



**North Carolina Department of Transportation  
Value Management Office  
Resource Conservation Program**



# **Recycling and Solid Waste Management Report For Highway Construction and Maintenance Projects**



**State Fiscal Year 2018-2019**

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# North Carolina Department of Transportation Value Management Office Resource Conservation Program



## INTRODUCTION

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 State Fiscal Year 2018 (July 1, 2018 - June 30, 2019) as required by G.S. 136-28.8(g) and G.S.130A-309.14(3). These statutes mandate that the Department prepare an annual report on the amounts and types of recycled materials specified or used in construction and maintenance projects during the previous state fiscal year and review of bid procedures, respectively. The types of recycled materials incorporated into this report would routinely 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 use recycled materials in highway projects. All applications of recycled materials are to be consistent with economic feasibility, applicable engineering, and environmental quality standards. In addition, the Department continues to comply with Chapter 136 of the General Statutes to encourage the purchase or use of reusable, refillable, repairable, more durable and less toxic supplies and products. This report contains only those materials recycled on construction and maintenance projects and does not contain information about the recycling efforts of individual NCDOT offices and rest stops for common recyclable items such as paper, cardboard, plastics, aluminum cans, and batteries.

## RESEARCH

NCDOT is continuously looking for new and innovative ways to reuse materials, reduce waste, recycle used products, and use products comprised of recycled content. Last year, NCDOT became a partner state with the Recycled Materials Resource Center (RMRC). In order to improve the types of materials recycled, their quantities, and improve overall accuracy of data collection, the Value Management Office (VMO) recently presented a new research idea to the State Transportation Innovation Council (STIC). This was VMO's second year requesting funding from the STIC. Our current proposal includes several tasks, which include;

1. Working with NCDOT offices, contractors, and industry to recycle more materials
2. Developing standard recycling procedures and methods, and
3. Developing cost estimates to determine monetary savings (if any) realized by NCDOT due to the recycling of materials

Even though our current proposal was not funded through the STIC, our office is pursuing additional funding opportunities through the NCDOT Research and Development Office. The entire project is projected to take approximately 12 months to complete, once funded.

## BID PROCEDURE REVIEW

The Department continues to review bidding procedures and processes yearly, to encourage the purchase and use of recycled and reusable products and practices in construction and maintenance projects. The newest edition of the NCDOT Standard Specifications for Roads and Structures released January 2018. Specification 104-13



## North Carolina Department of Transportation Value Management Office Resource Conservation Program



encourages Contractors to not only use recycled or solid waste materials in their projects, but also allows them the opportunity to initiate and develop the use of recycled products and construction methods that promote sustainability. Furthermore, the contractor is required to report to the VMO any use of recycled materials by July 1 each year.

### DATA COLLECTION

The data included in this report comes from three separate sources;

1. HiCAMS (Highway Construction and Materials System) database,
2. Various NCDOT Offices (SharePoint form), and
3. Contractors (both paper and electronic formats).

The data for most of the recycled materials (by weight) listed in Table 1 were pulled from HiCAMS. The HiCAMS information, however, is not conclusive, as maintenance project materials are not included. The online data collection form that was implemented in SFY 2017 was adjusted to collect these materials that would not traditionally be found in HiCAMS. Contractor data reporting continues to be an area in which the value management office is working on additional methods to increase compliance. NCDOT Standard Specification 104-13 states that contractors are to report the quantities of reused or recycled materials for each contract and any practice that minimized the environmental impacts by July 1 each year, but the reporting response rate remains low.

The data reported in Table 1 is all rounded to the nearest whole number for each item. Several important points regarding data collection need to be made for clarification and consistency purposes.

