



# NCDOT REDUCE/REUSE/RECYCLE REPORT

FISCAL YEAR 2010-2011



**John L. Sharp**  
**Environmental Specialist**  
**Support Services**



## EUGENE A. CONTI, JR. SECRETARY

"It is vitally important for all North Carolinians to preserve and protect our environment for future generations. NCDOT has made a strong commitment to recycle, reduce the amount of waste produced in projects and reuse as many materials as possible, and we continue to make this a central focus in our daily operations."



 **REDUCE**  **REUSE**  **RECYCLE** 



## **TERRY GIBSON, P.E. STATE HIGHWAY ADMINISTRATOR**

“The 3R Program is an important program at NCDOT. Being good stewards of the environment, and keeping a close watch on the larger picture, will help us to be more responsible toward conserving our natural resources today and in the years to come.”



## **MICHAEL D. ROBERTSON DMV COMMISSIONER**

“At the Division of Motor Vehicles, one of our key programs is working with the N.C. Division of Air Quality and the U.S. Environmental Protection Agency to reduce the pollutants coming from the vehicles we drive. Our safety and emissions inspections help keep our vehicles operating safely and cleanly. We take great pride in doing all we can to preserve the quality of our environment for future North Carolinians.”

# NCDOT 3R Program Tree

Source Reduction  
New Technology

Source Reduction  
New Design

Source Reduction  
Procurement

Reuse  
Materials

Source Reduction  
Planning

Reuse  
Composting

Reuse  
Items

Reuse  
Waste Exchange

Reuse  
Swap Shop Surplus

Recycle  
Paper/Aluminum  
Plastic/Cardboard

Recycle Purchasing  
Buy Recycled Items

**Benefits:** • More Efficient Operation • Cost Savings • Environmental Sustainability • Compliance

# Education on Waste Reduction and Recycling

**Effective education is key to a successful waste reduction program.**

**As of 2010–2011, NCDOT has the following measures in place:**

- Top-down support for a recycling program;
- A lead coordinator for waste reduction and recycling efforts;
- Waste reduction and recycling opportunities for visitors at its public facilities such as highway rest stops; and
- Ongoing educational and promotional programs for waste reduction and recycling.

**A majority of the information was communicated and distributed electronically through e-mail and online.**



# Source Reduction of Waste/ Waste Prevention and Reuse



**NCDOT places source reduction of waste/waste prevention and reuse at the top of the hierarchy of preferred methods for managing solid waste. Executive Order 156 requires state agencies to practice waste reduction.**

**The following are actions taken by NCDOT in 2010–2011 to practice waste reduction:**

- Most employees practiced at least one technique for reducing waste.
- 80 percent of NCDOT facilities took action to reduce office paper such as copy paper, letterhead, envelopes and packaging.

This was done through:

- Eliminating unnecessary reports and reducing report size;
- Eliminating unnecessary forms or converting to electronic format;
- Making fewer copies;
- Printing or copying documents on both sides of paper;
- Using electronic mail and voice mail;
- Posting announcements on bulletin boards and in break areas;
- Using “two-way” envelopes; and
- Reusing mailing envelopes.

# In 2010- 2011, NCDOT Construction & Demolition Waste Reduction/ Recycle Program recycled 3,409 tons of waste such as Metal, Brick/Block and Concrete



NCDOT is dramatically reducing the amount of material it puts into landfills statewide. One of the ways the department is accomplishing this reduction is by reusing and recycling parts of its old buildings through the Construction Waste Reduction and Recycling Program.

*"This program is a great example of our commitment to environmental sensitivity in action,"*  
said Transportation Secretary Gene Conti.

