Infrastructure Investment Needs With Consideration of Risk and O&M Cost

City and County of Broomfield

Progress Report

July 15, 2025

Agenda

- Objective of current analysis
- Asset management metrics
- Funding scenarios
- Water asset findings
- Sewer & stormwater asset findings
- Conclusions
- Discussion

Objective of Current Analysis

- Analysis reported to City Council in summer 2024 was an initial phase …
  - Prioritized infrastructure renewal needs based only on age and condition.

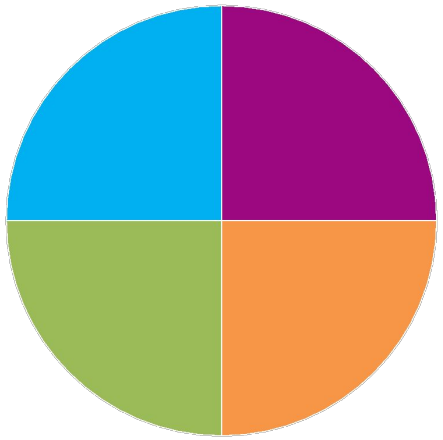
- This 2nd analysis phase introduces risk and operating cost impact into the prioritization process …
  - Better aligns the technique applied with asset management best practice.

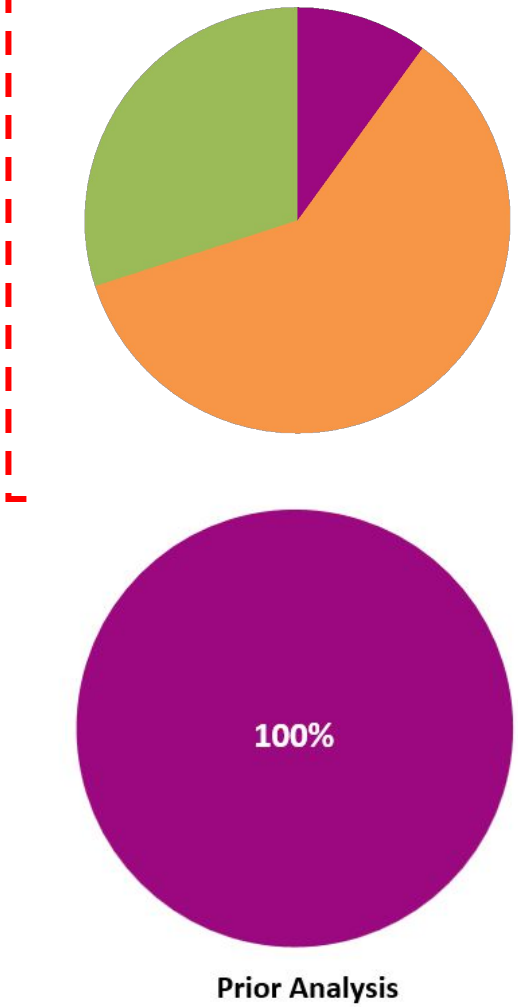
- Separate analyses were conducted for water and sewer & stormwater assets …
  - Recognizes that separate fund accounting is applied to budget expenditures.

- Focus on pipe (Water Distribution and Sewer Collection) assets

Priority Score Intended to Emulate Capital Program Decision Making

Prioritization Factors





- **Age/Condition/Performance Rating**
  - *Applies TERM Federal asset decay curves*
  - *Condition & performance based on observation, if available*
- **Risk Rating**

  Probability of failure x Consequence of failure x Duration of failure x Criticality factor
- **Benefit/Cost Rating**

  $$\frac{\text{NPV(O\&M cost of old asset - O\&M cost of new asset)}}{\text{Asset Replacement Value}}$$
- **Strategic Goals Rating**

  Can include response to regulatory demands and climate change vulnerability

Sum of [Factor Weighting x Project Rating] = Priority Score

Asset Management Metrics

Performance Measure Definitions

Better

SGR Backlog (2025 $): 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 per 100 miles of pipe

- Based on age vs rate of failure asset decay curves
- For water distribution and sewer collection assets only

Better

Better

Asset condition: On a 5-to-1 scale.

- 5 = New
- 1 = Worn

% of assets at SGR: $-weighted average portion of assets < useful lives.

Better

Performance Measures

Definition

Example

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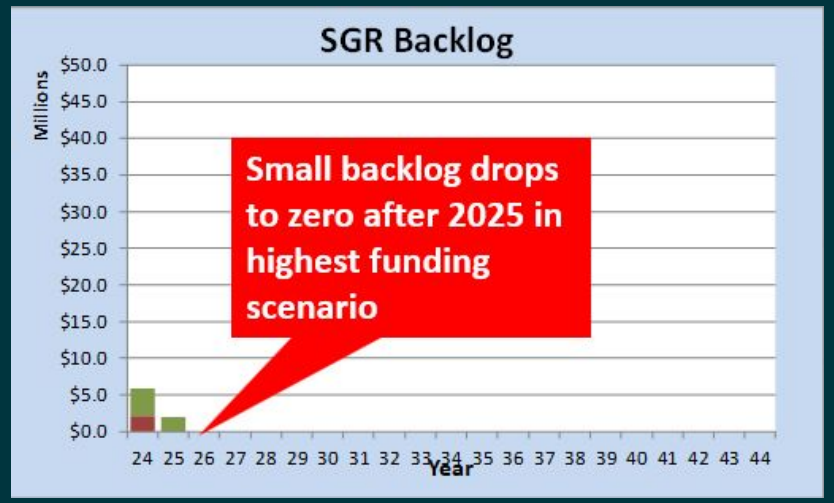

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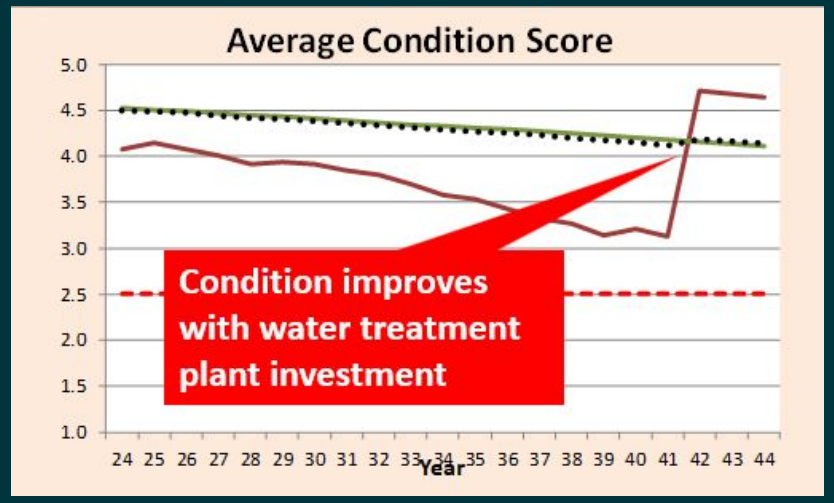

