

TO RFC AND BEYOND



HISTORY

Early 1900's



wind erosion



water erosion

HISTORY



1908

- Conference of Governors estimates nearly **500 Million tons of soil were being lost from farmlands into streams and rivers an ultimately into the ocean**
- Conference of Governors discusses Soil Erosion and a plan to provide for conservation of our Natural Resources

1930

- Congress appropriates funds for **studies** across country to assess and develop solutions
- Terraces and Contour plowing practices to address Sheet Erosion and “soil saving” dams become effective in addressing gully erosion
- J. A. Adams develops possibly the first variation of the surface dewatering basin. Includes a vertical pipe, outlet pipe, and earthen berm creating impoundment.

Were these studies across the country the catalysts for the first EC plan?

HISTORY



1933

- The Soil Erosion Service (Federal) was created under Dept of Interior.

1935

- Re named Soil Conservation Service and assigned to Dept of Agriculture.

1940's

- Mathematical modeling to address soil loss

1948

- Federal Water Pollution Control Act

1965

- USDA published the Universal Soil Loss Equation ($A=RKLS\text{CP}$)

1972

- Clean water Act - **planning** was recognized as important to control non point source pollution. NPDES created to control point source discharge

1973

- NC Sedimentation and Pollution Control Act included requirement of **Erosion Control Plan**

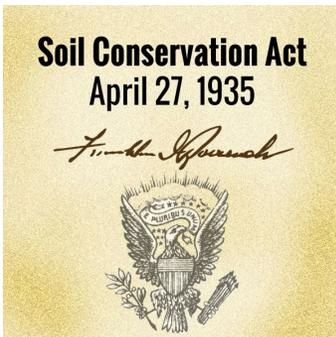


2. Background Information

The Universal Soil Loss Equation

$$A = R K L S C P$$

A = estimated long-term annual soil loss (Mg soil loss ha⁻¹ yr⁻¹)
R = rainfall and runoff factor representing the summed erosive potential of all rainfall events in a year (MJ mm ha⁻¹ h⁻¹ yr⁻¹)
L = slope length (dimensionless)
S = slope steepness (dimensionless)
K = soil erodibility factor representing units of soil loss per unit of rainfall erosivity (Mg ha h ha⁻¹ MJ⁻¹ mm⁻¹)
CP = characterizes land cover and conservation management practices (dimensionless).



Voila! The very cliff note version of how the EC plan came to be.... Maybe.

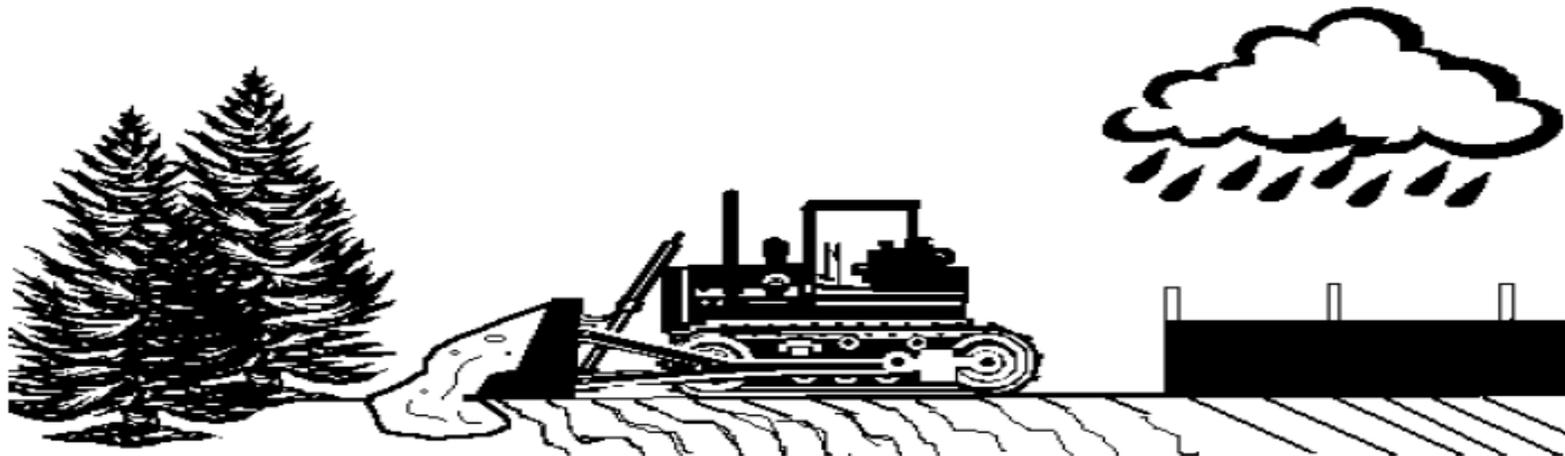
So, about this EC plan.... What is the purpose?



