North Carolina Department of Transportation
Materials and Tests Unit
Resource Conservation Program

Recycling and Solid Waste Management Report For Highway Construction, Maintenance Projects, and Office Products

State Fiscal Year 2019-2020

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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 (FY) 2020 (July 1, 2019 - June 30, 2020) 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 Statues to encourage the purchase or use of reusable, refillable, repairable, more durable, and less toxic supplies and products.

This report historically only contained those materials recycled on construction and maintenance projects and did not contain information about the recycling efforts of individual NCDOT offices and rest areas for common recyclable items. However, to streamline data collection efforts and reduce possible data duplication, this report now incorporates data from the former NCDOT “3R Report.” Starting with this FY report and subsequent future annual reports, these common recyclable items such as glass, plastics, aluminum cans, office paper, etc. that were reported separately in the “3R Report”, will be included in this annual report. Requirements for the submission of the “3R Report” are required by G.S. 130A-309.07 through 309.14, G.S. 143-58.2(f) and Executive Order (EO) 156.

Lastly, prior Resource Conservation Program (RCP) Reports were issued from the NCDOT Value Management Office (VMO), under the guidance of the State Value Management Engineer. In January 2020, the VMO was reorganized and the RCP was moved under the supervision of the NCDOT Materials and Tests (M&T) Unit.

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. To improve the types of materials recycled, their quantities, and improve overall accuracy of data collection, the RCP Program Engineer has been seeking funding opportunities for a new research idea. However, due to recent events regarding the COVID-19 situation and current funding limitations, further pursuit of this proposed research project has been put on hold. The RCP Program Engineer will continue to evaluate possible changes to the composition of the recycled material data collected without a formal research project.

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. Section 104-13 of the NCDOT Standard Specifications for Roads and Structures 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 M&T any use of recycled materials by July 1st each year.

DATA COLLECTION

Since the old "3R Report" was incorporated into the data collection and reporting function of this report, a new webform was needed to incorporate the new data types. The new webform was separated into two sections, one for the "construction and maintenance," data, and one for "DOT/DMV Offices and Rest Areas" data (formerly "3R Report" data). NCDOT IT finished the new webform on August 14th, and data collection efforts began on August 21st.

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

1. HiCAMS (Highway Construction and Materials System) database,
2. Various NCDOT Offices (new 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 many county maintenance project materials are not included. The online data collection form that was implemented in FY 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 RCP Program Engineer is working on additional methods to increase compliance. NCDOT Standard Specification Section 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 1st each year, but the reporting response rate remains low.

The data reported in Table 1 are all rounded down 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 come 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 contain recycled components and 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. The Metals section (Section 8) 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.
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 quantities cannot be determined.

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

Product Category / Description	Quantity	Unit of Measure
1-Asphalt:		
Reclaimed Asphalt Pavement (RAP)	7,331,426^	Tons
Reclaimed Asphalt Shingles (RAS)	2,773,189*	Tons
2-Organics:		
Mulch (wood)	3,356	Cubic Yards
Mulch (hydromulch)	628	Bales
Compost Material	393	Cubic Yards
Earth/Soil Fill (not for compost)	482	Tons
Vegetative Debris (not for compost)	157	Tons
Silt Fence Posts	10,949	Each
Scrap Wood/Lumber	35,918	Pounds
Wood Pallets	8,640	Pounds
Timber Piles/Posts	18,740	Pounds
3-Coal Combustion Products:		
Fly Ash	70,003*	Tons
4-Concrete:		
Recycled Concrete	29,519	Tons
5-Glass:		
Glass Beads	31,972^	Tons
6-Plastics:		
Plastic Offset Blocks	429,032*	Each
Plastic Pipe (All Types and Sizes)	274,058*	Linear Feet
Type III Barricades	41,858*	Linear Feet
7-Rubber:		
Tires – Sidewalls	70,252^	Each
Tires – Miscellaneous	34,140	Pounds
8-Metals:		
Steel Beams	4,137	Each
Scrap Metal	312	Tons

Cable Guiderail	1,080,642^	Linear Feet
Guardrail	531,348^	Tons
Signposts	56,731	Each
Paint Cans	418	Pounds
Signs	44,063	Pounds
9-Miscellaneous:		
Signal Heads	203	Each
Construction and Demolition Debris	17,500	Pounds
Comingled Construction Items	2,460	Pounds
Composite Blocks	187	Each

** Data pulled from HiCAMS as of 9/16/2020*
^ Data pulled from HiCAMS and combined with data reported by NCDOT field offices

The data reported in Table 2 are all rounded down to the nearest whole number for each item. Several offices and rest areas report their recycling report data as comingled recycling. As such, it is not possible to determine the quantities of each constituent material, and therefore a "comingled" product line was listed in Table 2.

Table 2: NCDOT Recycled Materials from NCDOT Offices and Rest Areas (formerly the "3R Report" data)

Product Category	Quantity	Unit of Measure
Office Paper	50,097	Pounds
Aluminum Cans	21,136	Pounds
Plastic - Soda/Drink Bottles	14,067	Pounds
Plastic - All Other	5,514	Pounds
Glass Bottles	7,209	Pounds
Cardboard	21,774	Pounds
Fluorescent Light Bulbs	104	Each
Appliances	2	Each
Toner Cartridges	692	Each
Petroleum Products	53,358	Gallons
Pesticide Containers	617	Each
Batteries	21,446	Pounds
Comingled Recycling	105,956	Pounds

FUTURE PLANNED WORK

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

- Adding charts/graphs of the past several reports' recycling totals to depict recycling trends in such products over time
- A separation into three distinct tables the following product categories:
  - 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
- Developing a better method to ensure greater data reporting compliance amongst contractors regarding the reporting of recycled/recyclable materials used on projects.