Performance Measures (Cont'd)

Definition

Example

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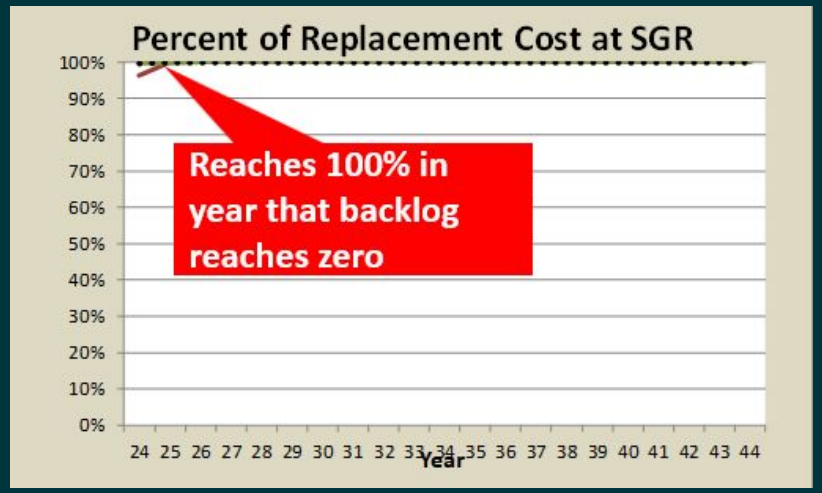

Spending Measure Definitions

Better

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.

- Inspection
- Preventive/proactive/scheduled maintenance
- Corrective/reactive/unscheduled maintenance

Better

Better

Annual capital + O&M costs: Sum of the above.

Cumulative capital + O&M costs: Cumulative sum of the above.

Better

Spending Measures

Definition

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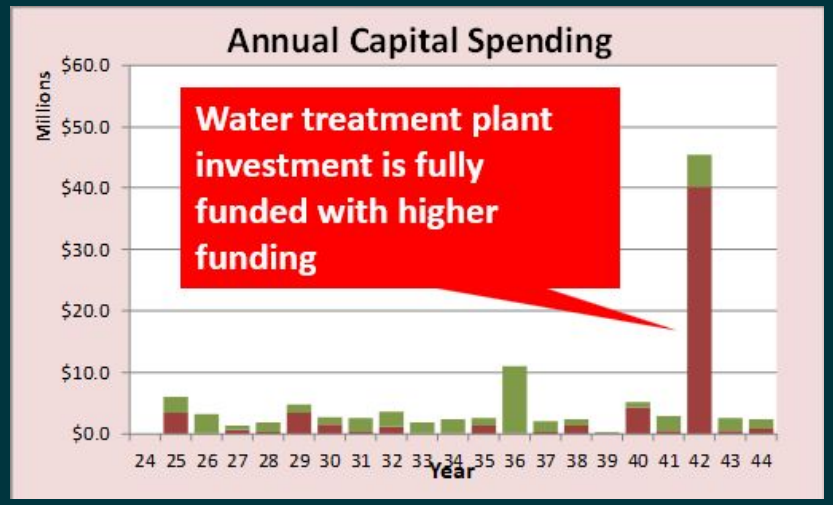
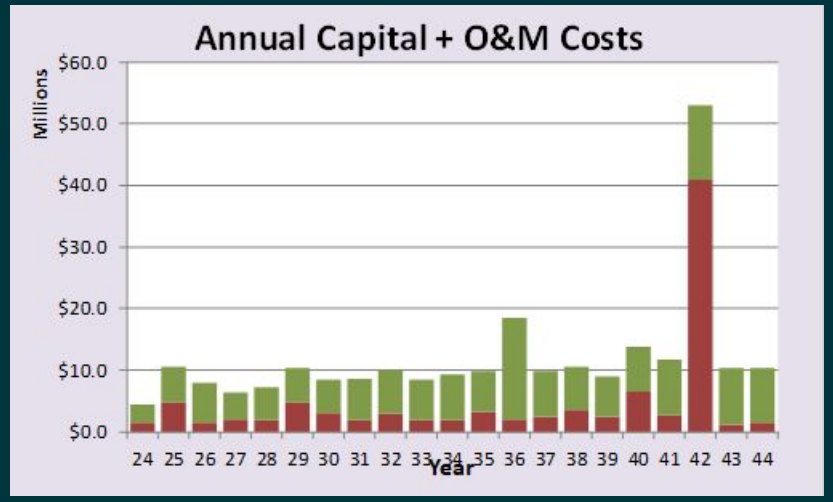


Better

Annual capital + O&M costs: Sum of the above.



Spending Measures (Cont'd)