From the NC DEQ Erosion and Sediment Control Planning and Design Manual:

*The purpose of an erosion and sedimentation control plan is to **establish clearly** which control measures are intended to prevent erosion and offsite sedimentation. The plan should serve as a blueprint for the location, installation, and maintenance of practices to control all anticipated erosion and prevent sediment from leaving the site.*

The approved erosion and sedimentation control plan—showing the location, design, and construction schedule for all erosion and sedimentation control practices—should be a part of the general construction contract. State specifically the method of payment for implementing this plan in the contract, and consider erosion and sedimentation control an early pay item.



Got it! Provide clear guidance. How do I accomplish that?



Understand/Familiarize yourself with site

- Topography
- Soils
- Jurisdictional/Sensitive Areas
- Neighbors
- Schedule
- Access

- Linear (NC DOT)
 - Traffic
 - Utilities
 - Limited ROW



EC Plan is the guide for developer/contractor to transition physical conditions of site through various degrees of risk.

- Plan should provide the necessary tools to address that risk



Topography

Great!

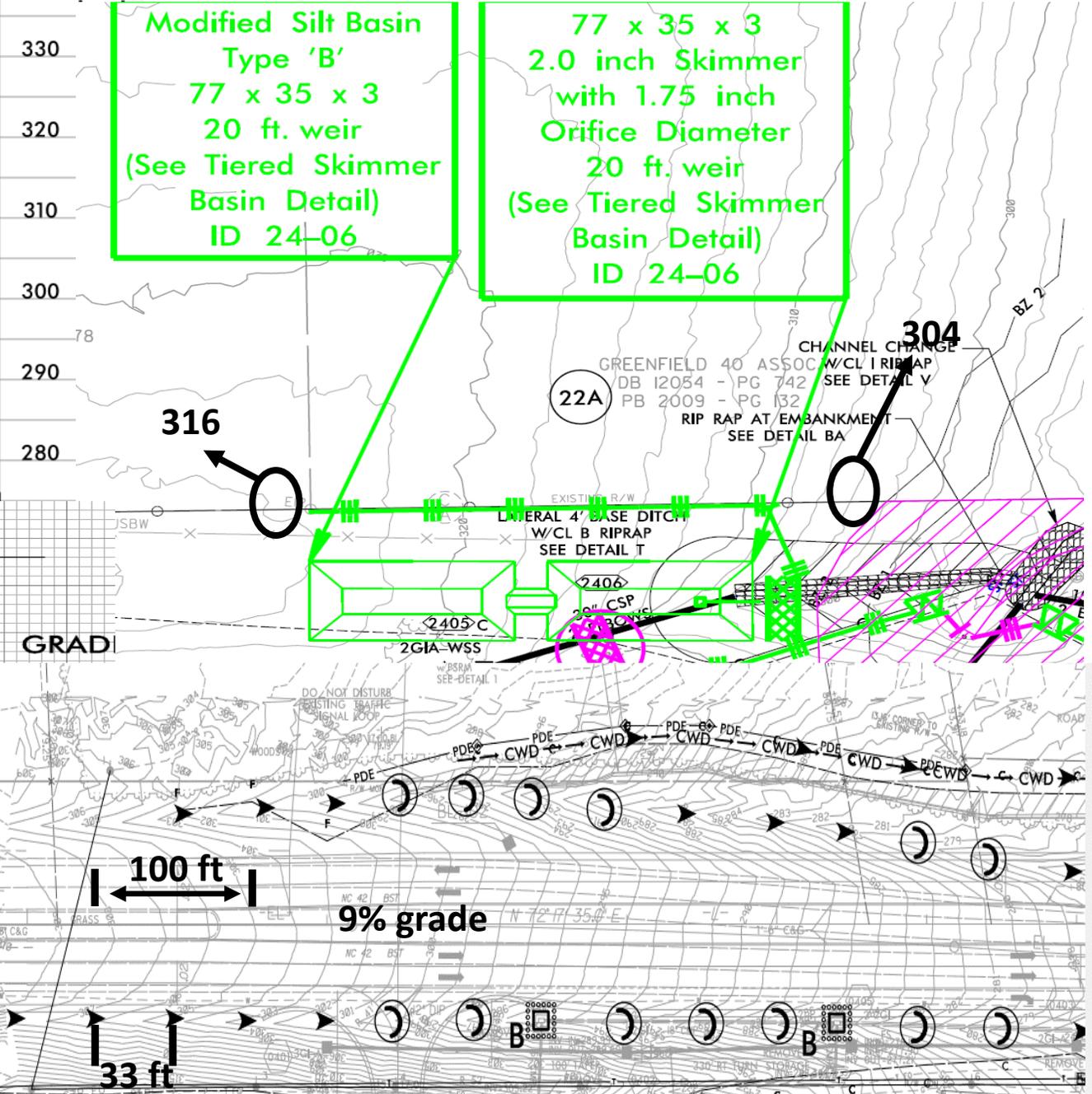
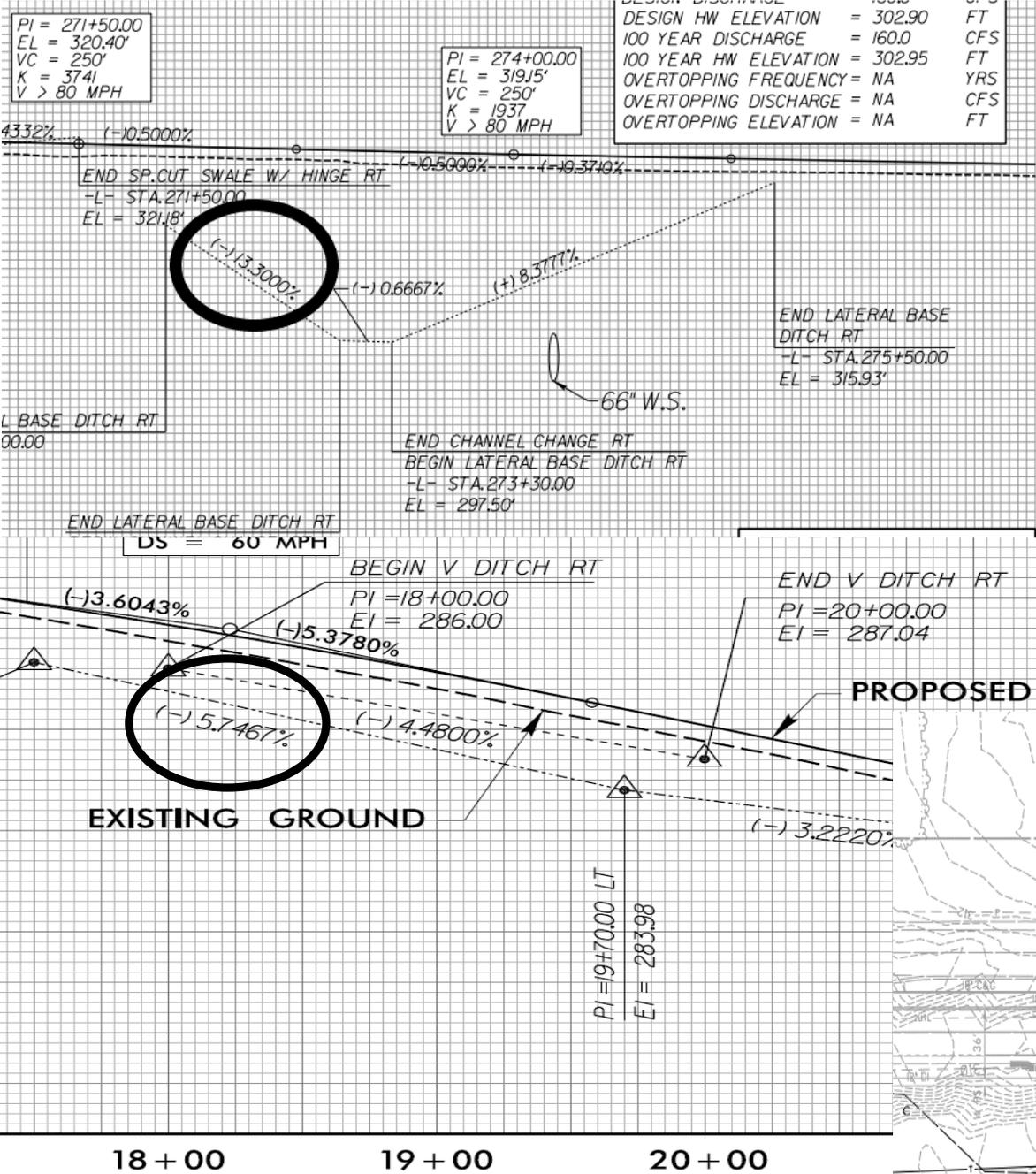
- Provide clear guidance
 - Consider project site to be developed.
- How does that help me with design?**