1. The glass beads contained in pavement markings can/could be from recycled sources, however the exact percentage and quantity is not completely known. Therefore, the entire quantity of glass beads is currently listed as a recycled/recyclable product.
2. The plastics section (Section 6) includes products that both contain recycled components and includes products that could be recycled in the future. The plastic pipe component is composed of all dimensions and compositions of plastic pipe. The exact amount of recycled plastic and recyclable plastic cannot be determined given the limited amount of data present. Therefore, all plastic pipe types and sizes were combined in a single category.
3. For Section 8 (Metals), this section is presumed to be composed of steel. However, various grades and types of steels are included, and our office cannot verify that this section does not include other metals. Furthermore, the materials listed do not specify a recycled content amount. The materials are included as a product that will be, or could be recycled in the future, and one that contains an unknown quantity of recycled metals presently. It is therefore included as both a recyclable product and a recycled product.



## North Carolina Department of Transportation Value Management Office Resource Conservation Program



4. Scrap metal is listed as one-line item, some of the scraps are presumed to be recycled guardrail, sheet piles, and pipes, but their individual amounts cannot be determined.
5. Sign posts are listed under the misc. section rather than the metals section because our office cannot verify that all of the sign posts are metal, rather than a mix of wooden and metal posts. Most of the posts are presumed to be metal.

**Table 1: NCDOT Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects**

Product Category and Description	Usage	Quantity	Unit of Measure
<b>1-Asphalt:</b>			
Reclaimed Asphalt Pavement (RAP)	Asphalt Mix Additive	9,233,899 <sup>^</sup>	Tons
Reclaimed Asphalt Shingles (RAS)	Asphalt Mix Additive	3,120,984 <sup>*</sup>	Tons
<b>2-Organics:</b>			
Mulch	Wood	19,433	Cubic Yards
Mulch	Hydromulch	1,136	Bales
Compost Material	Soil Amendment	3,425	Cubic Yards
<b>3-Coal Combustion Products:</b>			
Fly Ash	Concrete Mix Additive/Fill	153,565 <sup>*</sup>	Tons
<b>4-Concrete:</b>			
Recycled Concrete	ABC/Fill Material/Base Material	1,335	Tons
<b>5-Glass:</b>			
Glass Beads	Pavement Markings	14,585 <sup>*</sup>	Tons
<b>6-Plastic:</b>			
Plastic Offset Blocks	Guardrail Offset Blocks	543,677 <sup>*</sup>	Each
Plastic Pipe (All Types and Sizes)	Pipe	167,701 <sup>*</sup>	Linear Feet
Type III Barricades		46,594 <sup>*</sup>	Linear Feet
<b>7-Rubber:</b>			
Tire Sidewalls	Traffic Drum Ballast	36,089 <sup>*</sup>	Each
<b>8-Metals:</b>			
Cable Guiderail		760,320 <sup>^</sup>	Linear Feet
Steel Beams		50	Each
Metal Pipe		500	Linear Feet
Scrap Metal		235,080	Tons
Guardrail		567,920 <sup>^</sup>	Tons
Sheet Piles		7,354	Square Feet
<b>9-Misc. Materials:</b>			
Signs		120,259	Square Feet
Signal Heads		270	Each
Silt Fence Posts		22,888	Each
Sign Posts		15,157	Each
Wood Pallets		40	Cubic Yards
Composite Blocks		457	Each

<sup>\*</sup> Data pulled from HiCAMS as of 9/10/2019

<sup>^</sup> Data pulled from HiCAMS combined with data reported by NCDOT field offices



# North Carolina Department of Transportation Value Management Office Resource Conservation Program



## **FUTURE WORK**

Future data collection and reporting efforts will include several updates to the current data collection and reporting format. These planned changes include;

- Implementing any changes to the materials being recorded due to future research project outcomes
- Adding charts/graphs of the past several reports recycling totals to depict recycling trends in such products over time
- A separation into three separate and distinct tables products that are considered
  - Products currently recycled by NCDOT
  - Recyclable products that can/could be recycled in the future
  - Products which were recycled by other entities in conjunction with NCDOT projects
- Modifying the online SharePoint submission form to include a dropdown list of every NCDOT office, and add/remove products based upon future research project outcomes
- Developing a better method to ensure greater data reporting compliance amongst NCDOT offices and contractors regarding the reporting of recycled/recyclable materials