Definition

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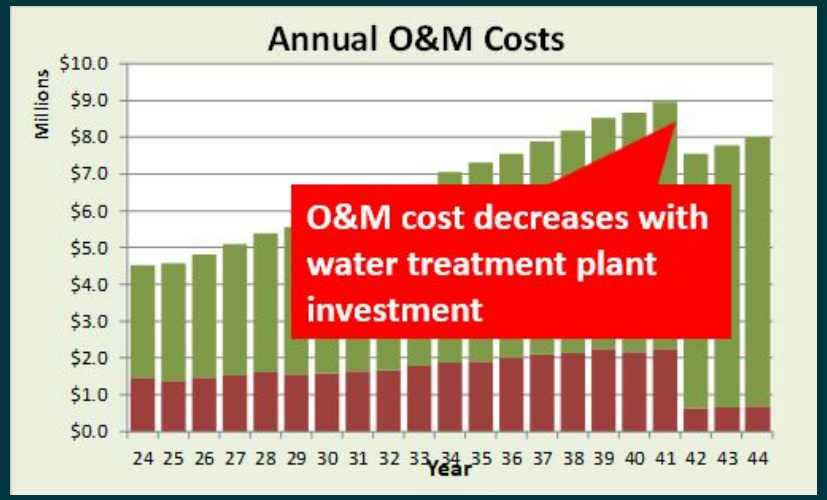
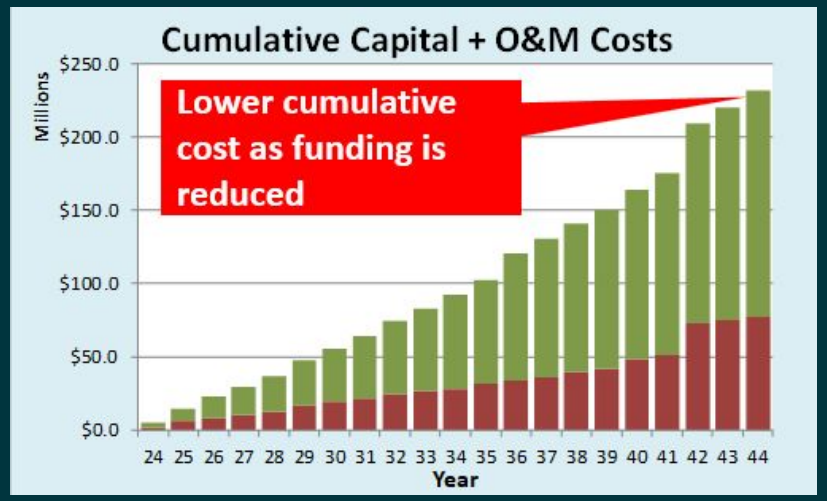


Better

Cumulative capital + O&M costs: Cumulative sum of the above.



Analysis Focuses on Water and Sewer (& Stormwater) “Utilities” Assets

- “Utilities” assets include distribution and collection (linear) assets
- “Facilities” assets include water and sewage treatment and other point location assets (e.g., pumps, lift stations)

Examined Alternative Levels of Flat Annual Funding in 2025 $

Looked for funding levels that achieve the following objectives:

- Backlog … limit growth from current value
- Condition … averages for Water Pump & Lift Stations and Sewer Pipe stay above 2.5 on 5-to-1 scale
- Reliability … limit growth from current value
- O&M cost … limit growth