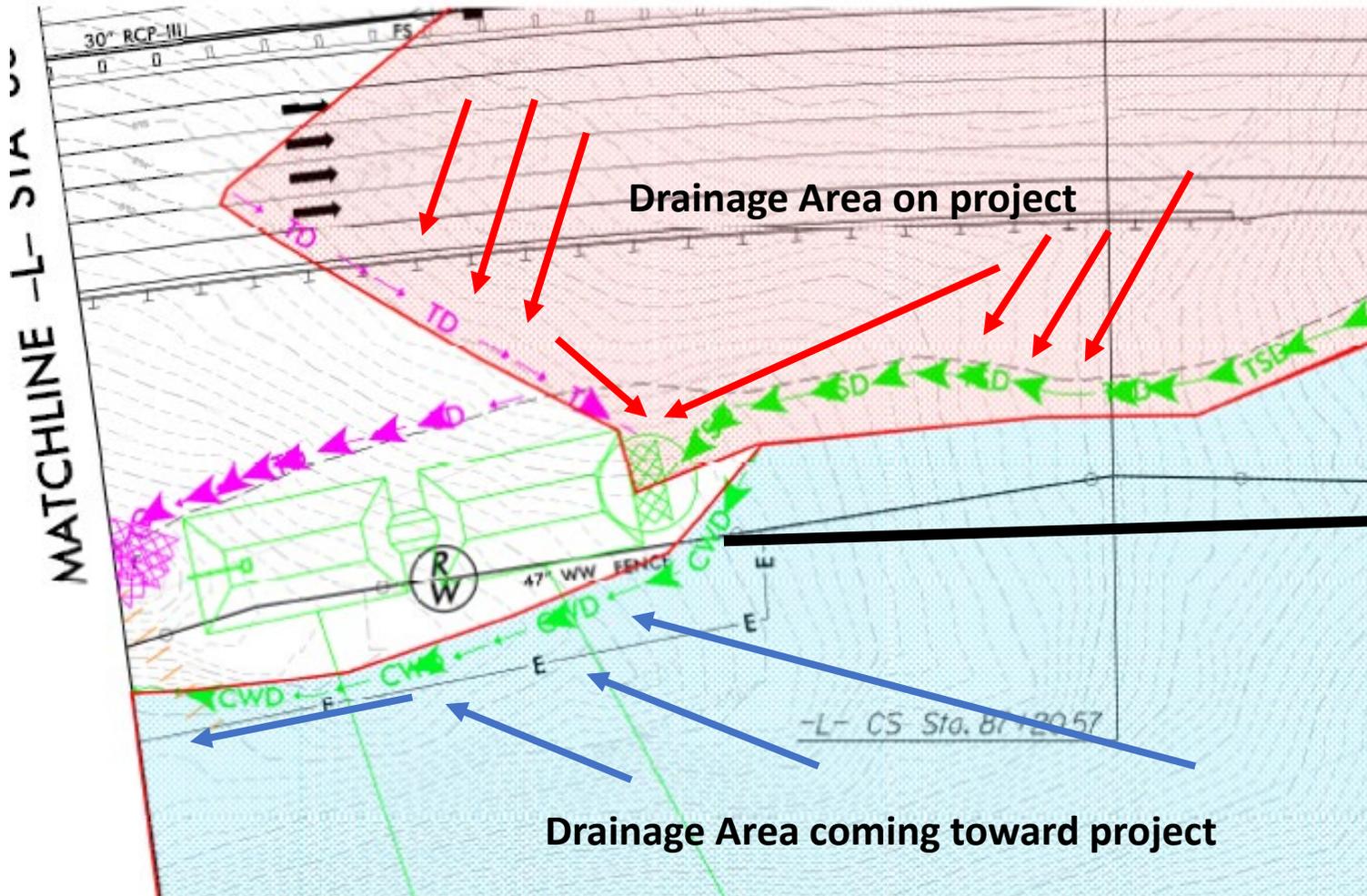
- Flat
 - Move water
 - Perimeter containment and occasional sediment impoundment BMPs
- Rolling
 - Slow water
 - Ditch line stabilization
 - Sediment Impoundment
 - Tiered basins
 - Diversion berms to slope drains
 - Rolled Erosion Control Products
- Drainage Area
 - Going
 - Diversions
 - Sediment Basins
 - Coming
 - Clean Water Diversions
 - Stream Crossings



