ANNUAL REPORT FOR 2010

Roanoke Island Mitigation Site
Dare County
Project No. 8.1052501
TIP No. K-4003

Prepared By:
Natural Environment Unit & Roadside Environmental Unit
North Carolina Department of Transportation
August 2010

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SUMMARY

The following report summarizes the monitoring activities that have occurred in the past year at the Roanoke Island Mitigation Site. The site was constructed to serve as mitigation for approximately 1.14-1.15 acres of estuarine fringe wetland forest impacts and 145.5-146 LF of stream impacts. The Roanoke Island Visitor Center/ Rest Area consists of 1.77 acres of estuarine fringe wetland forest restoration/creation, 1.29 acres of estuarine fringe wetland forest preservation, and 1003.9 LF of riparian buffer. The Roanoke Island Site was constructed in 2002 and this report details the monitoring activities during the 2010 growing season.

A site visit was held on April 23, 2007 with the regulatory agencies to address continued problems with planted hardwood vegetation. Based on that meeting it was agreed that NCDOT would plant the remaining bare areas of the site with elevation appropriate marsh species. The mix of these marsh species and sparse tree/shrub species is expected to more closely mimic the impacted communities (see e-mail in Appendix B). The planted areas would then be monitored based on accepted NMFS guidelines. The groundwater gauges were removed at this time.

The preservation areas that were inadvertently cleared during construction of the site in 2002 were replanted. Photo documentation of the mechanized clearing areas will continue to be provided to show the progression of the area returning to its original state. Photo documentation of the riparian buffer area is also provided per the agencies request.

NCDOT will continue to monitor vegetation at the Roanoke Island Mitigation Site.

1.0 INTRODUCTION

1.1 Project Description

The Roanoke Island Site serves as onsite mitigation for the Roanoke Island Visitor Center/Rest Area, located adjacent to the new US 64-264 Manteo Bypass. The site is divided into two tracts; the “south” tract is on the same property as the Visitor Center and the “north” tract is located approximately 600 feet north of the Visitor Center (Figure 1). The mitigation is associated with Project 8.1052501, TIP Numbers K-4003 and R-2551.

The site is designed to provide 0.11 acres of restoration (1:1) and 1.66 acres of creation (1:1) of Estuarine Fringe wetlands. The site also includes 1.29 acres (5:1) of estuarine preservation. In addition, approximately 1,004 feet of riparian buffer was planted with the same vegetation mix as that used in the wetland zones. The width of the buffer zone varies between 9 and 65 feet based on NCDOT property limits. The construction plan for the wetland sites involved grading the former borrow pit areas to meet the elevations of adjacent jurisdictional wetlands.

1.2 Purpose

In order to demonstrate successful mitigation, vegetative monitoring must be conducted for a minimum of five years or until success criteria are fulfilled. Success criteria are based on National Marine Fisheries Service guidelines. The following report details the results of the marsh vegetation monitoring during 2010 at the Roanoke Island Mitigation Site. Hydrologic monitoring is no longer required for this site.

Figure 1. Site Location Map

1.3 Project History

March 2002	Construction Completed
March 2002	Monitoring Gauges Installed
March 2002	Site Planted
March- November 2002	Hydrologic Monitoring (Year 1)
June 2002	Vegetation Monitoring (Year 1)
March- November 2003	Hydrologic Monitoring (Year 2)
September 2003	Vegetation Monitoring (Year 2)
February 2004	Site Replanted
March- November 2004	Hydrologic Monitoring (Year 3)
July 2004	Vegetation Monitoring (Year 1 Restart)
March 2005	Site Replanted
March- November 2005	Hydrologic Monitoring (Year 4)
August 2005	Vegetation Monitoring (Year 1 Restart)
March 2006	Applied Soil Amendments and Tilled Site
March 2006	Site Replanted
March- November 2006	Hydrologic Monitoring (Year 5)
August 2006	Vegetation Monitoring (Year 1 Restart)
April 2007	Onsite Agency Meeting
May 2007	Phragmites Treated
April 2008	Phragmites Treated
May 2008	Marsh Grass Planted
August 2008	Marsh Grass Vegetation Monitoring (Year 1)
October 2008	Phragmites Treated
May 2009	Phragmites Treated
August 2009	Marsh Grass Vegetation Monitoring (Year 2)
August 2010	Marsh Grass Vegetation Monitoring (Year 3)
August 2010	Phragmites Treated

1.4 Debit Ledger

The entire Roanoke Island mitigation site was used for the K-4003 project to compensate for unavoidable wetland impacts.

2.0 VEGETATION: ROANOKE ISLAND VISITOR CENTER (YEAR 3 MONITORING)

2.1 Success Criteria

The vegetative marsh success of the wetland site will be determined in accordance with NMFS Guidelines. Monitoring plots found to be located within the open water channel will not be evaluated, and will not count toward the final count of plots. The vegetation component of the wetland site will be deemed successful if the following criteria are met:

1. At year five, the average of all plots should have a scale value of 5 (>75% vegetation cover) consisting of wetland herbaceous species, not including any invasive species.
2. A minimum of 70% of the plots shall contain the target (planted) species.