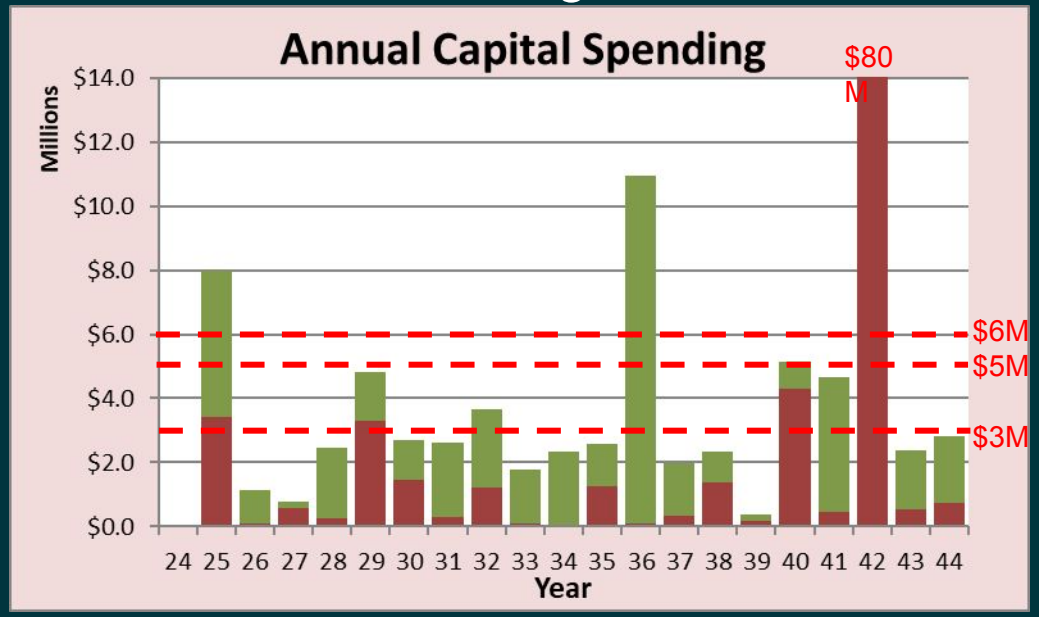
Flat annual funding applied …

Water	Sewer & Stormwater
$6M/yr	$9M/yr
$5M/yr	$6M/yr
$3M/yr	$5M/yr

How Flat Annual Funding Levels Were Determined

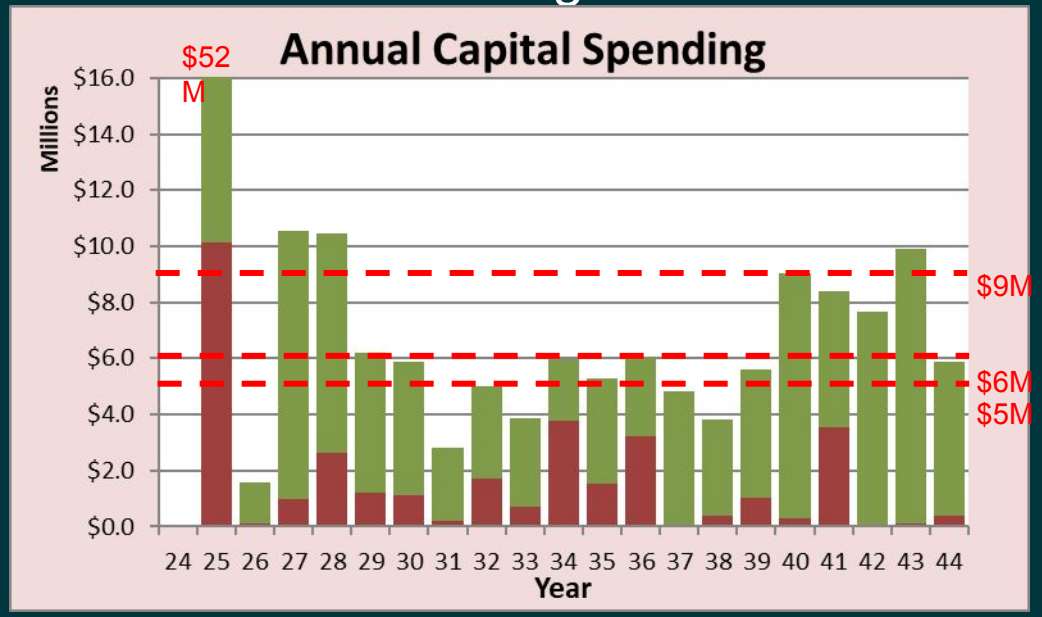
Water

Unconstrained Funding Scenario



Sewer & Stormwater

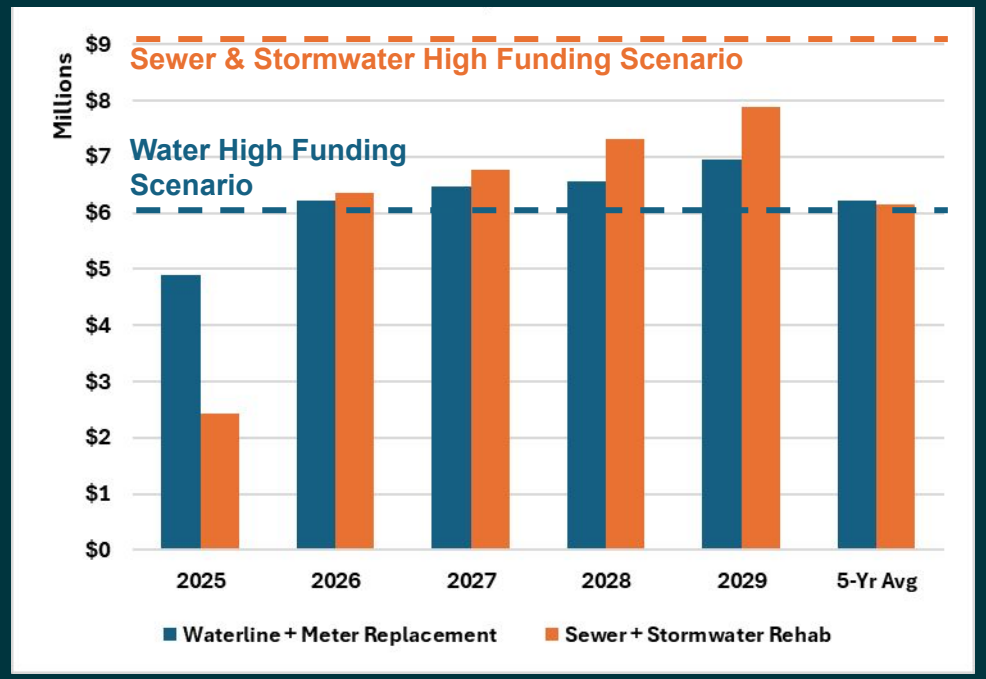
Unconstrained Funding Scenario



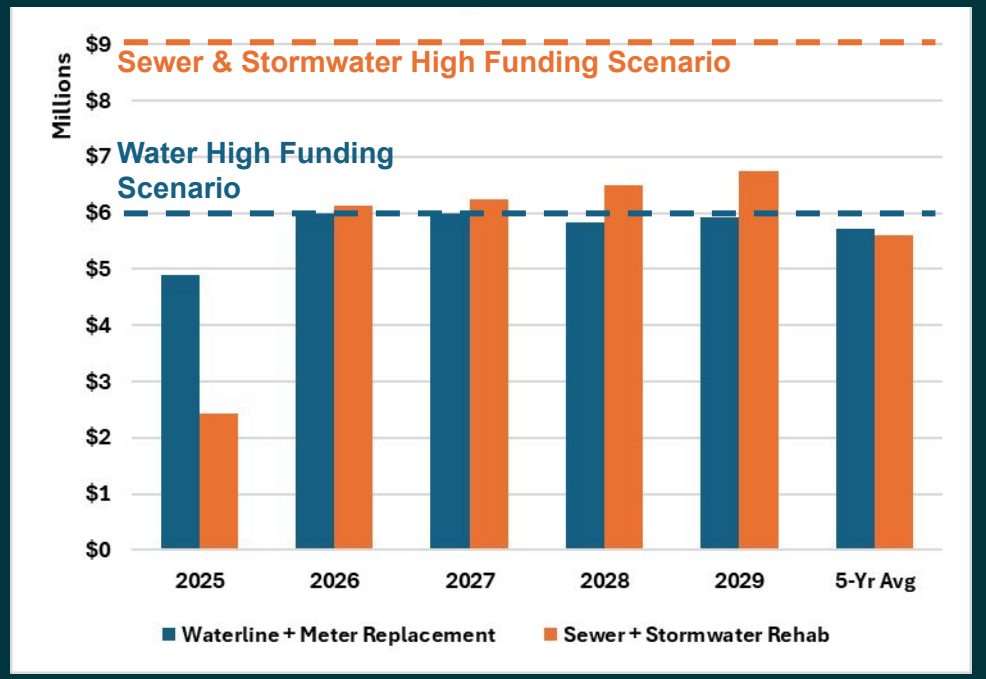
Bars = unconstrained needs
Red lines = funding scenarios

