



North Carolina Department of Transportation Materials and Tests Unit 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 (NCDOT) for State Fiscal Year (FY) 2022 (July 1, 2021 - June 30, 2022) as required by NC General Statute (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 if not reused/recycled, compounding the problem of declining space in landfills, and resources.

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, where possible. 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.

In addition to recycled/recyclable materials from Department construction and maintenance activities, this report also contains information regarding common recyclable items such as glass, plastics, aluminum cans, office paper, etc. that were previously reported separately. Requirements for the submission of this office and rest area data are required by G.S. 130A-309.07 through 309.14, G.S. 143-58.2(f), and Executive Order 156.

One new component that is now being included in this annual report is the addition of recycling data from the NCDOT Roadside Environmental Unit's (REU) Litter Cleanup Programs. There are a total of five programs that remove both litter and recyclable materials that are collected along the Right-of-Way of various NCDOT roadways every year. Only the recycled portion of which is being reported here.

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 Resource Conservation Program (RCP) Engineer has been seeking funding opportunities for new research ideas. 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 Engineer will continue to evaluate possible changes to the composition of the recycled material data collected without a formal research project.



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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 promotes sustainability. Furthermore, the contractor is required to report the use of recycled materials by July 1st each year.

DATA COLLECTION

All offices submitted data for this report via an online webform. The online [webform](#) is separated into two sections, one for the “construction and maintenance” data, and one for “DOT/DMV Offices and Rest Areas” data (formerly the “3R Report”).

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

1. HiCAMS (Highway Construction and Materials System) database,
2. Various NCDOT Offices (entered in a SharePoint form), and
3. NCDOT Roadside Environmental Unit’s Litter Cleanup Programs

The data reported in Table 1 from HiCAMS is denoted by an asterisk (*). HiCAMS is NCDOT’s main repository of project and material level information. 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 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. This is the first year that Reclaimed Asphalt Pavement (RAP) quantities and Reclaimed Asphalt Shingles (RAS) quantities are being reported as one item. This is necessary since changes were made to NCDOT’s HiCAMS database that now require the combined reporting of these two constituents.
2. The glass beads (Section 5) 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.
3. The Plastics section (Section 6) includes products that contain recycled components and products that could be recycled in the future. The plastic pipe



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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.

4. 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 such as Aluminum. 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.
5. Scrap metal is listed as one line item in Section 8; some of the scraps are presumed to be recycled guardrail, sheet piles, and pipes, but their individual quantities cannot be determined at this time.
6. Section 3 (Coal Combustion Products) contains Fly Ash quantities that are derived from HiCAMS, but do not currently include those quantities that are included in concrete mix designs, and any that may be contained in pre-cast concrete pipes or structural elements.

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)	1,975,724*	Tons
Reclaimed Asphalt Shingles (RAS)		
2-Organics:		
Mulch (wood)	22,955	Cubic Yards
Mulch (hydromulch)	7,275	Bales
Earth/Soil Fill (not for compost)	54,003	Tons
Vegetative Debris (not for compost)	43	Tons
Silt Fence Posts	8,570	Each
Scrap Wood/Lumber/Piles/Posts	618	Tons
Wood Pallets	25	Each
Sign Posts	2,282	Each
3-Coal Combustion Products:		
Fly Ash	80*	Tons
4-Concrete:		
Recycled Concrete	1,233,178	Tons
5-Glass:		
Glass Beads	7,998^	Tons
6-Plastics:		
Plastic Guardrail Offset Blocks	273,219*	Each
Plastic Pipe (All Types and Sizes)	186,256*	Linear Feet
Type III Barricades	30,361*	Linear Feet
7-Rubber:		
Tire Sidewalls	65,840^	Each



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Miscellaneous Rubber	27	Tons
8-Metals:		
Steel Beams	851	Each
Signal Heads	140	Each
Scrap Metal	588	Tons
Cable Guiderail	398,561 [^]	Linear Feet
Guardrail	395,491 [^]	Linear Feet
Signposts	46,051	Each
Signs	44	Tons
Sheet Piles	33	Tons
9-Other:		
Comingled Items	37	Ton

(*) Data pulled from HiCAMS as of 9/13/2022

(^) Data pulled from HiCAMS and combined with data reported by NCDOT field offices on 9/23/2022

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 is 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	55,443	Pounds
Aluminum Cans	14,219	Pounds
Plastic - Soda/Drink Bottles	21,344	Pounds
Plastic - Other than Bottles	26,743	Pounds
Glass Bottles	7,424	Pounds
Cardboard	214,130	Pounds
Fluorescent Light Bulbs	365	Each
Appliances (Various)	6	Each
Toner Cartridges	842	Each
Petroleum Products	14,242	Gallons
Pesticide Containers	1,265	Each
Batteries	29,539	Pounds
Comingled Recycling	29,782	Pounds

The total weight of office and rest area recycling is 398,624 pounds. This total does not include items for which the unit of measure for a recycled item was listed as each or gallon. Table 3 contains the reported recycling data from the NCDOT Roadside Environmental Unit’s various litter cleanup programs.



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Table 3: Comingled Recycling from NCDOT Roadside Environmental Unit’s Litter Cleanup Programs

REU Program	Quantity (lbs.)
Adopt-A-Highway	87,255
Contracted Removal	145,410
NCDOT Personnel	21,105
Sponsor-A-Highway	170,925
Other	2,895
Total	427,590

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 and graphs of the past several reports’ recycling totals to depict recycling trends in such products over time
- A separation into three distinct tables of 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
- Modifying the data inputs and reporting capabilities of the NCDOT HiCAMS system to better capture constituent data, and thereby increasing the granularity of data included in this report.
 - The Fly-Ash category will be changed to incorporate fly-ash used in all concrete mixes and pre-cast elements
 - The RAP and RAS will eventually be separated out into two different constituents again
 - Additional changes may occur to the reporting of recycled concrete and glass beads constituents as well