2.2 Description of Species

The following marsh grass species were planted in the Wetland Creation and Restoration Areas:

Juncus roemerianus, Black Needle Rush

Spartina patens, Saltmeadow Cordgrass

Cladium jamaicense, Sawgrass

2.3 Results of Vegetation Monitoring

Plot #	Scale Factor	Black Needle Rush	Saltmeadow Corgrass	Sawgrass	Frequency	Comments
1	5.0	⓪	⓪		⓪	
2	1.0					Saltgrass
3	5.0	⓪			⓪	Marsh-elder, Stinkweed, *Scripus americanus*
4	3.0	⓪	⓪		⓪	Stinkweed, *Scirpus* sp. (5% phragmites)
5	5.0	⓪			⓪	Marsh-elder
6	0.0					bare ground
7	5.0	⓪			⓪	Marsh-elder
8	5.0	⓪		⓪	⓪	*Scirpus americanus*
9	5.0	⓪			⓪	*Scirpus robustus*
10	5.0		⓪	⓪	⓪	*Scirpus robustus*, wax mrytle, baldcypress
11	5.0	⓪			⓪	Marsh-elder, Stinkweed
12	5.0	⓪	⓪		⓪	*Scirpus americanus*
13	5.0	⓪			⓪	
14	5.0	⓪			⓪	
15	5.0		⓪		⓪	
16	5.0	⓪			⓪	Stinkweed *(1% phragmites)*
17	5.0	⓪			⓪	*Scirpus americanus* (2% phragmites)
18	5.0			⓪	⓪	*Juncus* sp., (1% phragmites)
19	4.0	⓪			⓪	
20	5.0					*Scirpus americanus*
21	4.0					Stinkweed, wax myrtle
22	5.0		⓪	⓪	⓪	Stinkweed, marsh-elder, swamp blackgum, (1% phragmites)
23	5.0					Scirpus americanus
24	5.0	⓪			⓪	Cattails
25	5.0	⓪			⓪	
26	5.0		⓪		⓪	Stinkweed
27	5.0					Stinkweed
28	5.0					Wax myrtle
29	5.0		⓪		⓪	Marsh-elder (1% phragmites)
30	5.0	⓪	⓪		⓪	
31	5.0					Marsh-elder, stinkweed
32	4.0					*Scirpus robustus,* Stinkweed
33	5.0	⓪	⓪		⓪	Marsh-elder
34	5.0	⓪			⓪	Marsh-elder
35	5.0	⓪	⓪		⓪	Marsh-elder, Stinkweed
36	5.0	⓪	⓪		⓪	Marsh-elder, Stinkweed
37	5.0	⓪	⓪		⓪	
38	5.0	⓪	⓪		⓪	
39	4.0	⓪	⓪		⓪	Stinkweed, (1% phragmites)
40	5.0	⓪			⓪	Marsh-elder
Frequency (Percentage of Plots with Desired Species)					77.5%	
Sum Scale Value					185.0	
Total Number of Plots					40	
Vegetation Cover (Scale Value)					4.6	

Table 1. Results of Vegetation Monitoring

Site Notes: The planted marsh grass species are surviving and are continuing to spread. The sawgrass plantings have not survived as well as the other two planted marsh grass species. Baccharis, marsh-elder, and wax myrtle were the most dominate woody species noted throughout the site. NCDOT has been treating the phragmites that is located on site and will continue treatments throughout the monitoring period.

2.4 Conclusions

Percent Frequency of Target Species **77.5%**

Frequency of 70% required.

Vegetation Cover Scale Value **4.6**

Scale Value of 5.0 required for year 5.

Approximately 1.8 acres of this site was planted in the wetland restoration and creation areas in March 2002. The site was replanted in February 2004 and March 2005. In March 2006, NCDOT applied 1 ton of gypsum, 1 ton of hydrated lime, tilled the site with a walk-behind-tiller, and planted bareroot seedlings on four-foot centers. This was an attempt to get a greater survival rate of planted hardwood vegetation on site. The 2006 vegetation monitoring revealed that the steps taking to get a greater survival rate of planted hardwood vegetation on site failed. The planted hardwood vegetation was surviving in very low numbers. A few baldcypress, swamp blackgum, and wax myrtle were noted surviving. The soluble salt levels on site are so high that it has become impossible to get these hardwood species to survive in large numbers. An onsite agency meeting was held on April 23, 2007 for NCDOT to propose planting elevation appropriate marsh grasses in the remaining bare areas of the site and to continue monitoring under the NMFS Guidelines for the success criteria of the site. NCDOT planted the site with marsh grasses in May 2008.