Utilities (Pipe Asset) Spending in 2025-2029 Capital Program

Year-of-Expenditure $



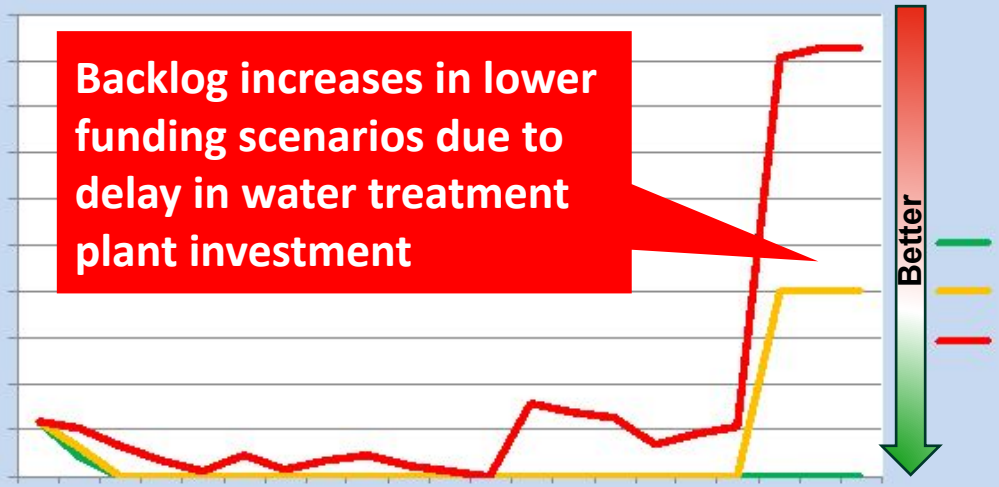
2025 $ Assuming 4%/Year Inflation

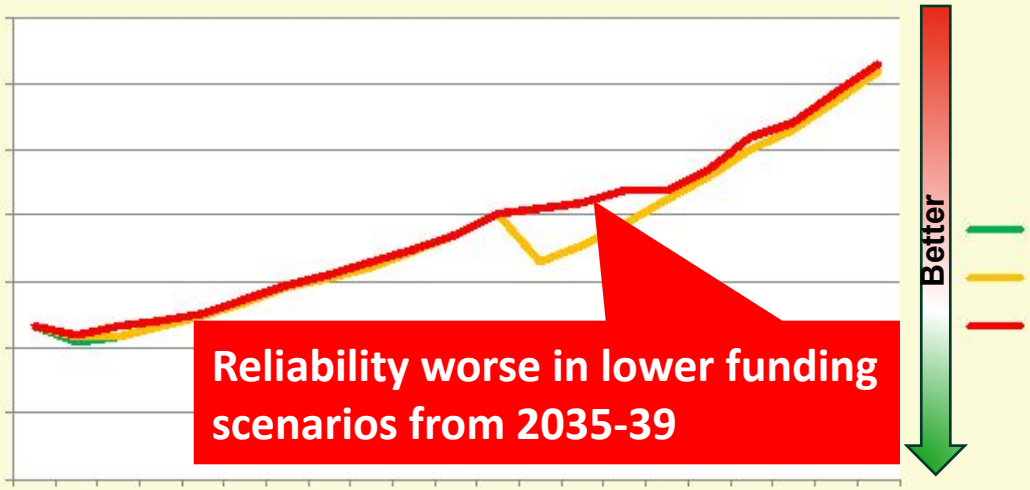


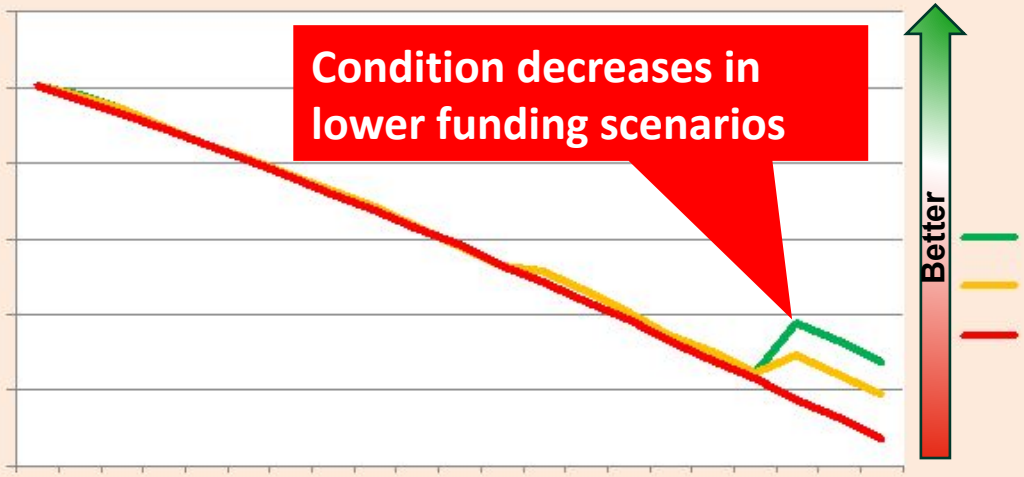
Bars = 2025 to 2029 Capital Program for Utilities (excludes Facilities)
Dashed Lines = High Funding Scenarios