Overall, the program has yielded \$283,100 in avoided hard costs, savings and revenue and has kept 5,780 tons of material out of landfills. For more information about NCDOT's environmental efforts, visit [www.ncdot.gov/programs/environment/3R](http://www.ncdot.gov/programs/environment/3R)



**REDUCE REUSE RECYCLE**

# Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects



Reused Materials 2010-2011	Quantity	Unit of Measure
Aggregate Base Course	10,713	Tons
Concrete Pipe	2,481	Linear Feet
Guardrail	49,355	Linear Feet
Portable Concrete Barrier	44,244	each
Sign Posts	40,545	each
Signal Heads	65	each
Signs	970	each
Steel Beams	2,880	pounds



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE  
GOVERNOR

EUGENE A. CONTI, JR.  
SECRETARY

**Recycling and Solid Waste Management Report  
For Highway Construction and Maintenance Projects  
State Fiscal Year 2010 – 2011**

This report is a summary of the recycling and solid waste management efforts on highway construction and maintenance projects within the North Carolina Department of Transportation for fiscal year 2011 (July 1, 2010 - June 30, 2011) as required by G.S. 136-28.8(g). This statute mandates the Department prepare an annual report on the amounts and types of recycled materials specified or used in construction and maintenance operations during the previous fiscal year. The types of recycled materials incorporated into the projects noted would normally contribute to the consumer and industrial waste streams, compounding the problem of declining space in landfills.

Efforts to utilize recycled and solid waste materials are in response to the requirements of G.S. 136-28.8(b) which mandates the Department to use recycled materials in highway projects, specifically:

- (1) Rubber from tires for pavements, subbase materials, and other appropriate applications.
- (2) Recycled materials for guardrail posts, right of way fence posts, and sign supports.
- (3) Recycling technology including but not limited to hot in-place recycling on roads in highway maintenance.

All applications of recycled materials are to be consistent with economic feasibility and applicable engineering and environmental quality standards.

**Highway Construction and Maintenance Projects**

Specifications now require that many of the products used in highway construction projects, such as guardrail offset blocks and flexible delineator posts, be manufactured from some quantity of recycled materials. Glass beads used for retroreflective pavement markings are manufactured from 100% recycled glass. Reclaimed asphalt pavement (RAP) may constitute up to 50% of the total material used in most recycled mixtures, and RAP mixtures are used on a majority of projects. Fly ash is sometimes used as a concrete component for up to 20% by weight of the required cement content. Some of the notable recycled or solid waste materials utilized this fiscal year are denoted on the following page.

**MAILING ADDRESS:**  
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RALEIGH NC 27699-1502

TELEPHONE: 919-508-1867  
FAX: 919-508-1954  
WWW.NCDDOT.GOV

**LOCATION:**  
RANEY BUILDING  
104 FAYETTEVILLE STREET MALL  
RALEIGH, NC 27601

**Recycling and Solid Waste Management Report  
For Highway Construction and Maintenance Projects  
State Fiscal Year 2010 – 2011**

1. Over 745,000 tons of Reclaimed Asphalt Pavement (RAP) were used as an asphalt mix additive.
2. About 15,000 cubic yards of clearing and grubbing debris were used as mulch for erosion control and roadside environmental applications.
3. Over 18,000 tons of coal combustion fly ash were used in concrete mixes.
4. Approximately 4,400 tons of recycled glass beads were used in pavement marking.
5. Maintenance personnel across the state continue to reuse products including:
  - Aggregate Base Course
  - Concrete pipe
  - Guardrail
  - Signs and posts
  - Steel Beams

See Attachment 1 for quantities of recycled and solid waste materials used during the 2010 – 2011 state fiscal year. Attachment 2 summarizes total quantities, as well as a rolling average since 1989.

**Website**

For up-to-date information on NCDOT's use of recycled materials, visit:

<http://www.ncdot.org/doh/preconstruct/altern/value/recycle/default.html>

**North Carolina Department of Transportation**  
**Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects**  
**Summary, July 2010 through June 2011**