Rolling Topo







Manage drainage areas

- TD to direct runoff to Sediment Basins
- CWD to route clean water around project

If you don't properly design for impoundment ...



Soils

- Clay Soils
 - Moderately Erodible but significant turbidity
 - Slow runoff down
 - PAM
 - Groundcover
 - Turbidity Curtain
- Silt
 - Highly erodible
 - Slow runoff down
 - PAM
 - Groundcover
 - Impoundment
- Sand/Loam
 - Minimal/Moderately Erodible
 - Slow runoff down
 - Groundcover

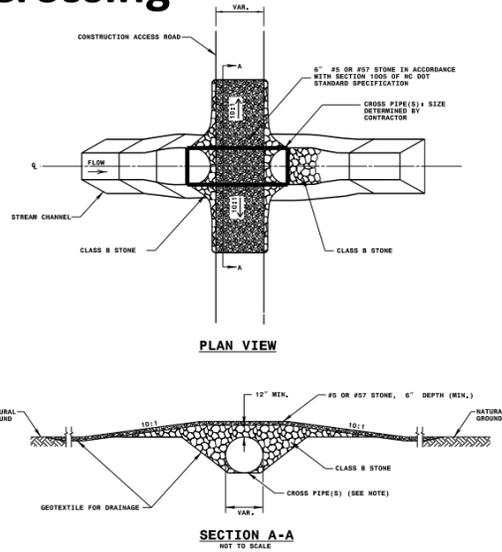


Jurisdictional/Sensitive Areas

- Natural
 - Streams
 - Identify
 - Culvert/pipe sequence
 - Temporary crossings
 - Wetlands
 - Identify
 - Filling in wetland
 - Endangered Species
 - Identify
 - Permit requirements
- Cultural
 - Historical structures
 - Archaeological
 - Clear boundaries



Temporary Stream Crossing



NOTES

PIPE(S) FOR TEMPORARY STREAM CROSSING SHALL BE DESIGNED TO PASS THE PEAK OR BANKFULL FLOW, WHICHEVER IS LESS, FROM A 2-YEAR PEAK STORM, WITHOUT OVER TOPPING.

