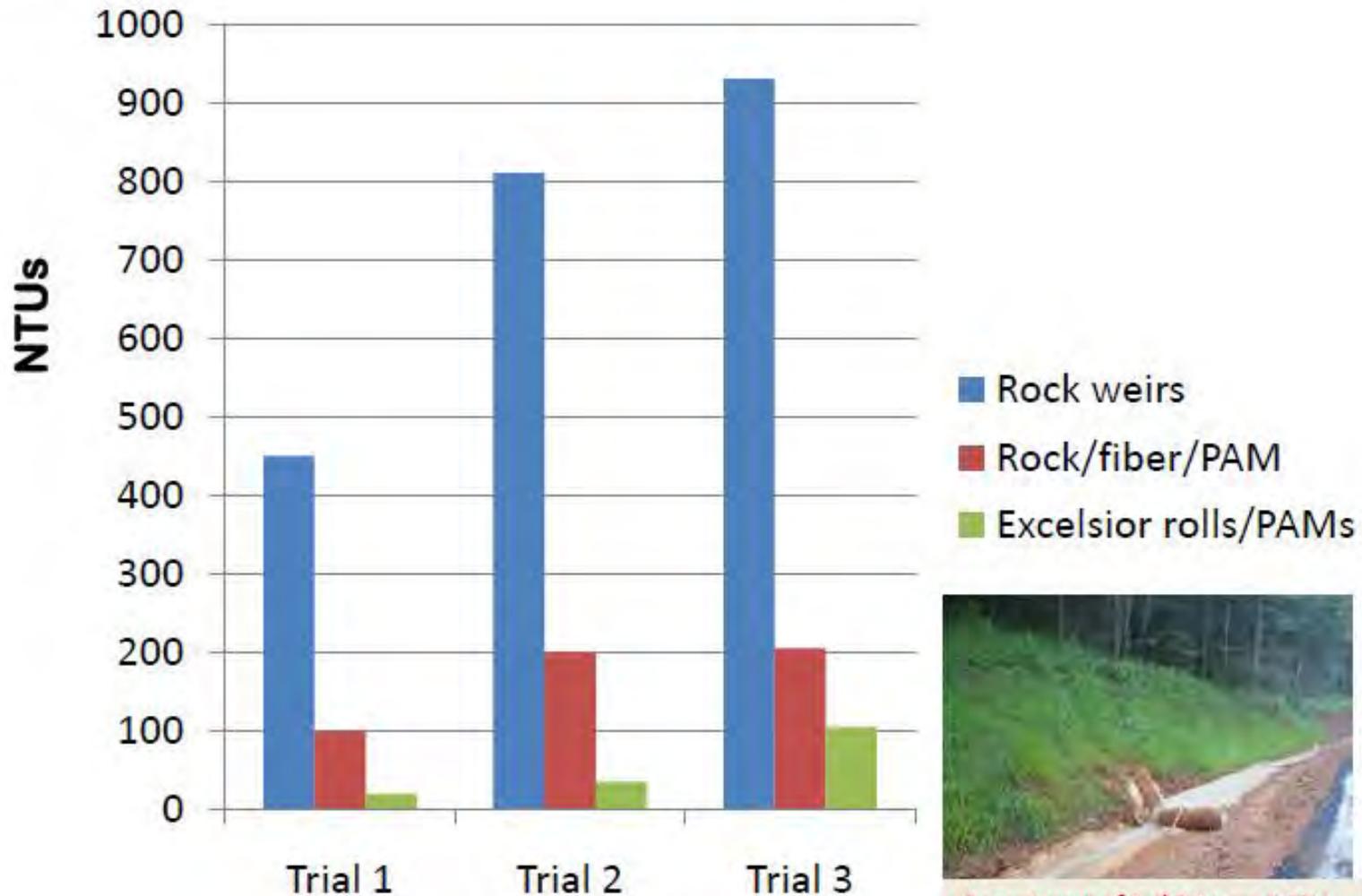
# Turbidity



# Turbidity



# Turbidity Reduction



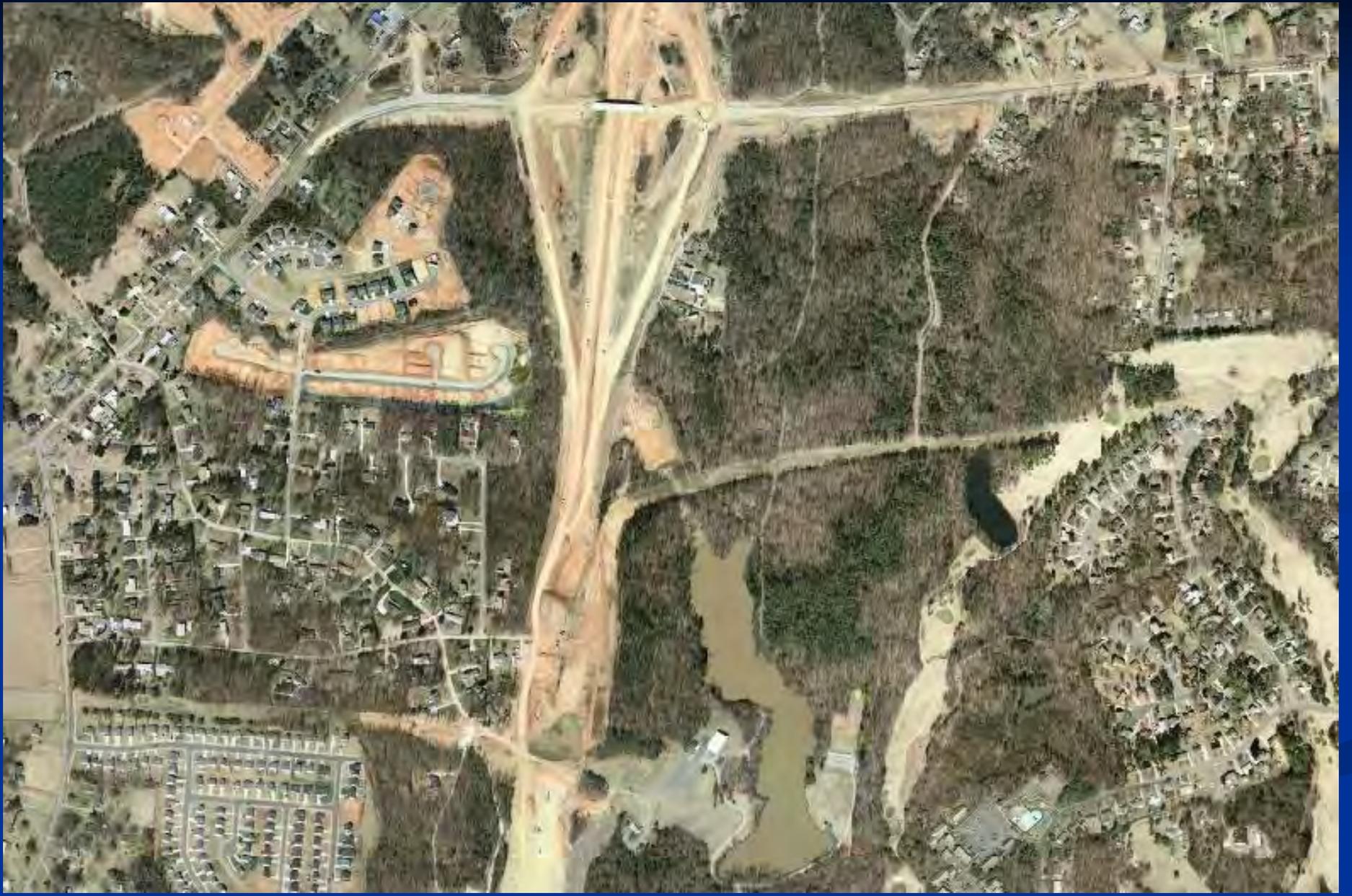
*Department of Soil Science, NCSU*

# SELF-MONITORING OF SEDIMENT BASIN DISCHARGES

- Where?
- When?
- How?









An aerial photograph of a construction site in a wooded area. The site is a large, cleared, sandy area with various pieces of construction equipment and materials scattered across it. The surrounding area is densely forested with trees showing autumn foliage in shades of orange, red, and yellow. A road or path runs through the site, and there are some buildings or structures visible in the background. The word "Questions?" is overlaid in the center of the image in a large, white, bold font with a black outline. The text is surrounded by a decorative border of orange diamond shapes.

**Questions?**