Product Category and Description	Usage	Quantity for SFY 2010-2011	Unit of Measure
<b>1-Asphalt:</b>			
Reclaimed Asphalt Pavement (RAP)	Asphalt Mix Additive	745,647	Tons
Reclaimed Asphalt Pavement (RAP)	Aggregate Base Course (ABC)	5,369	Tons
Reclaimed Asphalt Pavement (RAP)	Shoulder Reconstruction	33,788	Cubic Yards
Reclaimed Asphalt Shingles (RAS)	Asphalt Mix Additive	0	Tons
Hot-In-Place Asphalt Recycling	Pavement	782,000	Square Yards
Full-Depth Reclamation	Pavement	15,850	Cubic Yards
<b>2-Clearing and Grubbing Debris:</b>			
Mulch	Mulch	104	Acres
Mulch	Mulch - Roadside Environmental	13,530	Cubic Yards
Mulch	Erosion Control	1,575	Cubic Yards
<b>3-Coal Combustion Products:</b>			
Fly Ash	Concrete Mix Additive	18,189	Tons
Fly Ash	Embankment Fill	0	Cubic Yards
Fly Ash	Flowable Fill	89	Cubic Yards
Fly Ash	Asphalt Mix Additive	0	Tons
Bottom Ash	Embankment Fill	0	Cubic Yards
<b>4-Concrete:</b>			
Recycled Concrete	Aggregate Base Course (ABC)	0	Tons
Recycled Concrete	Fill Material	466	Tons
Crack and Seat	Base Material	0	Tons
Rubblized Concrete	Base Material	0	Tons
<b>5-Glass:</b>			
Recycled Glass Beads	Pavement Markings	4,396	Tons
Crushed Glass	Subdrain Backfill	0	Tons
Crushed Glass	Pipe Foundation	0	Tons
Crushed Glass	Aggregate Base	0	Tons
<b>6-Plastic:</b>			
Recycled Plastic Offset Blocks	Guardrail Offset Blocks	2,632,675	Each
Recycled Plastic Fence Posts (All Sizes)	Fence Posts	200	Each
Recycled Plastic Pipe (All Types and Sizes)	Pipe	0	Linear Feet
Recycled Plastic Flexible Delineators	Flexible Delineator Posts	0	Each
Recycled Plastic Barricades	Type III Barricades	0	Feet
Recycled Plastic Traffic Separators	Railroad Safety Device	0	Linear Feet
<b>7-Scrap Tires:</b>			
Chipped Tires	Embankment Fill	0	Tires
Chipped Tires	Lightweight Aggregate	0	Tires
Chipped Tires	Sound Wall Panels	0	Tires
Crumb Rubber	Crack Sealant	38,860	Tires
Crumb Rubber	Soil Amendment	0	Tires
Crumb Rubber	Asphalt Mix Additive	31,930	Tires
Rubber Mulch	Mulch	0	Tires
Tire Sidewalls	Traffic Drum Ballast	3,885	Tires
Whole Tires	Retaining Wall	491	Tires
<b>Total Waste Scrap Tires</b>		0	Tires
<b>8-Roadside Environmental:</b>			
Advanced Alkaline Sludge	Soil Amendment	0	Tons
Aged Leaf Mold & Yard Debris	Soil Amendment	0	Tons
Ammonium Sulfate Liquid	Fertilizer/Soil Amendment	0	Gallons
Bark Mulch	Soil Amendment	0	Tons
Bioremediated Petroleum Affected Soils	Soil Amendment	0	Cubic Yards
Cotton Gin Waste	Soil Amendment	0	Cubic Yards
Hog Waste Compost	Fertilizer/Soil Amendment	3	Cubic Yards

**North Carolina Department of Transportation**  
**Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects**  
**Summary, July 2010 through June 2011**