During construction of the mitigation site in 2002, approximately 0.29 acres of wetland preservation area was inadvertently cleared. These mechanized clearing areas are adjacent to the creation areas on the North and South Tracts. This activity was referenced in a letter to the Corps dated March 6, 2002. Per the letter to the Corps, the preservation areas have been replanted. NCDOT will continue to provide photo documentation of the mechanized clearing areas to show the progression of the area returning to its original state.

According to the July 2001 Roanoke Island Visitor Center/Rest Area Mitigation Plan, the riparian buffers are to be monitored pictorially and photos will be provided at the annual monitoring meeting. Photos of the riparian buffers are included with this report.

NCDOT proposes to continue vegetation monitoring at the Roanoke Island Visitors Center Mitigation Site.

3.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

A site visit was held on April 23, 2007 with the regulatory agencies to address continued problems with planted hardwood vegetation. Based on that meeting it was agreed that NCDOT would plant the remaining bare areas of the site with elevation appropriate marsh species. The mix of these marsh species and sparse tree/shrub species is expected to more closely mimic the impacted communities (see e-mail in Appendix B). The planted areas would then be monitored based on accepted NMFS guidelines. The groundwater gauges were removed at this time.

The preservation areas that were inadvertently cleared during construction of the site in 2002 were replanted. Photo documentation of the mechanized clearing areas will continue to be provided to show the progression of the area returning to its original state.

For 2010 marsh grass vegetation monitoring, the target species and scale values were 77.5% and 4.6, respectively. The planted vegetation is surviving and spreading throughout the site. NCDOT proposes to continue vegetation monitoring at the Roanoke Island Mitigation Site

NCDOT proposes to continue the vegetation monitoring for 2011.

