

*Review of
Erosion and Sedimentation Program
Delegation to the North Carolina Department
Of Transportation, Division of Highways*

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INTRODUCTION

The Land Quality Section reviewed the program delegation to the North Carolina Department of Transportation, (NC DOT) on September 17-19, 2013. The projects selected for review were a mix of contract construction, design-build and maintenance. The review and the results reported here are in accordance with requirements of the Sedimentation Control Commission (SCC) delegation to the NC DOT and § 113A-54(d)(2) and § 113A-56(b).

§ 113A-54. POWERS AND DUTIES OF THE COMMISSION

(d) In implementing the erosion and sedimentation control program, the [Sedimentation Control] Commission shall:... (2) Assist and encourage other State agencies in developing erosion and sedimentation control programs to be administered in their jurisdictions. The Commission shall approve, approve as modified, or disapprove programs submitted pursuant to G.S. 113A-56 and from time to time shall review these programs for compliance with rules adopted by the Commission and for adequate enforcement.

§ 113A-56. JURISDICTION OF THE COMMISSION

(b) The [Sedimentation Control] Commission may delegate the jurisdiction conferred by G.S. 113A-56(a), in whole or in part, to any other State agency that has submitted an erosion and sedimentation control program to be administered by it, if the program has been approved by the Commission as being in conformity with the general State program.

PROJECT REVIEWS

Twelve contract construction or design-build projects and four maintenance/force account projects were chosen based on the stage of construction and the significance of the projects. Projects were generally between 30 and 70 percent complete.

Land Quality Section personnel from the regional offices and central office accompanied NC DOT personnel to the 16 projects, which were inspected during a 3-day period. Each project review consisted of reviewing the erosion control plan for adequacy, inspecting the project for compliance, and examining the project files. Plans were available for review at all sites.

NC DOT is responsible for two types of inspections on each project. NPDES Self-Monitoring and SPCA Self-Inspections are conducted at least weekly by a project inspector from the office of the resident engineer for design-build or contract construction, or from the office of the county or district engineer for maintenance projects. There are 7 Roadside Environmental Unit Field Operations engineers, each covering 2 of the 14 divisions in the state. The engineers each have generally one technician, who inspects secondary road projects and some contract construction. REU Field Operations staff inspects all DOT projects. Projects are inspected monthly. Each project is evaluated on a scale of 1-10 for installation of measures, maintenance of measures, effectiveness of

measures, plan implementation and overall project evaluation. A score of 6 or less results in the issuance of an “Immediate Corrective Action” report (ICA). The weekly project inspections and monthly REU inspections were reviewed for each project.

Field data was collected on erosion and sediment control measure installation, maintenance and effectiveness. Timely provision of ground cover, adequacy of right-of-way, phasing of grading, field revisions and sedimentation damage were also evaluated. Each project was then given an overall rating of “Poor, Fair or Good.” A summary of the sixteen projects follows.

CONTRACT OR DESIGN-BUILD PROJECTS

Division	County	TIP #	Route	Contract Amount	Length (miles)	Overall Rating
1	Gates	R-2507 A	US 158	\$54,500,000	7.1	Good
2	Beaufort	B-4413	Bridge over Broad Creek, US 264	\$1,569,155	0.15	Good
3	Onslow	U-3810	Piney Green Road, SR 1406	\$50,543,692	6.6	Fair +
4	Wayne	R-2554 A	US 70	\$62,439,491	9.5	Good
5	Wake, Durham	U-4716	Hopson Road Rail Realignment	\$10,900,447	4.2	Good
6	Cumberland	U-2519 DA	I-295, Bragg Blvd to Yadkin Road	\$54,356,429	1.2	Fair
9	Rowan	B-4257	Bridge over Church Creek, SR 1004	\$2,188,889	0.57	Good
10	Cabarrus	R-2123	I-485 and I-85 Interchange	\$92,162,250	1.44	Fair +
11	Watauga	R-2237	US 321, Blowing Rock	\$66,438,147	4.0	Fair
12	Iredell	I-3819	I-40 and I-77 Interchange	\$89,072,360	3.36	Fair +
13	Burke	U-2551	SR 1922 and SR 1924	\$14,145,410	2.2	Good
14	Henderson	R-5207	Howard Gap Road, SR 1006	\$9,320,351	3.7	Fair +