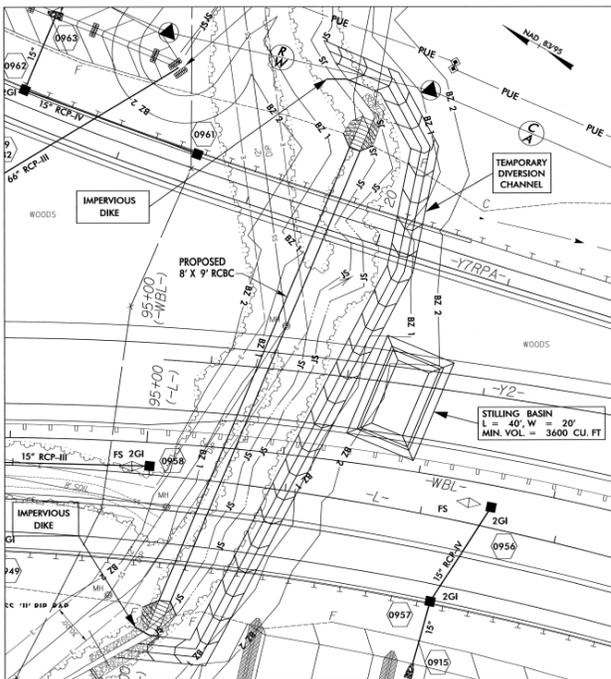
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
HALEIGH, N. C.

ROADWAY STANDARD DRAWING FOR
TEMPORARY STREAM CROSSING

SHEET 1 OF 1
14245 04



Stream Diversion for Culvert



ICA Engineering

PROJECT NUMBER: 1011 SHEET NO.: EC-35A
 DATE: 11/27/2013
 REVISION: 01
 REVISION DESCRIPTION: PROJECT PROGRESS

LEVEL IS CERTIFIED BY:
 STACEY H. BARRY, PE
 CERTIFICATION NUMBER: 3074
 ISSUED: NOVEMBER 27, 2013

M A Engineering Consultants, Inc.
 288 South Chatham Street, Suite 107, Cary, NC 27513
 Phone: 919.232.0102 Fax: 919.232.0101



Neighbors

Schedule phases

Access into and out of site



Got it!

- Clear guidance
- Consider unique elements of project site
- Identify challenges & use proper BMPs in design.

So, *who* is the plan being designed for?



EQUIPMENT OPERATOR



SUPERINTENDENT



REGULATOR/REVIEWER



REGULATOR/INSPECTOR

Roger!

- EC plan should provide clear guidance
- Address unique challenges of the site, and include proper BMPs.

That's a lot of information. How do I make sure the Regulator and Contractor understand the intent of my design?

Scheduling

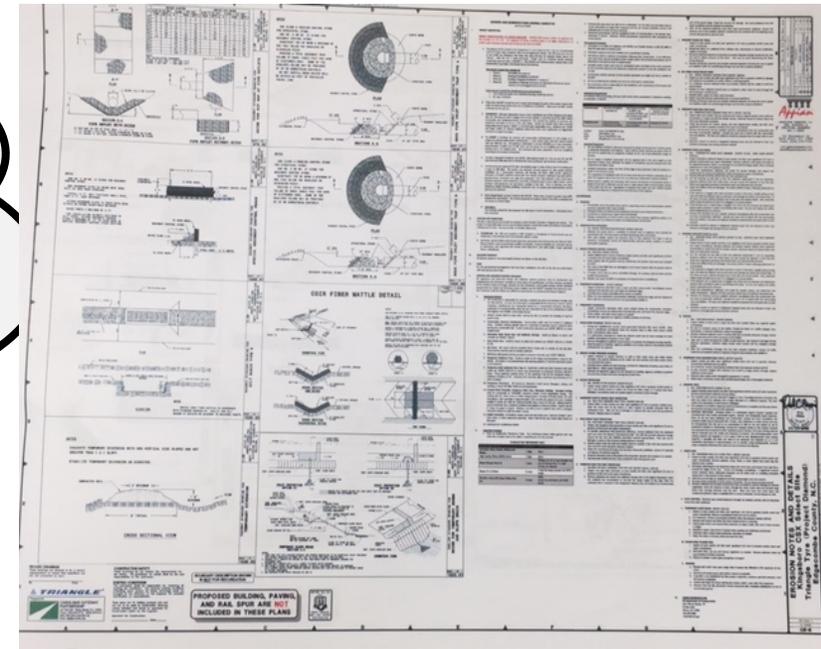
- Phase activities

Narrative

- Supplement/support design
- Provisions
- Detail Drawings

Contact Information

- Communication



Whew! I believe I got it all together....
Time to submit.