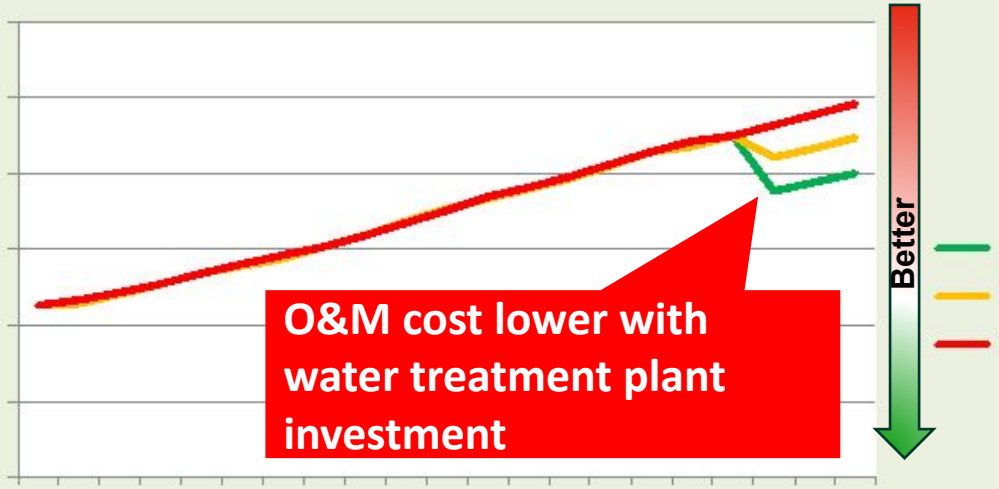
Water Assets Findings

Water Assets – Summary of Performance Measures
Flat Annual $ Funding Scenarios









Water Assets

Performance Measures

City and County of Broomfield

21-May-25 Water $6M per Yr

Scenario Summary Report - All Assets by Division - Performance Measures

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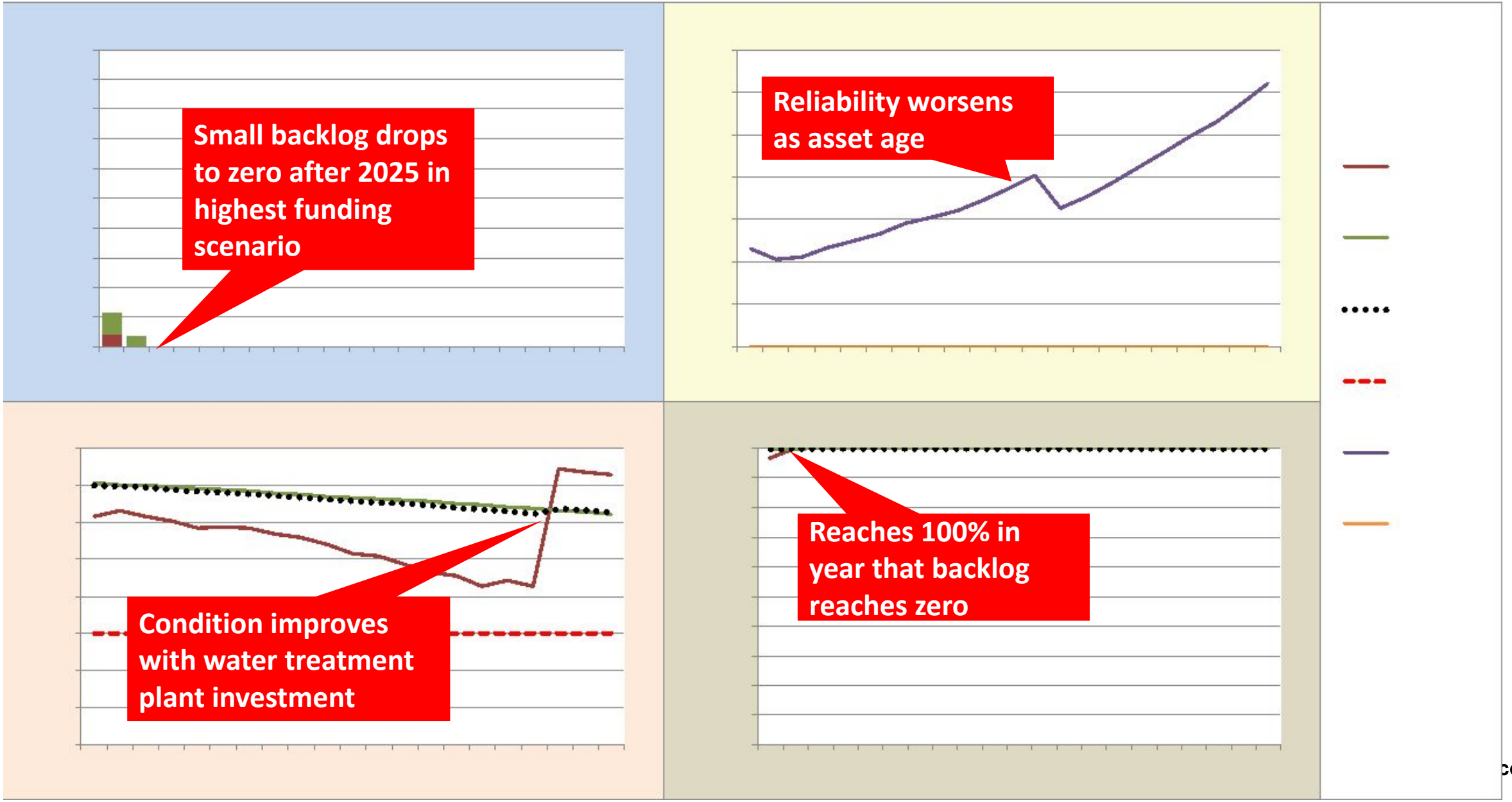

City and County of Broomfield

21-May-25 Water $5M per Yr

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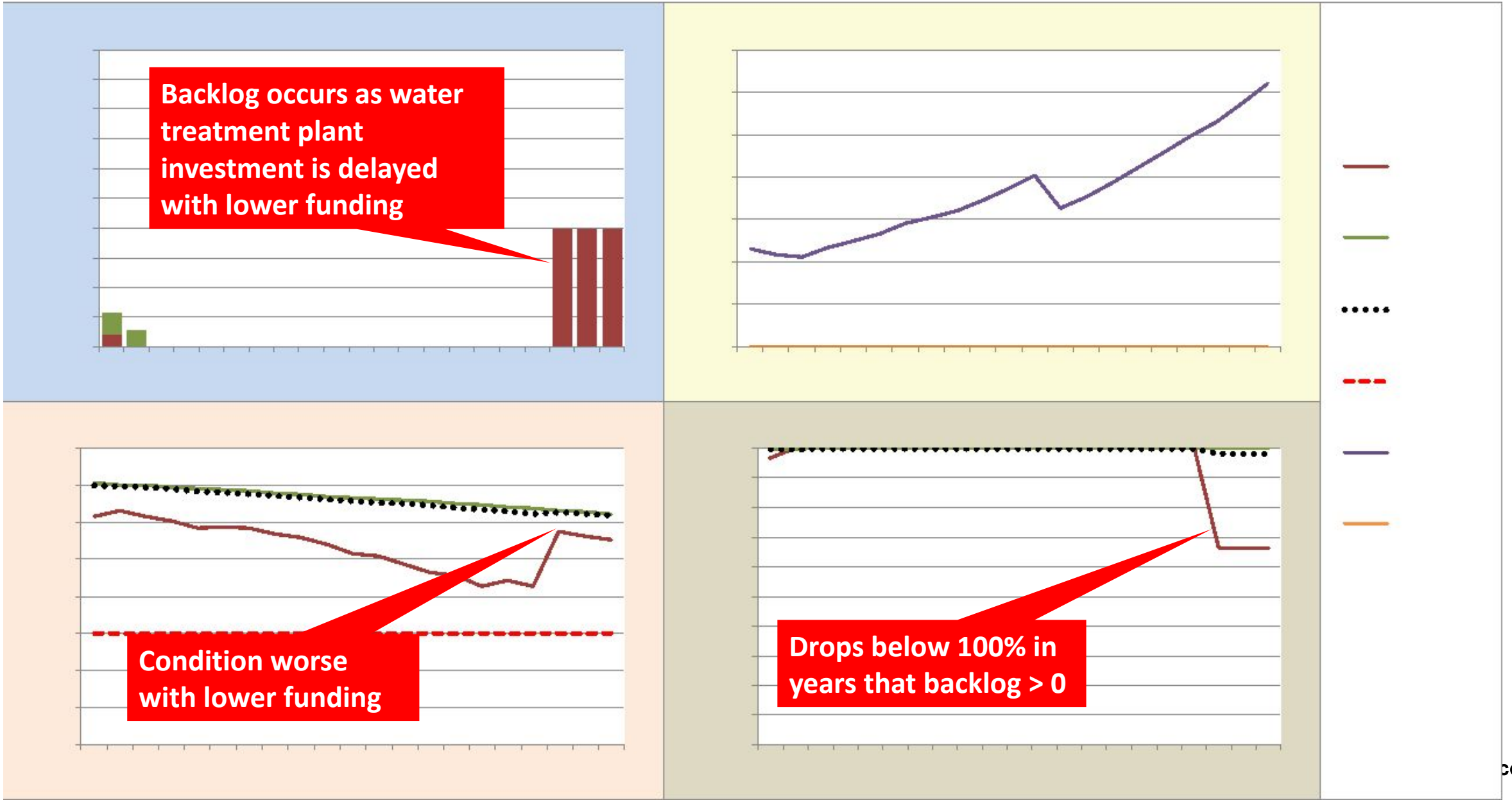