APPENDIX A

SITE PHOTOGRAPHS

PHOTO AND VEGETATION PLOT LOCATIONS

MECHANIZED CLEARING PHOTOGRAPHS

MECHANIZED CLEARING IMPACT AREAS

Roanoke Island Visitor Center

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

August 2010

Roanoke Island Visitor Center


Photo 7


Photo 8


Photo 9


Photo 10


Photo 11


Photo 12

August 2010

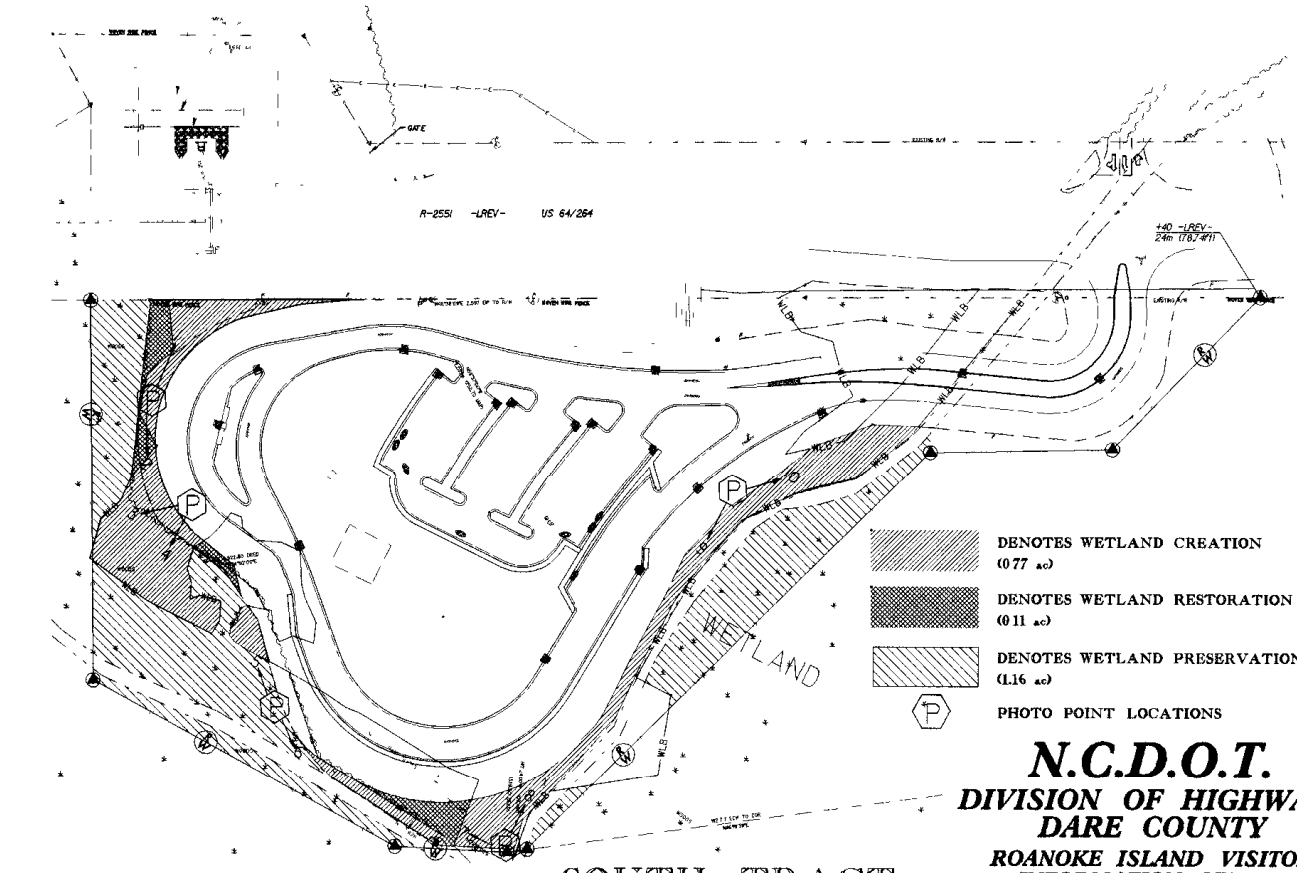
Roanoke Island Visitor Center

Photo 13

Photo 14

Photo 15

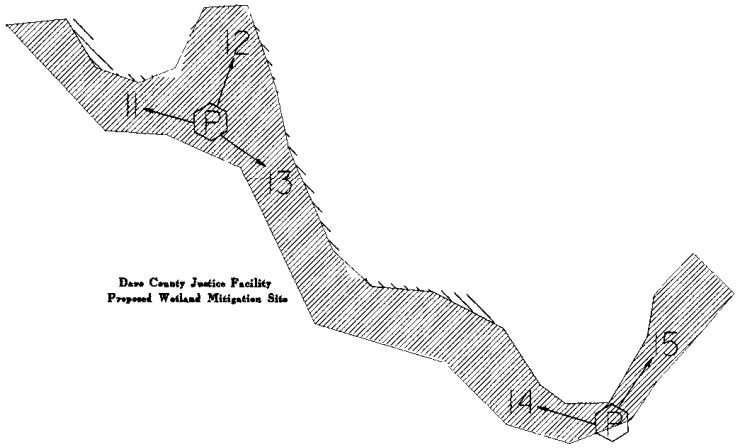
August 2010



SOUTH TRACT
FIGURE 2

N.C.D.O.T.
DIVISION OF HIGHWAYS
DARE COUNTY
ROANOKE ISLAND VISITOR INFORMATION CENTER AND REST AREA ON US 64-264

NORTH TRACT
FIGURE 4