Product Category and Description	Usage	Quantity for SFY 2010-2011	Unit of Measure
Hurricane Fran Mulch	Soil Amendment	0	Cubic Yards
Hydromulch	Mulch	0	Pounds
Lime-Stabilized Municipal Sludge	Soil Amendment	0	Tons
Municipal Sludge	Soil Amendment	0	Tons
Poultry Litter	Fertilizer/Soil Amendment	3	Tons
Soil Derived from Demolition Debris	Soil Amendment	0	Tons
Compost Material (Ref: AASHTO MP-10)	Compost Blanket	79,000	Cubic Yards
<b>9-Other:</b>			
Steel Slag	Base Aggregate	0	Tons
Processed Silica	Embankment Fill	0	Cubic Yards
Recycled Polyester Resin	Weedmat	0	Square Yards
Recycled Bridge Items	Decking & Beams (wood)	0	Linear foot/ft
Reclaimed Asphalt Pavement (RAP)	Patching	0	Tons
Used Unclassified Structure	Borrow	0	Cubic Yards
Mabey Bridge	Bridge	0	Each
Drainage Ditch Excavation	Borrow	0	Cubic Yards
Corrugated Metal Pipe	Metal Pipe	0	Linear foot/ft
Erosion Control Stone 'B'	Slope Protection	0	Tons
White Roofing Rock	Mulch, Ditch Liner	0	Cubic Yards
Aluminum	Traffic Signal Cabinets	15	Each/ea
Cardboard	Cardboard Boxes	100	Pound/lb
Asphalt Millings	Shoulder Repair	175	Tons
Woven Wire	Fence Reset	246	Linear foot/ft
Orange PVC Safety Fence	Environmental Sensitive Delineation	623	Linear foot/ft
<b>10-Reused Materials:</b>			
Aggregate Base Course	Aggregate Base Course	10,713	Tons
Concrete Pipe	Concrete Pipe	2,481	Linear Feet
Guardrail	Guardrail	49,355	Linear Feet
Refurbished Traffic Signal Heads	Traffic Signal Heads	0	Each
Sign Posts	Sign Posts	40,545	Each
Signal Heads	Signal Heads	65	Each
Signs	Signs	970	Each
Silt Fence and Posts	Silt Fence and Posts	0	Linear Feet
Steel Beams	Steel Beams	2,880	Pounds
Double Faced Concrete Barrier	Concrete Barrier	0	Linear Feet
Wooden Breakaway Posts	Guardrail Offset Blocks	0	Each
40' Signal Pole (wood)	Signal Pole Replacement	0	Each
LED Signal Lamps	Signal Repair	0	Each
Signal Cabinet	Signal Repair	0	Each
1" Rigid Pipe	Signal Repair	0	Linear Feet
Portable Concrete Barrier	Portable Concrete Barrier	44,244	Each
Timber Bridge Deck/Rail	Bridge Deck/Rail	4,200	Linear Feet
Wood Pallets	Wood Pallets	400	Each

**North Carolina Department of Transportation**  
**Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects**  
**Summary, January 1989 through June 2011**

Product Category and Description	Usage	Quantity	Unit of Measure	1989-2011 Rolling Average
<b>1-Asphalt:</b>				
Reclaimed Asphalt Pavement (RAP)	Asphalt Mix Additive	5,475,189	Tons	248,872
Reclaimed Asphalt Pavement (RAP)	Aggregate Base Course (ABC)	33,198	Tons	1,509
Reclaimed Asphalt Pavement (RAP)	Shoulder Reconstruction	64,820	Cubic Yards	2,946
Reclaimed Asphalt Shingles (RAS)	Asphalt Mix Additive	57,824	Tons	2,628
Hot-In-Place Asphalt Recycling	Pavement	3,199,267	Square Yards	145,421
Full-Depth Reclamation	Pavement	157,074	Cubic Yards	7,140
<b>2-Clearing and Grubbing Debris:</b>				
Mulch	Mulch	633	Acres	29
Mulch	Mulch - Roadside Environmental	52,562	Cubic Yards	2,389
Mulch	Erosion Control	41,326	Cubic Yards	1,878
<b>3-Coal Combustion Products:</b>				
Fly Ash	Concrete Mix Additive	121,082	Tons	5,504
Fly Ash	Embankment Fill	865,186	Cubic Yards	39,327
Fly Ash	Flowable Fill	719	Cubic Yards	33
Fly Ash	Asphalt Mix Additive	40,800	Tons	1,855
Bottom Ash	Embankment Fill	2,707	Cubic Yards	123
<b>4-Concrete:</b>				
Recycled Concrete	Aggregate Base Course (ABC)	6,399	Tons	291
Recycled Concrete	Fill Material	54,553	Tons	2,480
Crack and Seat	Base Material	260,853	Tons	11,857
Rubblized Concrete	Base Material	310,917	Tons	14,133
<b>5-Glass:</b>				
Recycled Glass Beads	Pavement Markings	80,219	Tons	3,646
Crushed Glass	Subdrain Backfill	130	Tons	6
Crushed Glass	Pipe Foundation	333	Tons	15
Crushed Glass	Aggregate Base	203	Tons	9
<b>6-Plastic:</b>				
Recycled Plastic Offset Blocks	Guardrail Offset Blocks	2,974,682	Each	135,213
Recycled Plastic Fence Posts (All Sizes)	Fence Posts	8,300	Each	377
Recycled Plastic Pipe (All Types and Sizes)	Pipe	57,703	Linear Feet	2,623
Recycled Plastic Flexible Delineators	Flexible Delineator Posts	4,838	Each	220
Recycled Plastic Barricades	Type III Barricades	2,091	Feet	95
Recycled Plastic Traffic Separators	Railroad Safety Device	2,922	Linear Feet	133
<b>7-Scrap Tires:</b>				
Chipped Tires	Embankment Fill	11,692,045	Tires	531,457
Chipped Tires	Lightweight Aggregate	50,739	Tires	2,306
Chipped Tires	Sound Wall Panels	8,000	Tires	364
Crumb Rubber	Crack Sealant	42,273	Tires	1,922
Crumb Rubber	Soil Amendment	2,000	Tires	91
Crumb Rubber	Asphalt Mix Additive	156,442	Tires	7,111
Rubber Mulch	Mulch	3,603	Tires	164
Tire Sidewalls	Traffic Drum Ballast	72,385	Tires	3,290
Whole Tires	Retaining Wall	4,212	Tires	191
Total Waste Scrap Tires		12,031,699	Tires	546,895