City and County of Broomfield

21-May-25 Water $3M per Yr

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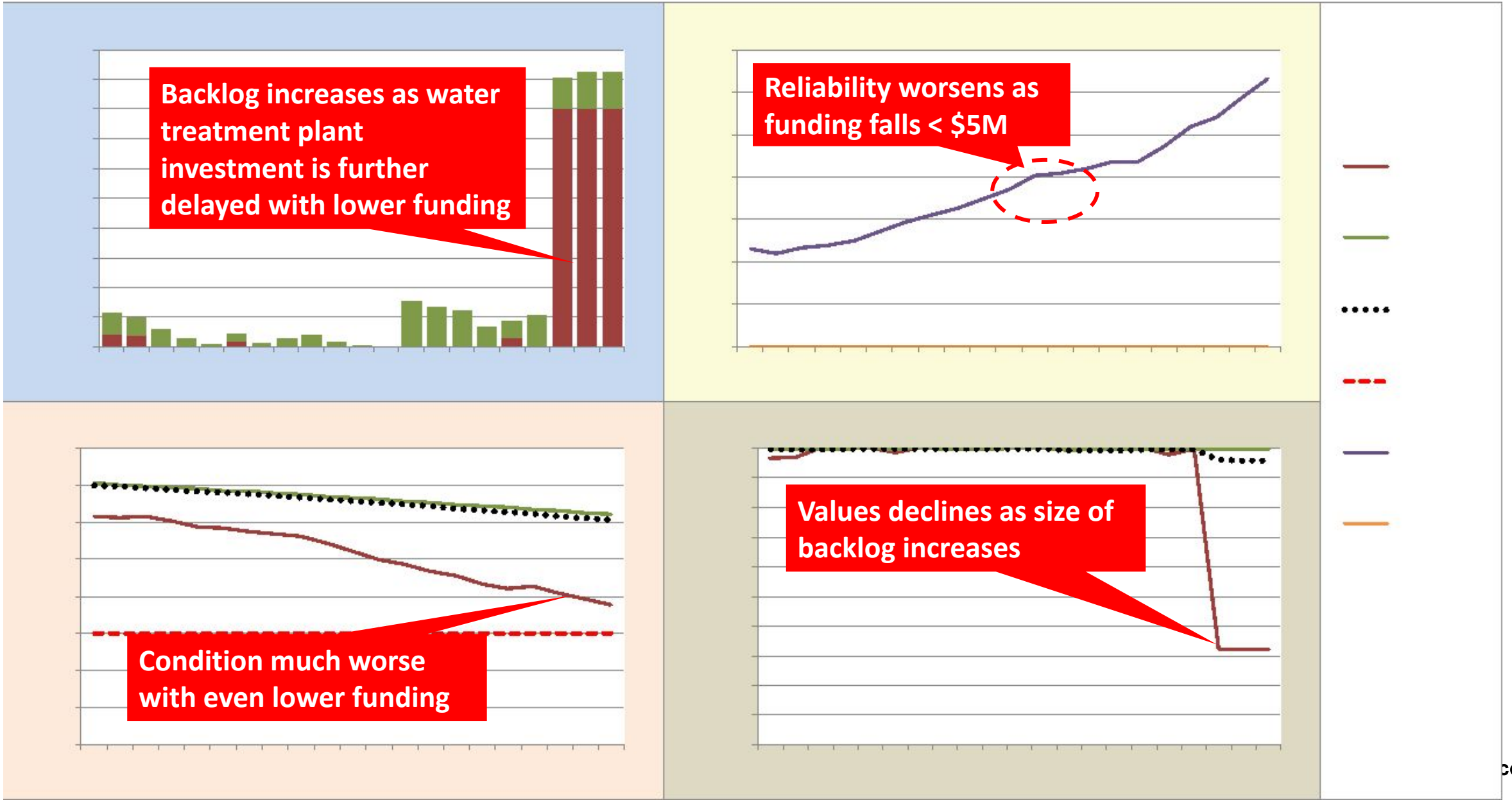

Water Assets

Spending Measures

City and County of Broomfield

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Scenario Summary Report - All Assets by Division - Spending ($ Millions)