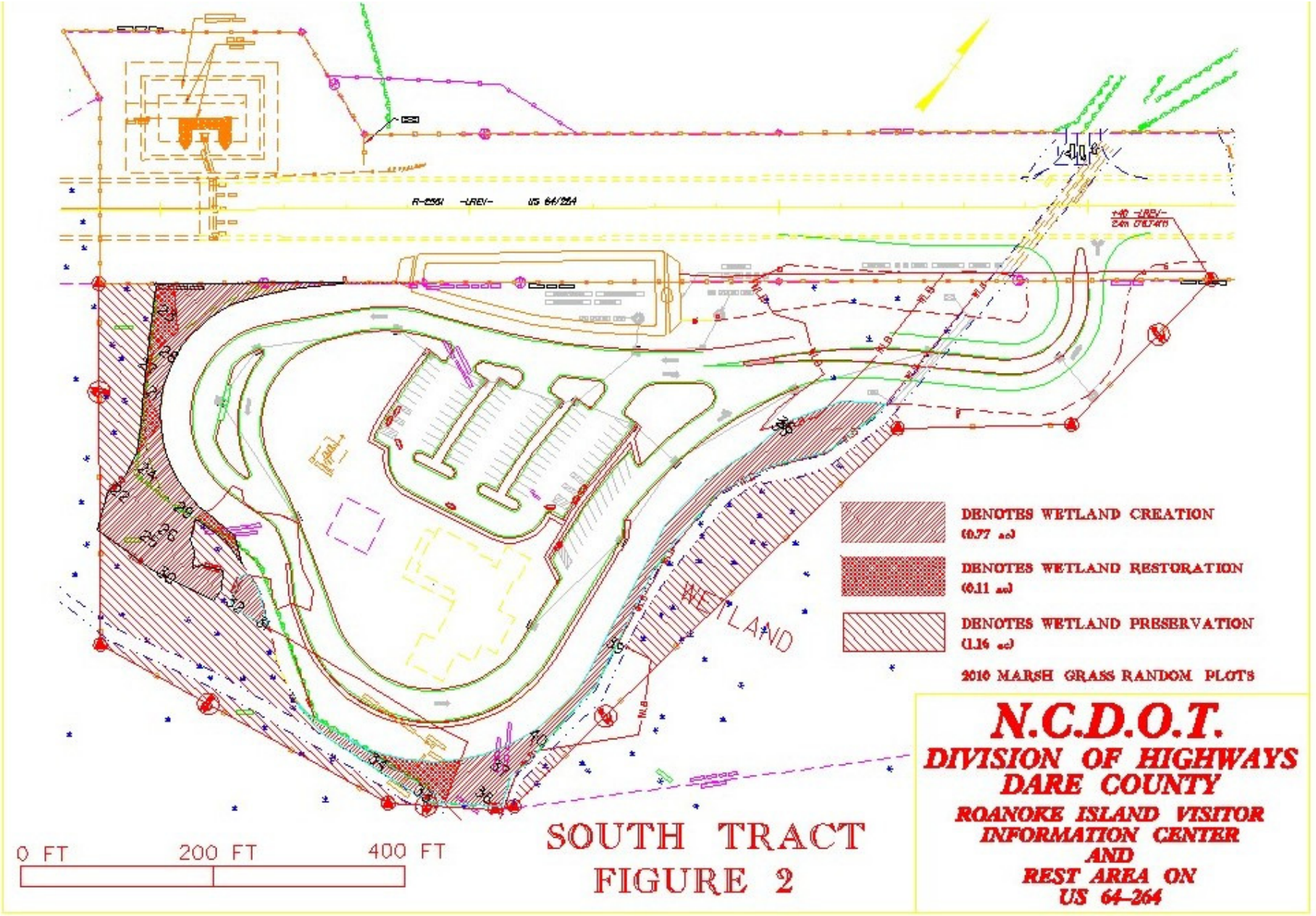


N.C.D.O.T.
DIVISION OF HIGHWAYS
DARE COUNTY
ROANOKE ISLAND VISITOR INFORMATION CENTER AND REST AREA ON US 64-264

DENOTES WETLAND CREATION (0.89 ac)

DENOTES WETLAND PRESERVATION (0.13 ac)

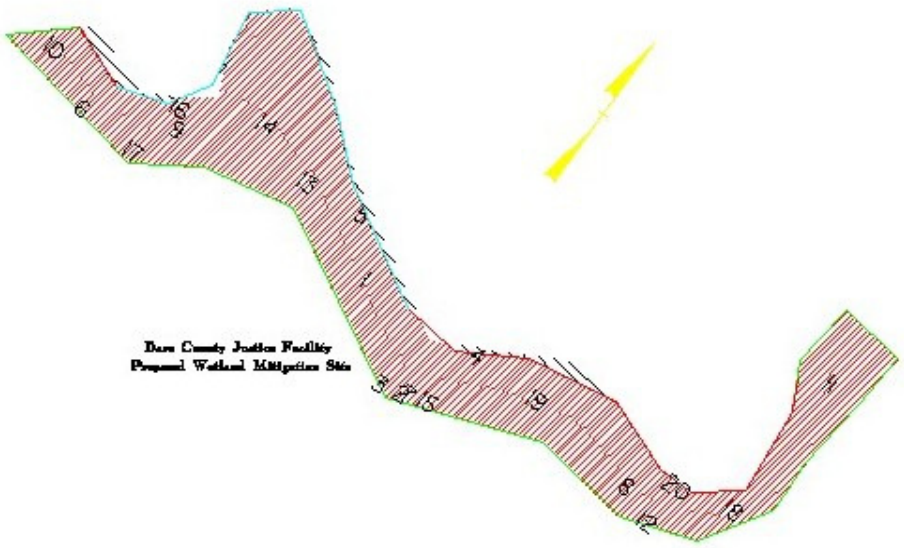
P — PHOTO POINT LOCATIONS



SOUTH TRACT
FIGURE 2

N.C.D.O.T.
DIVISION OF HIGHWAYS
DARE COUNTY
ROANOKE ISLAND VISITOR INFORMATION CENTER AND REST AREA ON US 64-264

NORTH TRACT
FIGURE 4



N.C.D.O.T.
DIVISION OF HIGHWAYS
DARE COUNTY
ROANOKE ISLAND VISITOR INFORMATION CENTER AND REST AREA ON US 64-264

DENOTES WETLAND CREATION (0.89 ac)

DENOTES WETLAND PRESERVATION (0.13 ac)