MAINTENANCE/FORCE ACCOUNT PROJECTS

Division	County	Route	Length	Overall Rating
3	Onslow	Mills Field Road, SR 1313	0.8	Good
8	Chatham	Lindo Johnson Road, SR 1512	0.8	Fair +
11	Watauga	Big Branch Road, SR 1156	0.8	Good
14	Haywood	Shady Brook Road, SR 1870	0.6	Good

PROJECT EVALUATIONS

US 158, TIP R-2507 A

NC DOT Division 1, Gates County

This is a 7.1 mile project with a design-build contract for \$54,500,000. The project scored 9's on the last inspection which was conducted on 8/21/2013. The project was estimated at 41% complete and has an estimated completion date of 12/5/2014. The plan was adequate and properly implemented. Self-inspection records were effective. Temporary and permanent ground cover and sediment controls were adequate and effective, with some minor maintenance needed in several areas. Overall rating was Good.



Equalizer outlet and stabilized easement US 158, Tarheel

Bridge over Broad Creek, US 264, TIP B-4413

NC DOT Division 2, Beaufort County

This is a NC DOT Bridge Maintenance project that is 0.15 miles in length and has a contract for \$1,569,155. The project scored 9's on the last inspection which was conducted on 9/9/2013. The project was estimated at 37% complete and has an estimated completion date of 11/8/2013. The plan was adequate and properly implemented. Sediment controls were adequate and effective. Self-inspection records were adequate. Turbidity curtains were used and topsoil stockpiles had good temporary vegetation established. This site is contained very well. Overall rating was Good.



Turbidity Curtain, Broad Creek, US 264

Piney Green Road (SR 1406), TIP U-3810

NC DOT Division 3, Onslow County

This is a 6.6 mile project with a contract for \$50,543,692. The project scored 9's on the last inspection which was conducted on 9/10/2013. The project was estimated at 13% complete and has an estimated completion date of 4/29/2016. The plan was adequate and properly implemented. Sediment controls were adequate and effective. Self-inspection records were adequate. The entire site was mulched in preparation of this audit. With the summer being so rainy, better vegetation was expected throughout the site. Because of the lack of established vegetation, minor erosion was occurring in several areas. Considering the size of the project, the site is well contained. Overall rating was Fair+.



Eroding Slope, Piney Green Road

Mills Field Road, SR 1313, Project # 3C.067068

NC DOT Division 3, Onslow County

This is a 0.8 mile maintenance project. The project scored mostly 8's on the last inspection which was conducted on 9/9/2013. The plan was adequate and properly implemented. Sediment controls were adequate and effective. Self-inspection records were adequate. All ditching has been seeded and mulched. Overall rating was Good.



Wattles and Mulched Ditching, Mills Field Road

US 70, R-2554A

NC DOT Division 4, Wayne County

This is a 9.5 mile project with a contract for \$62,439,491. The project scored 9's on the last inspection which was conducted on 8/28/2013. The project was estimated at 27.5% complete and has an estimated completion date of 4/29/2016. The plan was adequate and properly implemented. Sediment controls were adequate and effective. Self-inspection records were adequate. The temporary and permanent vegetation that is established throughout the site is very good. Considering the size of the project, the site is very well contained. Overall rating was Good.



Excellent Temporary and Permanent, US 70

I-295(Fayetteville Outer Loop from Bragg Blvd to Yadkin Road), U-2519DA

NC DOT Division 6, Cumberland County

This is a 1.2 mile project with a contract for \$54,356,429. The project scored mostly 8's on the last inspection which was conducted on 9/3/2013. The project was estimated at 38% complete and has an estimated completion date of 7/15/2015. The plan was mostly adequate and properly implemented. Several large drainage areas were exposed and were not draining into sediment basins. Sediment controls that had been installed were adequate and effective. Self-inspection records were adequate. A majority of the site was mulched in preparation of this audit. With the summer being so rainy, better vegetation was expected throughout the site. For the most part, the site is pretty well contained. Overall rating was Fair.



