

City and County of Broomfield (CCOB) Asset Management

State of Good Repair – 2024 Water, Stormwater and Wastewater Analysis
Executive Summary

Broomfield, Colorado

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City and County of Broomfield Asset Management

Quality information

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Executive Summary

Introduction

The City and County of Broomfield asked AECOM to undertake asset-based projections of state-of-good-repair (SGR) backlog, future SGR needs, and future condition of CCOB water and sewer assets under fiscally constrained scenarios. In this context, "state of good repair" means assets that are within their useful life and delivering intended performance. These projections provide an analytical component to CCOB's capital planning process, aid in developing a compelling justification for funding the capital program and allow CCOB to better anticipate future capital funding needs by major asset class.

Approach

To accomplish the analysis, AECOM applied an analytical platform based on a web-based database tool developed originally developed for the New York Metropolitan Transportation Authority. The Capital Investment Planning Support Tool (CIP Tool) was developed to emulate capital programming decisions based on facts known and quantification of investment policy. It assists with:

- Developing inventory-based estimates of SGR backlog by operating agency and by asset class
- Projecting future SGR needs by operating agency and by asset class
- Projecting the impact on asset condition, asset reliability, and operating cost by asset class, as the result of alternative constrained funding scenarios

CIP Tool was selected due to its ability to accommodate the number of line items contained in the CCOB asset inventory, its ability to accommodate realistic project spending profiles (i.e., recognizing that some asset types have long procurement or construction periods), and its computational speed. CIP Tool provided the following capabilities:

- Ability to evaluate SGR needs across multiple years/planning horizons. Additionally, SGR Tool accounts for multi-year cash outlays for each asset or project. SGR Tool has the flexibility to also represent asset-specific multi-year spending.
- A prioritization capability that is intended to emulate the CCOB capital programming process in the context of age and condition. Addition CIP Tool capability to prioritize in terms of risk, operating savings, and strategic goals were not applied.
- Ability to perform sensitivity tests on funding levels, prioritization process, and timing of projects. CIP Tool allows a user to quickly assemble "what if" scenarios that test different funding levels or different prioritization criteria weightings. Only alternative funding scenarios were examined. CIP Tool also has the capability to

commit specific projects in a specific year and has the flexibility of overriding default asset useful lives with more specific CCOB experience or expectations.

- Ability to optimize across multiple resource levels. Data in CIP Tool is structured to allow drill-down analyses of the results of a funding scenario down to the asset line-item level. It also reports results by asset class. CIP Tool has the capability to include only certain assets (i.e., a subset of the overall data) when running a scenario.
- Ability to examine/monitor several measures of capital program performance. CIP Tool provides several performance measures to evaluate the impact of future spending and prioritization on the capital program. This capability recognizes that there are multiple ways to measure how well assets are performing during the scenario horizon. The set of performance measures included in CIP Tool are:
 - **Performance measures**
 - SGR Backlog (2023 \$): Value of assets whose age >useful lives and in the queue for replacement.
 - Assets in the queue are prioritized and funded in priority order
 - Assets remain in the queue until funded
 - Reliability: Average failure-impacted taps affected per year.
 - Based on age vs reliability asset decay curves.
 - Asset condition: On 5-to-1 scale.
 - 5 = New
 - 1 = Worn
 - % of assets at SGR: \$-weighted average portion of assets < useful lives.
 - **Spending measures**
 - Annual capital spending: \$ for assets funded from the replacement queue.
 - Annual spending based on budget or actuals experience, by asset class.
 - All asset classes in stacked bar chart
 - Annual O&M costs: Maintenance costs associated with asset condition.
 - Annual capital + O&M costs: Sum of the above.
 - Cumulative capital + O&M costs: Cumulative sum of the above.

These capabilities allow CCOB to examine the short-term impacts to asset condition and asset performance based on the funding levels prescribed by the capital program, and long-term impacts to asset condition and asset performance based on funding levels to achieve certain strategic goals, such as eliminating the SGR backlog over a specified number of years.

Note that while CIP Tool emulates the capital programming process, it is intended to provide support to the capital program decision making process (i.e., CIP Tool is a decision support tool, not a decision making tool). Application of CIP Tool does is not intended to establish asset line-item-specific asset priorities and does should not be

applied to sequence asset-specific capital programming actions. Rather, CIP Tool establishes priorities at a broader, more aggregate level to compare and provide insights as to what happens at different funding levels (i.e., comparing the results between different funding levels). The analytical results from a range of scenarios should be incorporated with other decision criteria (e.g., reflecting CCOB goals and strategies, operational sequencing considerations) to arrive at a holistic solution.

Data

The data applied in the analysis included assets for water treatment and distribution, sewer collection and treatment, and stormwater collection. The analysis addressed a total of 9063 line-item assets with a total replacement value of \$3.119 billion (2023 dollars). The collection and distribution pipe data, while comprehensive, did not provide the condition of assets at the block-level within subdivisions. As a result, a risk-based prioritization was not possible given that the number of taps affected by a failure could not be estimated.

Analysis

CIP Tool was applied to separately address water and sewer assets. 20-year analyses were undertaken for the following funding scenarios:

- **Water assets:** \$2 million, \$4 million, and \$6 million per year funding
- **Sewer assets:** \$6 million, \$8 million, \$10 million, and \$12 million per year funding

Findings

- **Water assets:** Spending between \$4 to 6 million per year is projected to bring the immediate backlog to zero and keep it at year until the last analysis year. While overall asset condition is projected to decline from 4.5 to 4.2 (on the 5-to-1 scale) over the analysis period, all of the assets were within their useful life, except in the initial analysis year (due to the current backlog) and the last analysis year, when there is a surge in need for water treatment asset replacement. Operating costs are projected increase as the asset age, but, again, all assets are within their useful lives except in the first and last analysis years.
- **Sewer assets:** Spending at \$8 million per year is projected to bring the backlog current backlog of \$25 million to zero by 2029. In subsequent years, all of the assets are within their useful lives, but overall condition is projected to decline from 4.5 to 4.2 (on the 5-to-1 scale). Because asset condition declines over time, operating costs are projected to grow.