2010 MARSH GRASS RANDOM PLOTS

Roanoke Island Visitor Center

Mechanized Clearing Photographs

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

August 2010

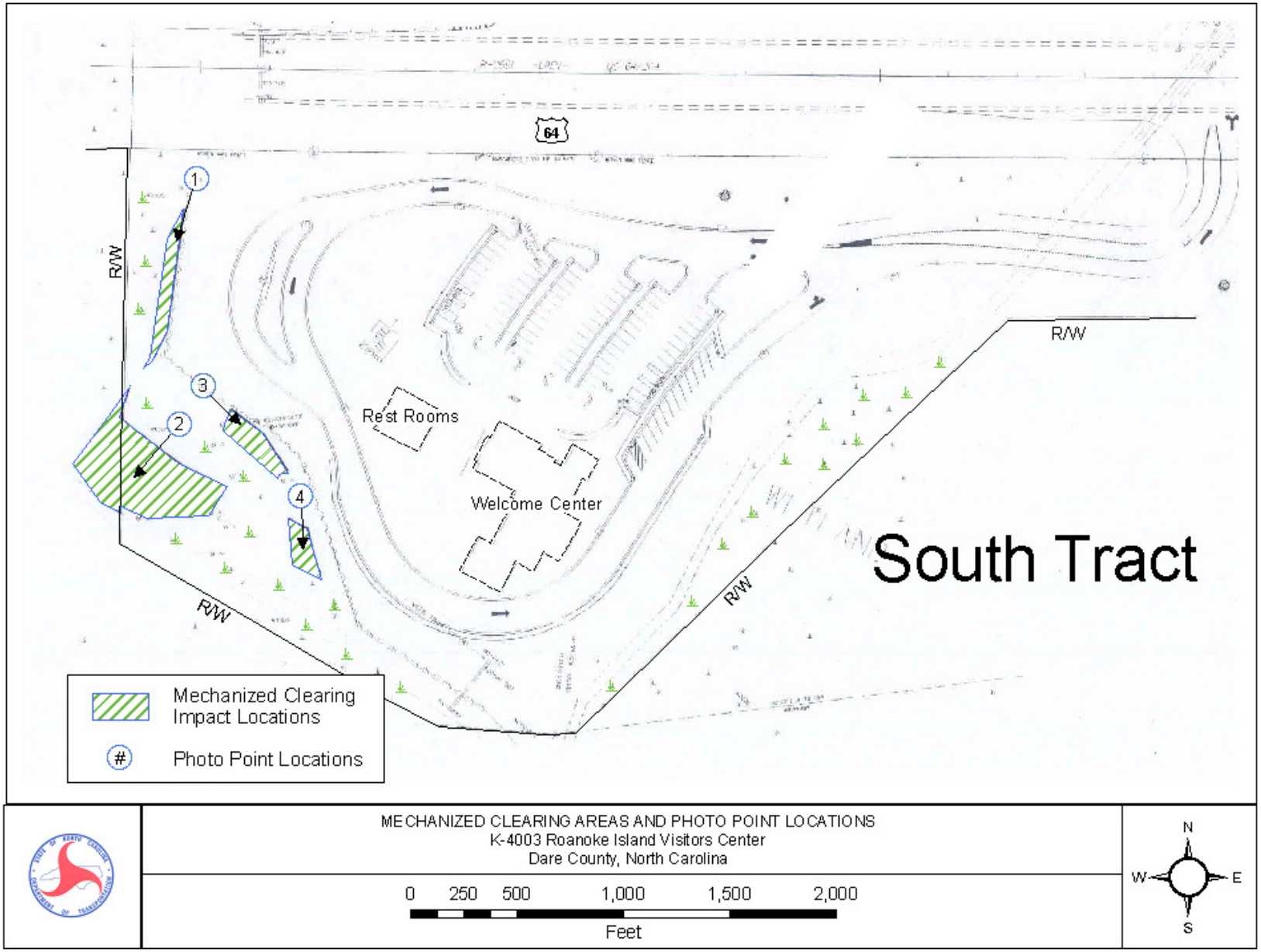
Roanoke Island Visitor Center

Mechanized Clearing Photographs

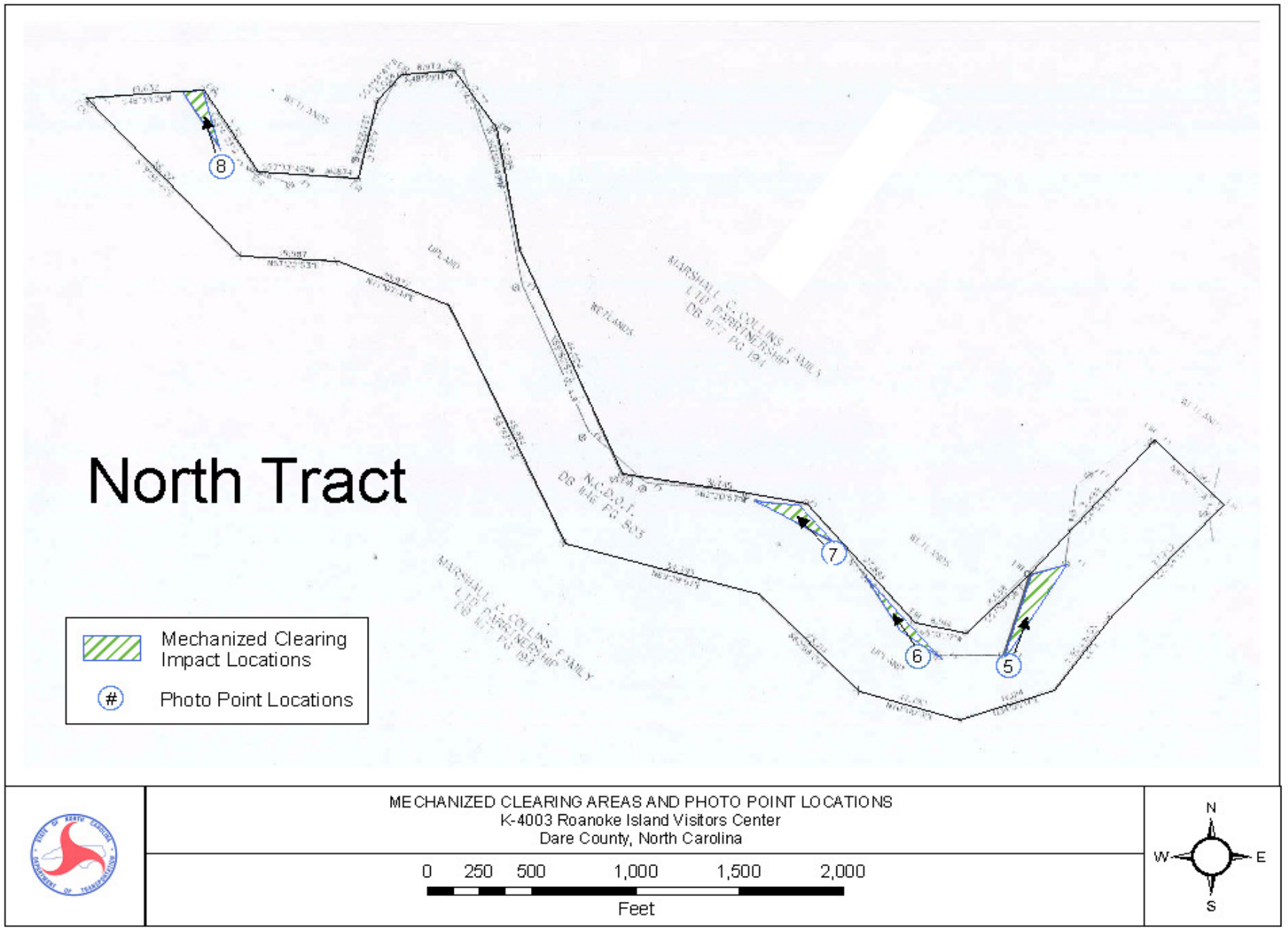
Photo 7

Photo 8

August 2010



Mechanized Clearing Impact Areas – South Tract



Mechanized Clearing Impact Areas – North Tract

Roanoke Island Visitor Center

Riparian Buffer Photographs

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

August 2010

Roanoke Island Visitor Center

Riparian Buffer Photographs

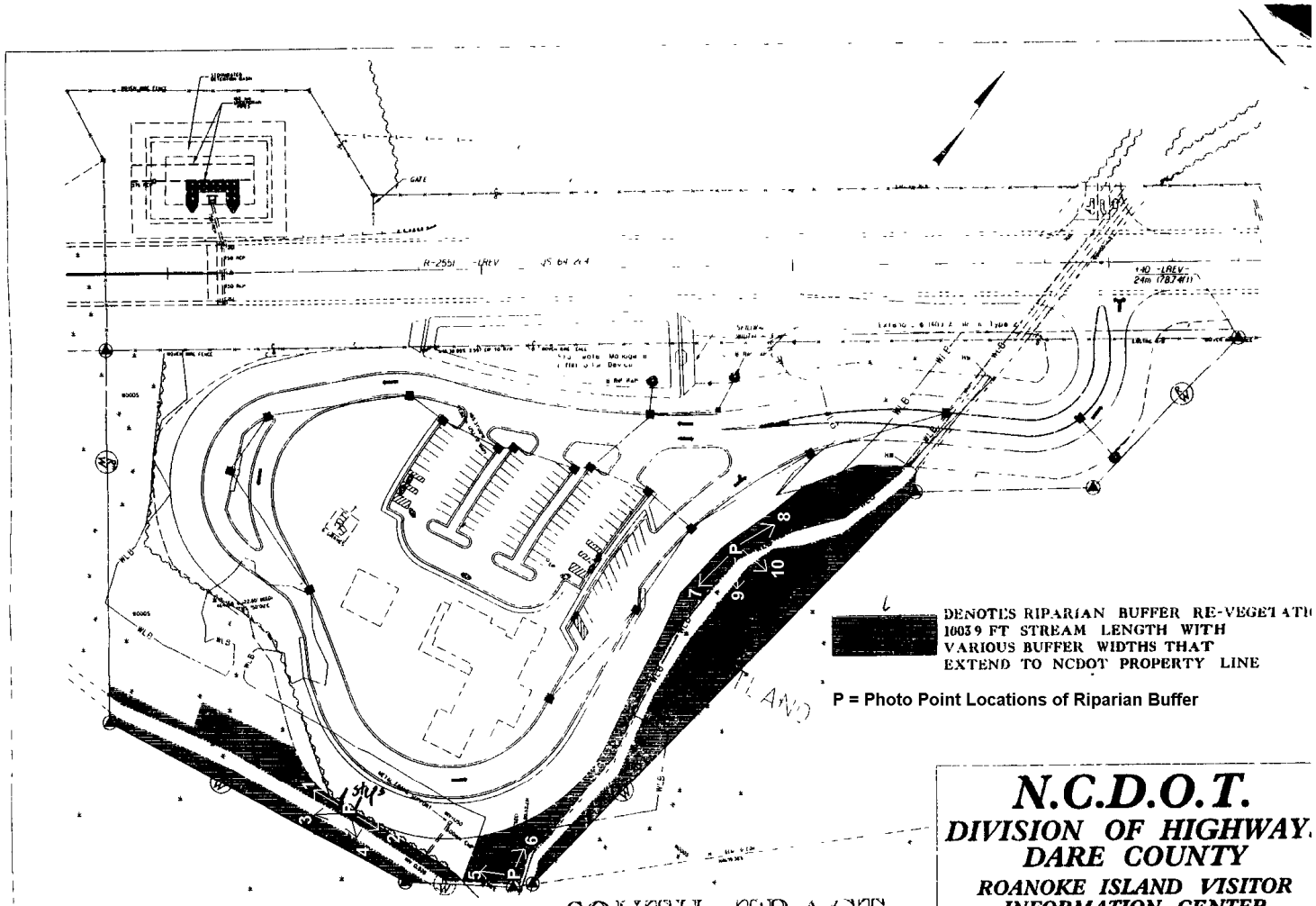
Photo 7

Photo 8

Photo 9

Photo 10

August 2010


DENOTES RIPARIAN BUFFER RE-VEGETATI
10039 FT STREAM LENGTH WITH
VARIOUS BUFFER WIDTHS THAT
EXTEND TO NCDOT PROPERTY LINE
P = Photo Point Locations of Riparian Buffer
0 FT
200 FT
400 FT
SOUTH TRACT
FIGURE 3
N.C.D.O.T.
DIVISION OF HIGHWAY
DARE COUNTY
ROANOKE ISLAND VISITOR
INFORMATION CENTER
AND
REST AREA ON
US 64-264

APPENDIX B

EMAIL REFERENCING APRIL 23, 2007 ONSITE AGENCY MEETING

-----Original Message-----
From: Byron Moore [mailto:bgmoore@dot.state.nc.us]
Sent: Monday, April 30, 2007 10:23 AM