Good plan – Good comments – **RFC!**

Mission Accomplished!

It's not?

DON'T FORGET



... AND BEYOND

Follow up

- Communicate with contractor/developer
- Check in on the plan implementation
- Observe and Learn
 - what worked and what didn't
 - alternatives/options

Continuing education

- Attend classes/workshops
- Network with others



“No matter how much experience you have, there’s always something new you can learn and room for improvement.”-

Roy T. Bennett

Planning

Need is identified

Scoping meeting to review options

Programming

Priority

Funding

Project Development

Environmental Meetings to assess Natural and Cultural Impacts

Public input

Design/Property Acquisition

Design input from multi disciplines

25% submittal

75% submittal

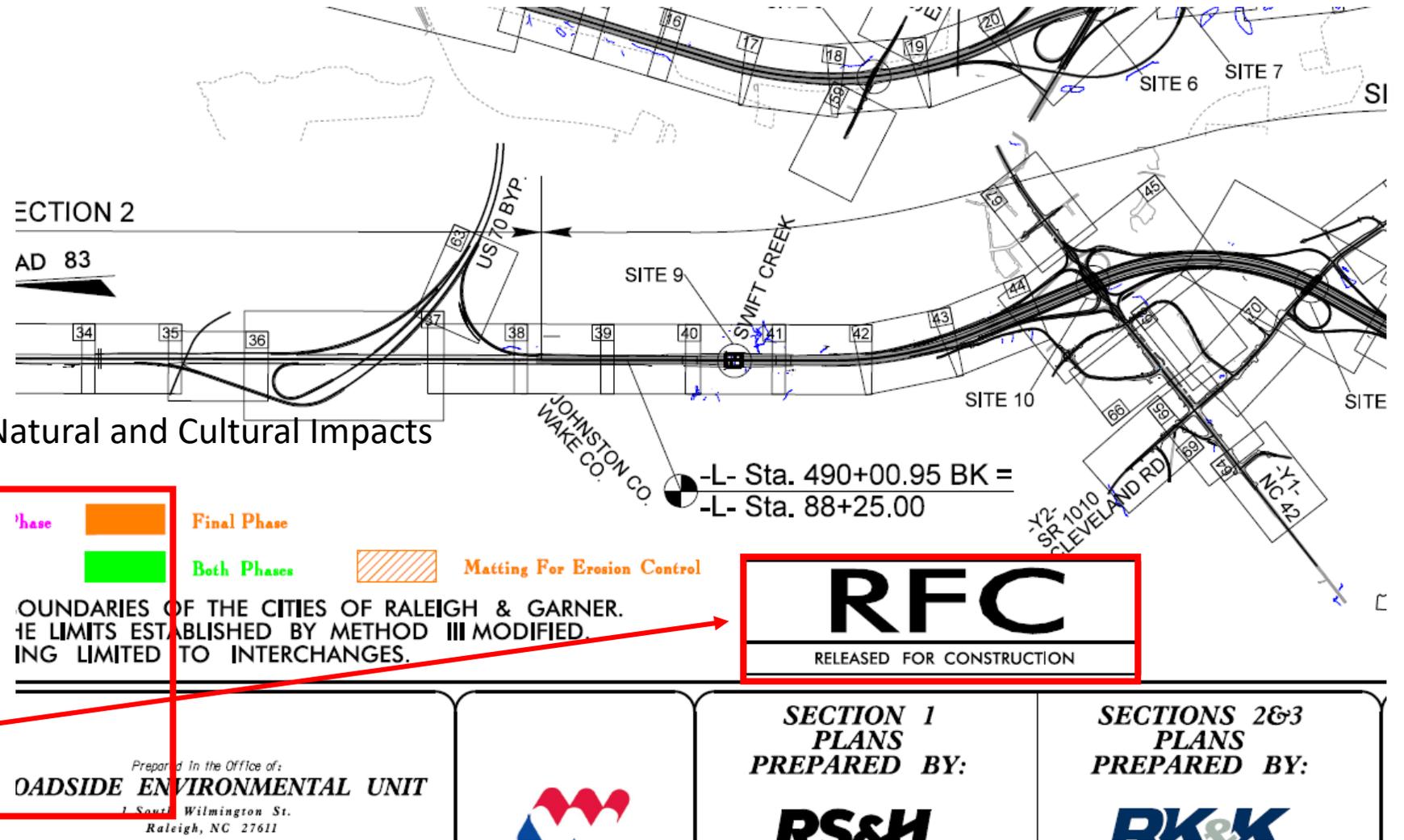
100% submittal

Release for Construction

Construction

Plan implementation

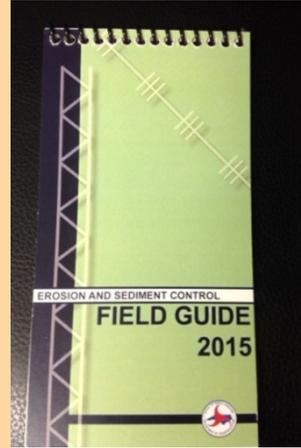