## Attachment 2

<b>8-Roadside Environmental:</b>				
Advanced Alkaline Sludge	Soil Amendment	495	Tons	23
Aged Leaf Mold & Yard Debris	Soil Amendment	2,370	Tons	108
Ammonium Sulfate Liquid	Fertilizer/Soil Amendment	420,948	Gallons	19,134
Bark Mulch	Soil Amendment	10,434	Tons	474
Bioremediated Petroleum Affected Soils	Soil Amendment	1,137	Cubic Yards	52
Cotton Gin Waste	Soil Amendment	7,130	Cubic Yards	324
Hog Waste Compost	Fertilizer/Soil Amendment	28	Cubic Yards	1
Hurricane Fran Mulch	Soil Amendment	200,000	Cubic Yards	9,091
Hydromulch	Mulch	89,160	Pounds	4,053
Lime-Stabilized Municipal Sludge	Soil Amendment	704	Tons	32
Municipal Sludge	Soil Amendment	8,610	Tons	391
Poultry Litter	Fertilizer/Soil Amendment	428	Tons	19
Soil Derived from Demolition Debris	Soil Amendment	1,742	Tons	79
Compost Material (Ref: AASHTO MP-10)	Compost Blanket	79,000	Cubic Yards	3,591
<b>9-Other:</b>				
Steel Slag	Base Aggregate	224	Tons	10
Processed Silica	Embankment Fill	46,072	Cubic Yards	2,094
Recycled Polyester Resin	Weedmat	1,152	Square Yards	52
Recycled Bridge Items	Decking & Beams (wood)	1,500	Linear foot/lft	68
Reclaimed Asphalt Pavement (RAP)	Patching	900	Tons	41
Used Unclassified Structure	Borrow	3,180	Cubic Yards	145
Mabey Bridge	Bridge	2	Each	0
Drainage Ditch Excavation	Borrow	200	Cubic Yards	9
Corrugated Metal Pipe	Metal Pipe	2,500	Linear foot/lft	114
Erosion Control Stone 'B'	Slope Protection	340	Tons	15
White Roofing Rock	Mulch, Ditch Liner	250	Cubic Yards	11
Aluminum	Traffic Signal Cabinets	40	Each/ea	2
Cardboard	Cardboard Boxes	210	Pound/lb	10
Aphalt Millings	Shoulder Repair	175	Tons	8
Woven Wire	Fence Reset	246	Linear foot/lft	11
Orange PVC Safety Fence	Environmental Sensitive Delineation	623	Linear foot/lft	28
<b>10-Reused Materials:</b>				
Aggregate Base Course	Aggregate Base Course	65,816	Tons	2,992
Concrete Pipe	Concrete Pipe	13,815	Linear Feet	628
Guardrail	Guardrail	99,087	Linear Feet	4,504
Refurbished Traffic Signal Heads	Traffic Signal Heads	11	Each	1
Sign Posts	Sign Posts	56,954	Each	2,589
Signal Heads	Signal Heads	1,155	Each	53
Signs	Signs	43,815	Each	1,992
Silt Fence and Posts	Silt Fence and Posts	2,550	Linear Feet	116
Steel Beams	Steel Beams	562,532	Pounds	25,570
Double Faced Concrete Barrier	Concrete Barrier	8,041	Linear Feet	366
Wooden Breakaway Posts	Guardrail Offset Blocks	11,409	Each	519
40' Signal Pole (wood)	Signal Pole Replacement	17	Each	1
LED Signal Lamps	Signal Repair	200	Each	9
Signal Cabinet	Signal Repair	3	Each	0
1" Rigid Pipe	Signal Repair	110	Linear Feet	5
Portable Concrete Barrier	Portable Concrete Barrier	55,672	Each	2,531
Timber Bridge Deck/Rail		4,200	Linear Feet	191
Wood Pallets	Wood Pallets	400	Each	18



