

Integrated Planning in Action

Columbia Wastewater and Stormwater Integrated Management Plan

Columbia, Missouri

Hinkson Creek shows off its autumn colors. Photo courtesy of City of Columbia.

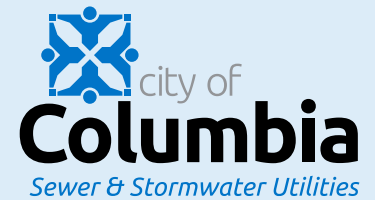
Columbia is Missouri’s fourth largest city, with a population of about 120,000. It is located near the geographic center of the state and is well known for its urban streams and lakes. Columbia manages its wastewater through a separate sanitary sewer that the city owns and operates. It transports sewage to the city’s wastewater treatment facility¹, which discharges to the Eagle Bluffs Conservation Area—a large wetland that eventually drains into the Missouri River. Columbia also operates a storm sewer system² that is permitted jointly with Boone County and the University of Missouri. The storm sewer system discharges to Missouri River tributaries, including Hinkson Creek, which runs through Columbia and features several trails and parks along its path.

Challenges

During heavy storms, stormwater and groundwater enter Columbia’s sanitary sewer system through cracks and improper connections (i.e., infiltration and inflow). This leads to sanitary sewer overflows (SSOs) that discharge sewage to the city’s waterways, and it causes sewage to back up into basements. In 2011, the Missouri Department of Natural Resources (MDNR) initiated enforcement negotiations with the city to address SSOs. Around the same time, MDNR and U.S. Environmental Protection Agency (EPA) developed a total maximum daily load (TMDL) for Hinkson Creek for biological impairment, an indication that pollution is negatively affecting aquatic life in the water body. This is in part due to stormwater discharges from Columbia, the University of Missouri, and Boone County. In 2013, the city invested \$64 million to expand and upgrade its wastewater treatment facility to meet new permit limits for ammonia. The city anticipated that more nutrient, bacteria, and dissolved oxygen limits would be incorporated into the wastewater

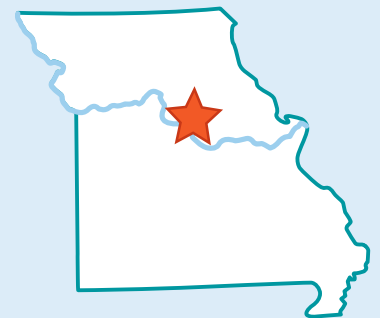
¹ “Wastewater treatment facilities” (WWTFs) is a generic term for facilities that treat or manage wastewater, including publicly owned treatment works.

² Storm sewers and storm sewer systems can also be referred to as municipal separate storm sewer systems (MS4s). Stormwater discharge permits can be referred to as MS4 permits.

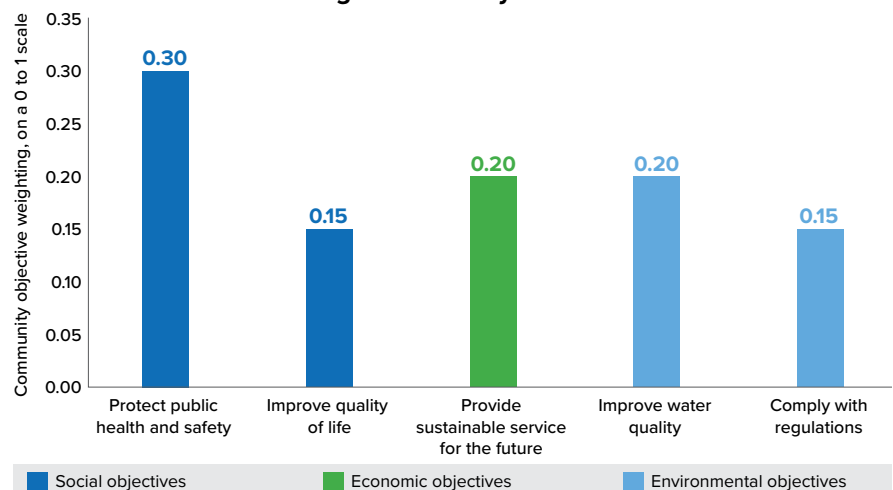


EPA Region 7

120,000 population



Triple Bottom Line Weighted Criteria Developed Through Community Outreach



treatment facility permit during future permit terms that would cost another \$40 million.

Integrated Planning in Action

In 2017, Columbia and MDNR agreed that the city would develop an integrated plan to prioritize wastewater and stormwater improvements for consideration in future regulatory decisions (graphic above). The city hosted a two-day workshop with representatives from various city departments, the University of Missouri, Boone County, and the Boone County Regional Sewer District to develop goals for the integrated plan and strategies to meet those goals. The city kept the public engaged throughout the planning process by distributing fact sheets, developing a project website, issuing press releases, posting updates on social media, developing an online survey, and conducting community workshops. Through these workshops, the city developed community objectives to be used when evaluating plan options (see box to right).

Columbia developed three funding levels, each with a combination of sanitary sewer collection system, wastewater treatment facility, and storm sewer system projects that met or exceeded existing Clean Water Act obligations. The funding levels represented incremental amounts of infrastructure service, community expectations, and anticipatory project commitments:

- Level 1: Projects to meet community expectations and current Clean Water Act requirements.
- Level 2: All projects from Level 1 plus other infrastructure commitments to meet known future Clean Water Act requirements.
- Level 3: All projects from Level 2 plus additional projects that meet all anticipated future infrastructure needs and Clean Water Act requirements.

After outlining the three funding levels, city staff calculated a total benefit score for each suite of projects that represented the anticipated value they would produce for the community. Community priorities established throughout the outreach program formed the basis for the scoring criteria and process. The city then conducted a benefit-cost analysis for each suite of

Community Objectives for Columbia's Integrated Planning Process

- Meet Clean Water Act requirements
- Protect important regional waterbodies
- Protect or improve water quality in city streams
- Provide services to growing areas
- Improve services to underserved and redeveloping areas
- Renew systems beyond effective life
- Reduce potential for property damage
- Provide community-wide benefits
- Reduce safety hazards from system failures

projects under each level. Based on this comparison, the city determined that it would be most cost effective to create an optimized suite of alternatives composed of wastewater treatment facility and collection system projects from Level 1 and stormwater projects from Level 2.

Columbia preferred this optimized program portfolio for its integrated plan. The city estimated that its plan would require \$1.02 billion over 20 years for capital and programmatic costs. To ensure affordability and produce the greatest possible benefits to human health and water quality, the plan proposed revising assumptions every 5–10 years for project costs, implementation dates, socioeconomic conditions, and regulatory requirements.

Results

The *Columbia Wastewater and Stormwater Integrated Management Plan* was adopted by the Columbia City Council in 2019 and implemented in the wastewater treatment facility and storm sewer permits MDNR issued in July 2020. In the permits, MDNR committed to using the plan when making future regulatory decisions. Columbia's wastewater treatment facility permit required an annual progress report on any proposed updates to the plan, the past year's implementation activities, and the implementation activities proposed for the following year.