

CASE STUDY

Montgomery County, MD



Exceeding TMDL Requirements for Nutrient and Sediment Reductions in Maryland with CMAC

The Challenge

Located in the Chesapeake Bay Watershed and bordering Washington, DC, Montgomery County is one of the first Phase I MS4s nationwide to implement a stormwater management program in 1972. Faced with decades of urbanization with the pressures of higher runoff volumes, outdated infrastructure and water quality challenges, the County needed an innovative approach to tackle its 20% impervious area restoration goal, including EPA's Chesapeake Bay TMDL requirement to restore over 3,700 impervious acres to reduce nutrients and sediment. The County also needed to minimize cost and community disruption.

The Solution

Montgomery County innovated its approach to stormwater management by retrofitting existing ponds with Opti's digital solutions platform, continuous monitoring and adaptive control (CMAC). Opti's CMAC predicts and responds to the weather forecast, enabling the system to maximize storage capacity and retention time.

By using predictive analytics and real-time data, Opti's platform provides substantial cost savings and pollutant removal to enhance efficiencies and effectiveness compared to other solutions.

At a Glance

- 95% cost savings over other water quality projects
- Total pollutant removal averaged: 80% TSS, 29% TP and 29% TN

“Opti's CMAC is as an advantageous and cost-effective tool to attain multiple environmental objectives and help meet MS4 permit requirements”

Leying Zhang, P.E., PhD
Senior Engineer,
Montgomery County, MD



ECONOMICAL

95% Savings

\$22k vs. \$200k per acre



RESILIENT

86% Wet Weather Capture

Wet pond performance



PEACE OF MIND

Regulatory Compliance

Achieve MS4 nutrient and sediment goals

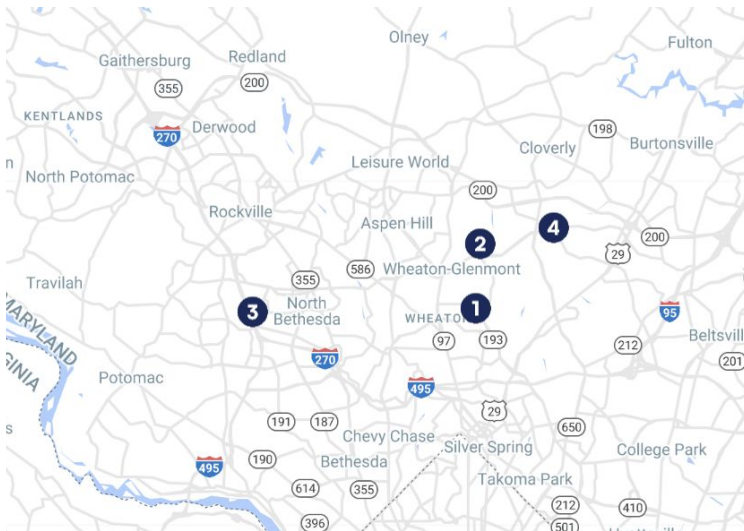
Results

To date, Montgomery County has retrofitted four ponds with Opti's CMAC and, in May 2024, extended the program for ten additional years to reduce stormwater pollution and improve water quality.

One large regional wet pond (440 acres of area) was retrofitted and now controls over 12 acre-feet of storage, which generated 123 Impervious Area Credits (IACs) and has reduced wet weather outflow by 86%. The cost per credit was only \$976.

Retrofitting three small extended detention dry ponds that previously provided no water quality treatment resulted in additional IACs averaging \$21,645/credit. Total pollutant removals averaged 80% for TSS, 29% for TP, and 29% for TN.

Together, these four ponds generate 151.6 IACs toward Chesapeake Bay TMDL requirements, achieving over 95% cost savings compared to other water quality projects. CMAC is now an integral part of the County's stormwater management action plan, including its Clean Water Montgomery initiative for restoration of local waters and long-term resilience.



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About OptiRTC

Opti is the leading provider of digital adaptive stormwater control solutions. With over 300 deployments to date, Opti empowers customers and partners to address the impacts of climate change, aging infrastructure, urbanization, and water pollution, enabling them to secure the sustainability of our communities and natural resources. Opti's cloud-based platform optimizes stormwater asset performance through instant actionable insights to provide economic savings, resilient solutions, and peace of mind. With our commitment to innovation, we are driving a resilient and brighter future for all.

Estimate Water Quality Credit for Pond Retrofits in Maryland Using Opti's Calculator

Opti's tool helps you make preliminary assessments of existing facilities to determine suitability and potential benefits of a CMAC dry or wet pond retrofit. Learn more at optirtc.com.

Regulatory Approvals

In 2016, National Fish and Wildlife Foundation selected a regional wet pond in Montgomery County to evaluate CMAC efficacy for sediment and nutrient reduction. Success led to the **Maryland Department of Environment (MDE) approving Opti's CMAC for wet pond retrofits** to meet MS4 permit water quality restoration requirements. Results also led to the **Chesapeake Bay Program's** Urban Stormwater Group Expert Panel unanimous endorsement of the use of CMAC retrofits for pollutant removal credits.

Through a national program sponsored by Water Environment Federation and Water Environment Research Foundation, the County then identified 10 stormwater ponds for potential retrofit and secured funding for four projects. Results provided evidence for **MDE's approval of CMAC for dry pond retrofits** to meet MS4 water quality restoration requirements. The County continues to expand and model pond retrofits using CMAC technology, whose efficacy it helped demonstrate for regulators. Read about Opti's approvals at optirtc.com.

- 1 University Blvd Wet Pond
- 2 Randolph Dry Pond
- 3 Bethesda Dry Pond
- 4 Broadmore Dry Pond



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