# In 2010-2011, NCDOT recycled 706 tons of paper such as office papers, telephone books and cardboard.

## **NCDOT has embraced recycling throughout North Carolina.**

The growth in recycling programs throughout NCDOT reflects the common-sense instinct of its employees to conserve resources and save on operating costs in their own backyard. Transforming waste materials into useable resources supports our mission of connecting people and places in North Carolina — safely and efficiently, with accountability and environmental sensitivity.



## **NCDOT 2010–2011 Paper Recycling Program Environmental Impact**

- 4,941,440 gallons of water saved
- 2,878,036 kilowatt hours of energy saved
- 59,297 gallons of oil saved
- 2,329.53 cubic yards of land fill space
- 12,001 trees saved

**In 2010-2011, NCDOT recycled 54 tons of plastic such as jugs, buckets and bottles.**



**NCDOT Rest Areas make recycling opportunities easy for the general public. In 2010-2011, NCDOT Rest Areas recycled more than 77 tons of glass and plastic bottles, aluminum cans, newspaper, and cardboard.**



**REDUCE REUSE RECYCLE**

**In 2010-2011, NCDOT recycled 747,432 tons of waste such as oil, concrete, tires and asphalt.**



**REDUCE REUSE RECYCLE**

**In 2010-2011, NCDOT recycled 7,501 tons of organic material such as wood pallets, beams and mulch.**



**REDUCE REUSE RECYCLE**

**In 2010-2011, NCDOT recycled 67 tons of electronics such as computers, monitors and printers.**



**NCDOT also recycled 1,613 tons of metal such as highway signs and scrap metal that same year.**



**REDUCE REUSE RECYCLE**

# NCDOT Rail, Ferry and Aviation Divisions



The NCDOT Rail Division leads the way among alternative modes in reuse and recycling of materials. Rail Division recycle/reuse programs diverted over 190 tons of waste from the landfill as well as provided thousands of dollars in cost savings.



Reuse and Recycle programs in the Ferry and Aviation divisions keep their waste stream to a minimum.

**REDUCE REUSE RECYCLE**

# NCDOT Solid Waste Disposal and Cost Information July 1, 2010 - June 30, 2011

## **SOLID WASTE DISPOSAL AND COST INFORMATION**

1. Total tons of solid waste disposed of in land fills or by incineration  
**87,428**
2. Total costs for solid waste collection and disposal  
**\$ 3,147,426**
3. Total tons recycled or composted  
**757,406**
4. Total solid waste collection and disposal costs avoided through recycling and composting  
**\$ 27,266,616**
5. Total revenues from sale of recycled materials and compost products  
**\$ 505,270**

NCDOT's focus on waste management over the past year has moved towards implementing and educating employees on source reduction, reuse, and recycle practices. These practices have resulted in a significant reduction in our waste stream and a large increase in recycling numbers reported.

- **Expanding Facility Construction and Demolition Waste Reduction recycle program statewide.**
- **Increasing specifications to allow more reuse of asphalt, hot in-place recycling and Highway Construction and Materials System (HiCAMS) reporting.**
- **Eliminating mass printing of several manuals, documents and forms by placing them online for customers and employees.**