Project Reviews



North Carolina Department of Transportation

Erosion and Sediment Control Design and Construction Manual

2015 Edition



BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

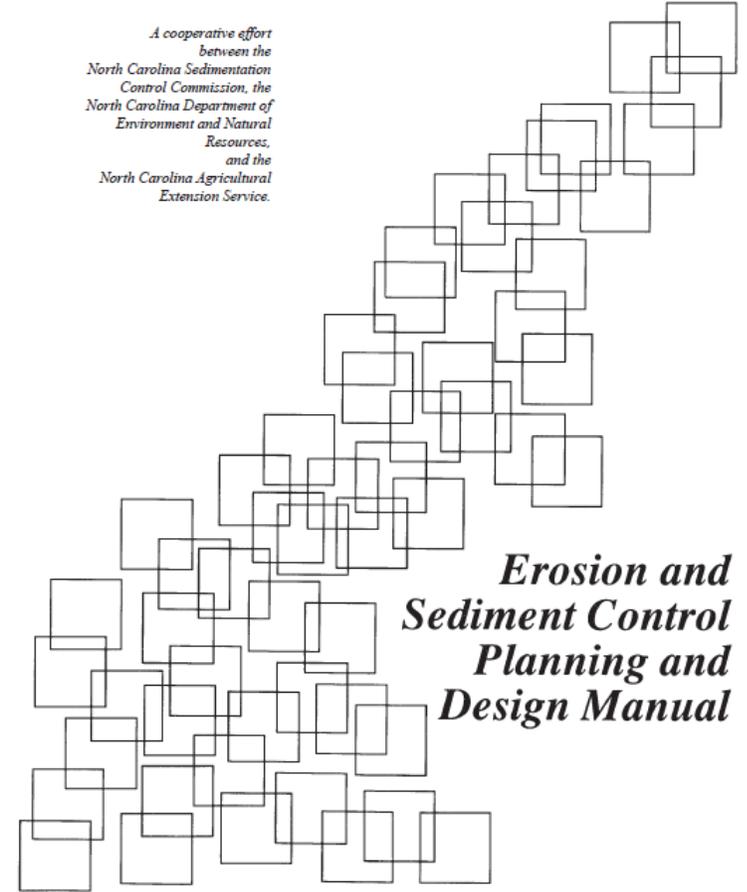


August 2003



Chapters 6 and 8 revised May 2013

A cooperative effort between the North Carolina Sedimentation Control Commission, the North Carolina Department of Environment and Natural Resources, and the North Carolina Agricultural Extension Service.



Erosion and Sediment Control Planning and Design Manual

<https://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permit-guidance/erosion-sediment-control-planning-design-manual>

Questions?

North Carolina Erosion and Sediment Control Design Workshop

December 3, 2019



Please Remember to Complete the End of Workshop Evaluation

(separate from the PDH sponsor evaluation)

bit.ly/Raleigh2019-ESC-Eval