

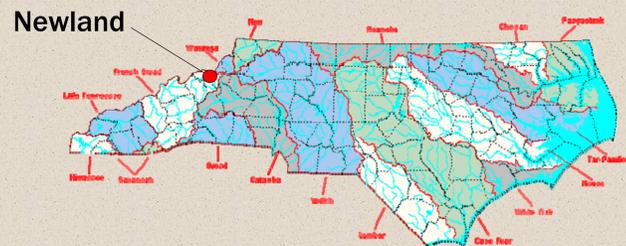
Constructed Storm Water Wetland and Stream Stabilization in Newland, North Carolina

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Background

In Fall 2007, a stormwater wetland and stream stabilization project was completed in the Town of Newland, North Carolina. The Town owned a vacant 10.4-acre parcel in the floodplain along the North Toe River adjacent to the downtown area. Extension Associates with the Department of Biological and Agricultural Engineering at North Carolina State University (NCSU) designed a stormwater wetland to treat runoff from a 17-acre catchment that includes a portion of downtown Newland. NCSU also designed streambank stabilization measures for eroding areas on the North Toe River. Funding was provided by the North Carolina Department of Environment and Natural Resources (DENR) Division of Water Resources



Project Location Map

Site Conditions

Prior to the stormwater wetland installation, stormwater from roof tops, roads, and parking lots was discharged without treatment to the North Toe River, causing erosion and degrading water quality.



Portion of Wetland Catchment Area



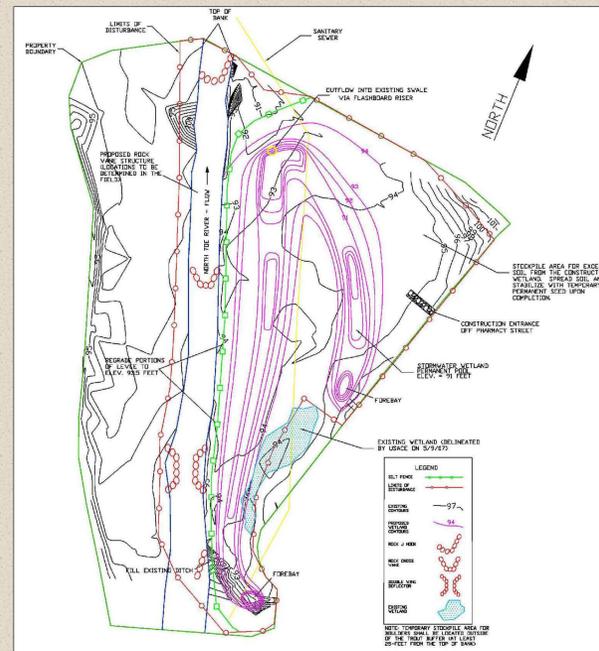
Eroding Streambank

Design and Permitting

A stormwater wetland is an example of an end of the pipe, best management practice (BMP) retrofit. It treats pollutants carried in stormwater such as sediment, phosphorous, nitrogen, and bacteria and also reduces peak discharge, minimizing erosion downstream.

The 1.4-acre wetland in Newland was designed to capture and treat the runoff produced by the first flush (precipitation = 1.2 inches). The outlet structure was designed to draw down this volume of water over a 72-hour period to optimize the stormwater treatment. An emergency spillway was designed to convey and discharge the runoff from significant rainfall events (>2 year storm) at non-erosive velocities.

Streambank stabilization structures such as rock vanes, j hooks, and deflectors were located to protect infrastructure, provide public access, reduce near bank shear stress, and improve instream habitat.



Plan Sheet

Permits were obtained from the following agencies:

- US Army Corps of Engineers – Nationwide 27 permit
- NC DENR Division of Water Quality – 401 Water Quality Certification
- NC DENR Division of Land Quality – Erosion and Sedimentation Control and Trout Buffer Variance

Implementation

Wetland



Before Construction

During Construction



Planting

After Construction

Streambank Stabilization



J Hook Located at the Downstream Extent of the Project

Future Plans

- Sample the inlets and outlet of wetland to determine pollutant removal efficiencies
- Develop trail system, educational signage, and install a fishing pier
- Utilize the site as a model for surrounding communities to learn about stormwater best management practices and water quality