Large exposed area not draining to a sediment basin, Fayetteville Outer Loop

Lindo Johnson Road (SR 1512), Project # 8C.019115

NC DOT Division 8, Chatham County

This is a 0.8 mile maintenance project. The project scored 9's on the last inspection which was conducted on 9/13/2013. The plan was adequate and properly implemented. Sediment controls were adequate and effective. Self-inspection records were adequate. The ditches and roadbed are currently being graded. Erosion and sediment control measures are being installed as construction progresses. Ditches should be stabilized in sections as final grade is reached. The site is well contained. Overall rating was Fair+.



Ditching along Lindo Johnson Road, Chatham County

Hopson Road Rail Realignment, TIP U-4716 A/B/C

Division 5, Wake/Durham County

This is a 4.2 mile project with a contract for \$10,900,447. The project scored 8's on the last inspection which was conducted on 8/9/2013. The project was estimated at 25% complete and has an estimated completion date of 12/28/2015. The plan was adequate and properly implemented. Sediment controls that had been installed were adequate and effective. Self-inspection records were adequate. The site is well contained. Overall rating was Good.



Stabilized culvert outlet underneath the track, Hopson Road

Bridge Over Church Creek, SR 1004, TIP B-4257

Division 9, Rowan County

This is a 0.6 mile bridge project with a contract for \$2,188,889. The Roadside Environmental Unit (REU) monthly inspections consistently rated all aspects of the project as “8’s.” The plan was adequately implemented and measures were effective. An additional stone outlet was needed in the silt fence under the bridge and a slope drain needed inlet protection. Temporary seeding had been provided, but was not well established. The overall project condition was Good.

I-485 and I-85 Interchange, TIP B02123CE

Division 10, Cabarrus County

This is a 1.44 mile design-build project with a contract for \$92,162,250. The REU has issued two ICA’s on the project, the most recent on May 23, 2013. The plan has been revised and the measures were significantly improved. Measures appeared to be effective and were maintained. The most significant issue was ground cover. An emphasis should be placed on finishing areas and establishing permanent ground cover on slopes and along streams. The overall project rating was Fair +, due to the lack of established ground cover.



I-485 and I-85 Interchange—Actively graded fill slope and large sediment trap.

US 321, Blowing Rock, TIP R-2237C

Division 11, Watauga County

This is a 4.0 mile project with a contract for \$66,438,147. The southern portion of the project features very large fill slopes constructed of rock. The only “sediment” noted was large boulders that had rolled through the woods during placement of the fill. The northern portion of the project near Blowing Rock had problems with runoff conveyance and sediment control. A long stretch of road bed drained to one small rock check dam placed between the old and new culverts. Measures have been improved since the review based on the recommendations the Land Quality Section provided. The project was rated Fair because of the issues on the north end of the project.



US 321—Fill slope built with rock.

US 321—Right, Check dam was only measure below long stretch of bare road bed.



Below, Long stretch of road bed draining to check dam.



Big Branch Road, SR 1156

Division 11, Watauga County

This is a 0.8 mile secondary road widening and paving project being done by NC DOT personnel through the district maintenance office. The project had received an ICA when a measure failed during heavy rain. Currently, the project had effective measures and was well maintained. Ditches were lined with riprap as soon as they were brought to grade, greatly reducing the potential for soil erosion. The overall project rating was Good.

*Big Branch Road,
SR 1156—
Right, cut
slope being
graded with
seeding on
upper slope.*



*Big Branch
Road,
SR 1156—
Left, Riprap
lined ditch and
check dam
above culvert
inlet.*

I-40 and I-77 Interchange, TIP I-3819

Division 12, Iredell County

This is a 3.36 mile project with a contract for \$89,072,360. The majority of the grading is in this contract, but there will be additional contracts for some of the structures. The plan had been revised and appeared adequate. New measures were being properly installed. There were several existing measures where sediment accumulations needed removal. The resident engineer's staff did not want to clean the measures because they would be removed in the next phase of grading. This perspective results in measures not being in good working order when it rains. There was also a lack of ground cover in critical areas near streams. The overall project condition was Fair +.



