

Integrated Planning in Action

Integrated Plan and 2015 WWMP Update Report

Columbus, Ohio

The Scioto River with Columbus Skyline.
Photo courtesy of City of Columbus.

Columbus is the capital of Ohio and has a population of nearly 900,000. The city operates separate sanitary, combined, and storm sewers that discharge to the Scioto and Olentangy Rivers. The separate sanitary and combined sewer systems connect to two wastewater treatment facilities that discharge into the Scioto River. The river runs through the middle of downtown Columbus. In 2015, Columbus opened the “Scioto Mile”—a massive project to rehabilitate the river that included habitat restoration, miles of trails, and 33 acres of new parkland.

Challenges

During heavy storms, stormwater and groundwater enter Columbus’s sanitary sewer system through cracks and improper connections (i.e., infiltration and inflow). This leads to sewage releases in the form of sanitary sewer overflows (SSOs) and backups into basements. In addition, large storms cause combined sewer overflow (CSOs) and bypasses at the wastewater treatment facilities. These overflows and bypasses lead to the discharge of sewage and partially treated wastewater into the Scioto and Olentangy Rivers. Both wastewater treatment facilities have permits that require the city to control these discharges. Columbus also has a stormwater permit that requires the city to implement a management plan to improve stormwater quality. All three permits implement total maximum daily loads (TMDLs) for bacteria, nutrients, sediment, and total suspended solids.

Columbus agreed to eliminate SSOs and basement backups and to address CSOs in two separate consent orders, filed with the Ohio Environmental Protection Agency (EPA) in 2002 and 2004. To meet all the consent order requirements, the city developed a combined Wet Weather Management Plan (WWMP) in 2005, which had an implementation cost of \$2.5 billion over 30 years.

Integrated Planning in Action

In 2012, the city began an integrated planning process to update the 2005 WWMP and consider more beneficial and cost-effective solutions to address SSOs, CSOs, and stormwater pollution. Columbus used a city-wide engagement approach, called Blueprint Columbus, to educate residents about sewer overflows, get feedback on proposed options, and improve outreach to homeowners. The city also created a community advisory panel to provide guidance during the development of the plan. Planners developed and analyzed two options for updating the 2005 WWMP:

- A “Blueprint” option that focused on reducing the sources of infiltration and inflow and implementing green infrastructure in certain areas of the city (see box on below).

**BLUE
PRINT**
COLUMBUS

Clean streams.
Strong neighborhoods.

EPA Region 5

900,000 population



- A “gray” option that focused on managing a likely increase of flows over time. This option would use tunnels for excess storage, increase the size of sewer pipes, and clean and line pipes to transport and minimize sewer overflows.

Columbus first compared how well the options could achieve compliance goals, additional water quality improvements, regional economic benefits and job creation, neighborhood benefits, and sustainability. In addition to meeting all water quality compliance obligations, green infrastructure in the Blueprint option would achieve a greater reduction in overflows and remove an estimated 342 tons of sediment each year. Columbus also estimated that the city’s investment in maintaining private laterals would save homeowners \$453 million, and that the Blueprint option would create more than 700 jobs over 20 years.

Next, Columbus evaluated how the cost of the two options would affect water and sewer bills, particularly for households with lower income. Analysis showed that even with a faster 20-year implementation schedule, the Blueprint and gray options would require lower rate increases than the 2005 WWMP, which had a 30-year schedule.

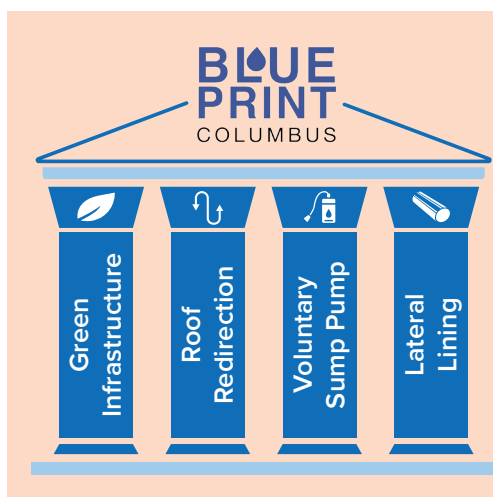
After considering implementation schedules, Columbus tabulated how much each option would cost in total over 20 years. The city determined that the Blueprint option would be more expensive than the gray option. However, it chose to invest the additional funds

because of the stormwater quality benefits and the larger reduction in overflows that the Blueprint option would achieve.

Columbus estimated that revising the 2005 WWMP using the Blueprint option would require capital costs of \$1.74 billion, with an estimated operation and maintenance cost of \$60 million over 20 years (through 2035). The capital cost estimate includes \$400 million for some projects identified in the 2005 WWMP, including adding a process to partially treat bypasses at the wastewater treatment facility, and \$1.3 billion for new green infrastructure and infiltration and inflow reduction projects.

Results

In 2015, Columbus finalized its *Integrated Plan and 2015 WWMP Update Report*. The Ohio EPA approved the plan that same year and incorporated it into one of the city’s existing wastewater treatment facility permits. Columbus has made significant progress in implementing the plan’s “pillars,” which include installing more than 400 rain gardens along roadways and parking lots, more than 30,000 square feet of porous pavement, and 350 private sump pumps—along with assessing more than 670 homes (25 percent of the target number) for improvements to reduce infiltration and inflow. As a result, the city experienced 30 percent fewer SSOs in 2019 than in the previous year, despite above-average precipitation.



Four Pillars of the Blueprint Option

- Installing green infrastructure (rain gardens and porous pavement) to help slowly filter water
- Redirecting downspouts so runoff from roofs goes into the storm sewer
- Installing sump pumps to direct excess groundwater to the storm sewer and keep it from getting into the sanitary sewer
- Lining pipes (specifically, “laterals” that connect homes to the sewer main) to reduce infiltration through cracks