To: bill biddlecome; David Wainwright; gary jordan; Travis Wilson; stephen lane; cathy brittingham; Chris Militscher; kathy matthews
Cc: Randy Griffin; matt green; Clay Willis; Jason Elliott
Subject: Roanoke Island Visitor's Center

Hello all,

Based on our meeting last Monday (April 23) NCDOT is going to proceed with planting elevation appropriate marsh grasses (black needle rush, sawgrass and patens) in the remaining bare areas of the Roanoke Island Visitor's Center Mitigation Site. Due to ordering plant material, this will not happen until next spring.
DOT will treat any phragmites in the site this summer and fall.

Our typical monitoring approach for marsh sites is to follow NMFS guidelines which specify random plots, target species coverage, and overall coverage. This is a 5 year monitoring period but we would propose an early closeout if coverage meets the required success criteria.

According to the permits (404, 401, DCM) the project impacts were
1.14-1.15 acres of estuarine fringe wetland forest and 145.5 -146 LF of stream. All three permits refer to the May 2001 mitigation plan for the Roanoke Island Visitor Center. Included in this document (and in the 401 permit) is a table with a breakdown of mitigation activities at the site. This table shows a total of
1.77 acres estuarine fringe restoration/creation, 1.29 acres estuarine fringe preservation, 1.36 acres forested wetland preservation, and 1003.9 LF riparian buffer.

There was a lot of discussion about this proposal as being "out-of-kind" mitigation. Personally I feel that the combination of marsh grasses and sparse tree/shrub vegetation is exactly the same community that we were looking at in the preservation areas (and the original impact area). This sparse tree/shrub vegetation consists of planted species and volunteer species such as baccharis, pine, red maple, and wax myrtle. Both sites are directly adjacent to tidal streams or sloughs which would put that community at the lower elevation range of an estuarine fringe system. According to Schafale and Weakley that lower range contains species from adjacent marshes. Roanoke Island is used as an example of this system in their book.

I would propose that this existing mitigation site be used as was originally intended to offset impacts caused by the construction of the entrance to the Visitor Center. This would be contingent on the success of the marsh grasses that are planted next spring.

If you have any questions please call. Thank you.

Byron Moore
919-715-1491