I-40 and I-77 Interchange—Area above and below skimmer basin needed ground cover.

SR 1922 and SR 1924, Enola Road, Morganton, TIP U-2551

Division 13, Burke County

This is a 2.2 mile project with a contract for \$14,145,410. It involves a new interchange between Enola Road and I-40 in Morganton, and widening the road in both directions from the interchange. The plan was adequate and measures were properly installed and maintained. New ramps had been built and stabilized, while widening of the road continued. The only significant issue was the lack of a stabilized construction exit for trucks pulling onto Enola Road at I-40.

The overall project condition was Good.



*SR1922 and SR 1924—
Slope drain conveying
runoff from I-40 across
new ramp to skimmer
basin.*

Shady Brook Road, SR 1870

Division 14, Haywood County

This is a 0.6 mile secondary road widening and paving project being done by NC DOT personnel through the district maintenance office. The plan for the project was done as a “straight-line” or schematic drawing of the road. Division 14 is one of the few, if not the last, highway division to still prepare “straight-line” drawings instead of drawing roads as curvi-linear features. It makes visualization of stream crossings and measures difficult in the field. The measures were properly installed and effective. A new culvert was properly imbedded below grade. Straw mulch had fallen off a steep cut slope. Repair seeding and application of an adequate hydro mulch was recommended. An outlet in silt fence across a drainage feature was constructed of a coir log or wattle. This practice should be limited to areas that cannot be accessed with equipment. A large rock silt check dam was recommended for this location. The overall rating was Good.



Shady Brook Road, SR 1870—Combination silt fence/horse fence along widened road.

Howard Gap Road, SR 1006, TIP R-5207

Division 14, Henderson County

This is a 3.7 mile contract construction project to widen a secondary road, with a contract for \$9,320,351. The plan for the project was prepared by a private engineering firm under contract to NC DOT. The plan was significantly inadequate, notably at a large fill slope across a drainage feature. The resident engineer's staff had added numerous measures in the field to compensate for the inadequate plan. The REU inspection report dated September 5, 2013 scored the project at 7, just above the threshold for an ICA. The corrective actions had been taken by September 12, 2013, and ground cover provided on September 13, 2013. Six recommendations for corrective actions were made by Land Quality Section staff at the review to improve erosion and sediment control on the project. The overall project condition was a Fair + because of the plan, not a lack of effort by project staff.



Howard Gap Road, SR 1006—Cut slope being stabilized with soil anchors and chain link fence over seeding and matting.

ISSUES NOTED AND RECOMMENDATIONS

Measures below Fill Slopes

Adequate and appropriate sediment control measures must be provided below graded slopes and fills. Silt fence with stone outlets or in combination with rock silt check dams is generally not adequate when slope heights exceed 10 feet. Measures with adequate sediment storage capacity and spillway capacity must be designed.

The use of wattles or coir logs as outlets in silt fence should be limited to small drainage areas and spots inaccessible to heavy equipment. Stone measures should be used below culvert outlets and other distinct drainage features (but not in intermittent or perennial streams.)

Ground Cover on Steep Slopes

There is a great disparity in the stabilization of graded slopes and fills on maintenance projects compared with contract construction projects. Graded slopes on maintenance projects are rarely matted, even though they may be steeper than 2:1 in the mountains. As noted every year, matting, bonded fiber matrix or flexible growth media (at recommended application rates) should be used on slopes steeper than 2:1. Straw mulch is not going to remain on a 1:1 cut slope.

Review of Plans Prepared by Consulting Engineering Firms

The Roadside Environmental Unit is responsible for reviewing plans designed by private engineering firms under contract to NC DOT, or as part of design-build contracts. These plans should be subjected to a detailed and critical review. Measures shall be designed to meet or exceed standards developed by the Roadside Environmental Unit, Soil and Water Engineering Section or the *Erosion and Sediment Control Planning and Design Manual*. Sufficient time and manpower should be devoted to these reviews. Inadequate plans should be sent back for revisions.