

Memorandum

Date: April 13, 2021

To: S. Douglas Hokuf, Jr., P.E.
John J. Gysling, P.E. CFM
New Castle County

From: Greg Hoffmann, P.E.
Center for Watershed Protection, Inc.

Re: Analysis of Proposed New Castle County
Drainage Code



3290 NORTH RIDGE RD, SUITE 290
ELLICOTT CITY, MD 21043

Per your request, the Center for Watershed Protection, Inc., (CWP) has analyzed some of the requirements in the proposed New Castle County Drainage Code in order to determine how much environmental benefit might be realized with implementation of the proposed code. CWP focused its analysis on three specific aspects of the code:

- Elimination of the standard plan compliance option for non-residential redevelopment projects.
- For redevelopment projects, application of the resource protection event (RPv) requirements to 50% of the pre-developed impervious coverage, rather than the current 15%.
- Requirement that developments within areas subject to Water Quality Improvement Plans (WQIPs) meet all Total Maximum Daily Load (TMDL) requirements.

In order to do the analysis, CWP reviewed a sampling of past development plans approved in 2019 and 2020 and calculated the increased pollutant removal (nitrogen, sediment, and phosphorus) that would have been achieved if the past plans had been required to meet the proposed stormwater regulations.

Standard Plans

For standard plans, CWP looked at 25 non-residential redevelopment projects from 2019 and 2020 that qualified for Standard Plans because they disturbed less than one acre of land. Minimal stormwater management was required for these sites when they were originally reviewed and approved. For this analysis, rather than treating them as standard plans, CWP applied the proposed redevelopment standards, applying the resource protection event (RPv) to all new impervious cover and 50% of the existing impervious cover. CWP combined the 25 sites into one composite site with 17.13 acres of disturbance, 6.85 existing impervious acres and 10.49 proposed impervious acres. CWP input these areas into the current version of the DURMM spreadsheet, assuming that 50% of the composite site is on Type B soils, 25% is on Type C soils, and 25% is on Type D soils, which roughly aligns with the soil type distribution in the developed portions of New Castle County. To treat the RPv for this composite site requires a runoff reduction volume of 0.56 inches, or 34,405 cubic feet (Incidentally, if only 15% of existing impervious needed to be treated, the runoff reduction volume would be reduced to 23,712 cubic feet).

To treat the required runoff reduction volume, CWP added a theoretical bioretention area with a storage volume of 34,405 cubic feet to the DURMM spreadsheet, yielding a 38% runoff reduction and 38% pollutant removal for nitrogen, phosphorus, and sediment.

- Nitrogen removal: 101.24 pounds per year
- Phosphorus removal: 17.64 pounds per year
- Sediment removal: 3,248 pounds per year

These removals would represent an annual benefit. If best management practices such as the theoretical bioretention area had been installed to treat runoff from these 25 sites, the pollutant removals would occur each year, with runoff reduction and pollutant removal benefits accruing continuously to improve water quality. To put these removal totals into context, they equate the complete treatment of the pollutant loads from 4.28 acres of impervious cover.

Detailed Plans

For detailed plans, CWP looked at 8 projects from 2019 and 2020 that qualified as Detailed Plans and were located in the Christina River or Dragon Run watersheds, both of which have WQIPs and TMDLs for nitrogen and phosphorus (Note: CWP also looked at the redevelopment rule change for these projects, but found that the TMDL compliance requirement generally requires a higher standard of treatment.). The 8 projects had a total of 37 drainage areas and 370.84 acres of disturbed area. For each drainage area, CWP compared the nitrogen and phosphorus loads produced by the proposed plan (as reported in their DURMM submission) with the TMDLs for the watersheds. For the Christina River (7 projects), the nitrogen TMDL is 5.70 pounds per acre per year, and the phosphorus TMDL is 0.35 pounds per acre per year. For the Dragon Run watershed (1 project), the nitrogen TMDL is 5.30 pounds per acre per year, and the phosphorus TMDL is 0.28 pounds per acre per year.

If these 8 projects had been designed to meet their watershed's TMDLs, pollutant removals would have increased significantly:

- Increased nitrogen removal: 2,122.95 pounds per year
- Increased phosphorus removal: 569.63 pounds per year

These pollutant removal totals equate to the complete treatment of the pollutant loads from 137.59 acres of impervious cover. As additional WQIPs are approved, the number of sites providing increased pollutant removal and the number of watersheds experiencing the benefits will both increase.

Conclusions

From this analysis, it is clear that New Castle County's proposed Drainage Code would increase the stormwater standards for development which would lead to a significant reduction in nitrogen, phosphorus, and sediment discharges from developed properties. These three pollutants are common causes of water quality impairments in the mid-Atlantic region, as evidenced by the many TMDLs created for them for the region's water bodies. It is therefore not difficult to conclude that the proposed Drainage Code could lead to tangible and measurable improvements in the water quality of the County's streams and rivers. While the extent of that improvement depends on many factors, including the rate and type of development that occurs in the future, greater regulation of small redevelopment sites that used to qualify for Standard Plans and TMDL compliance requirement for sites in certain watersheds will certainly lead to water quality improvements and reduce the burden on New Castle County to implement water quality retrofits.