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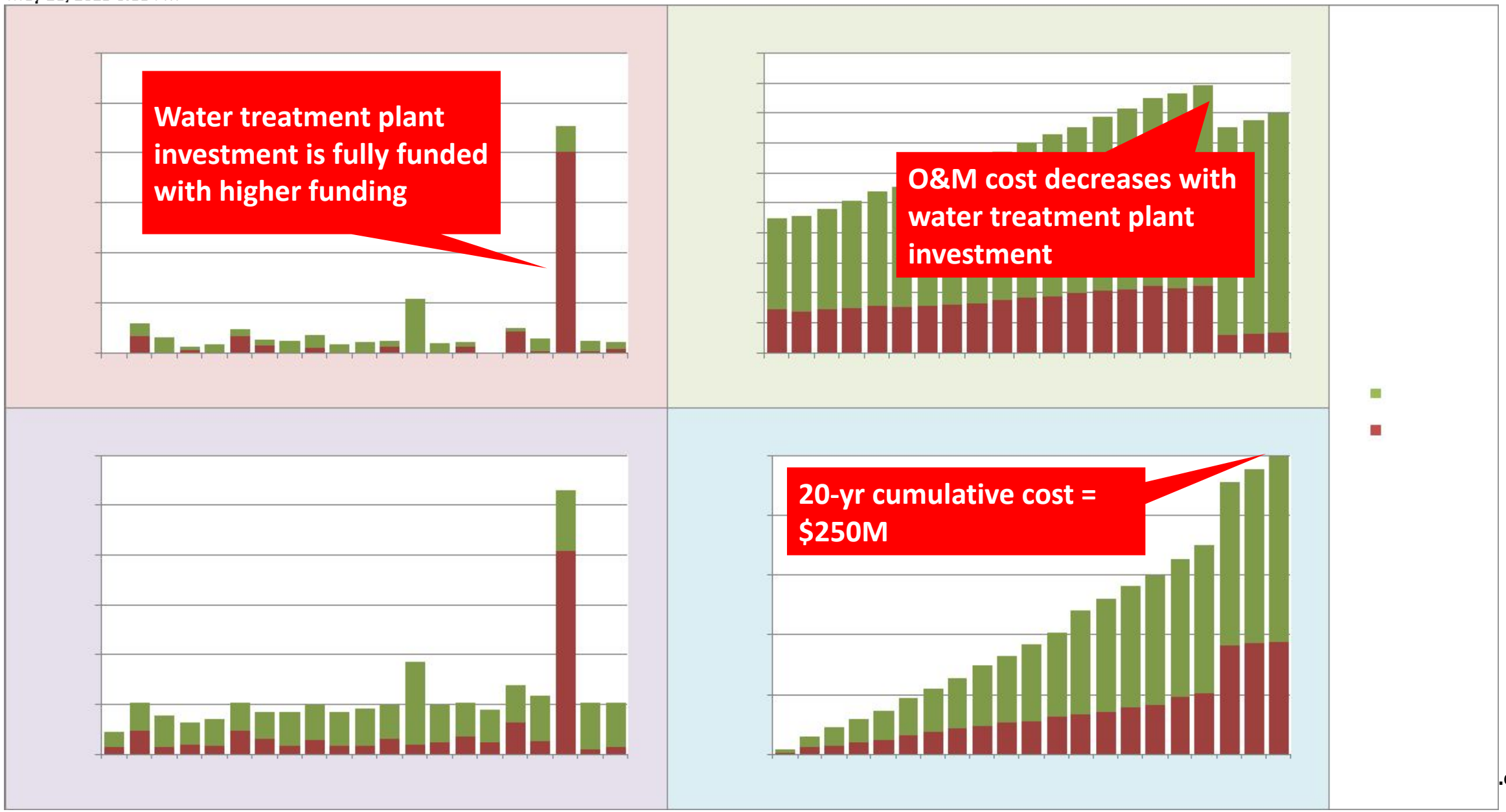

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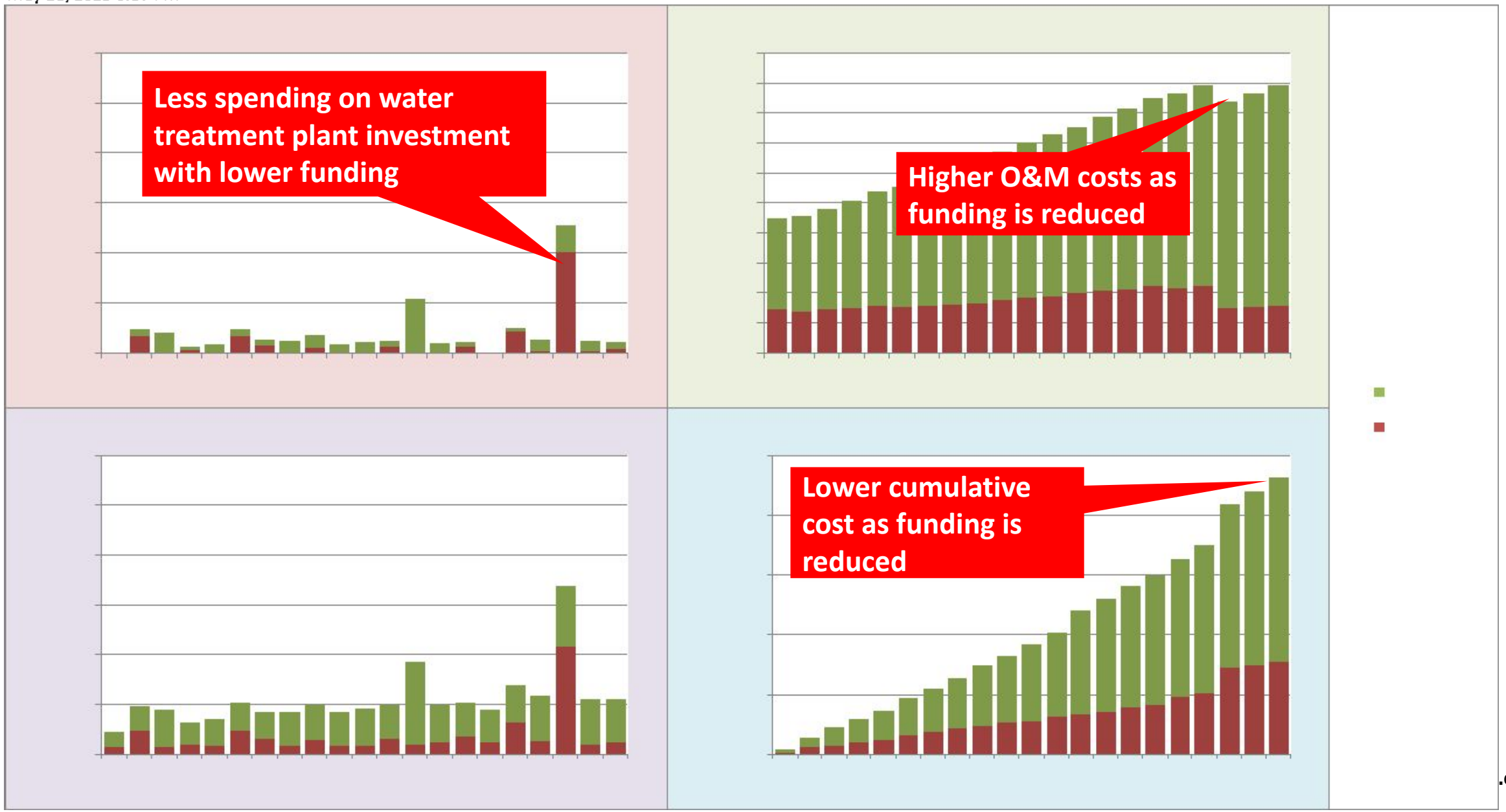

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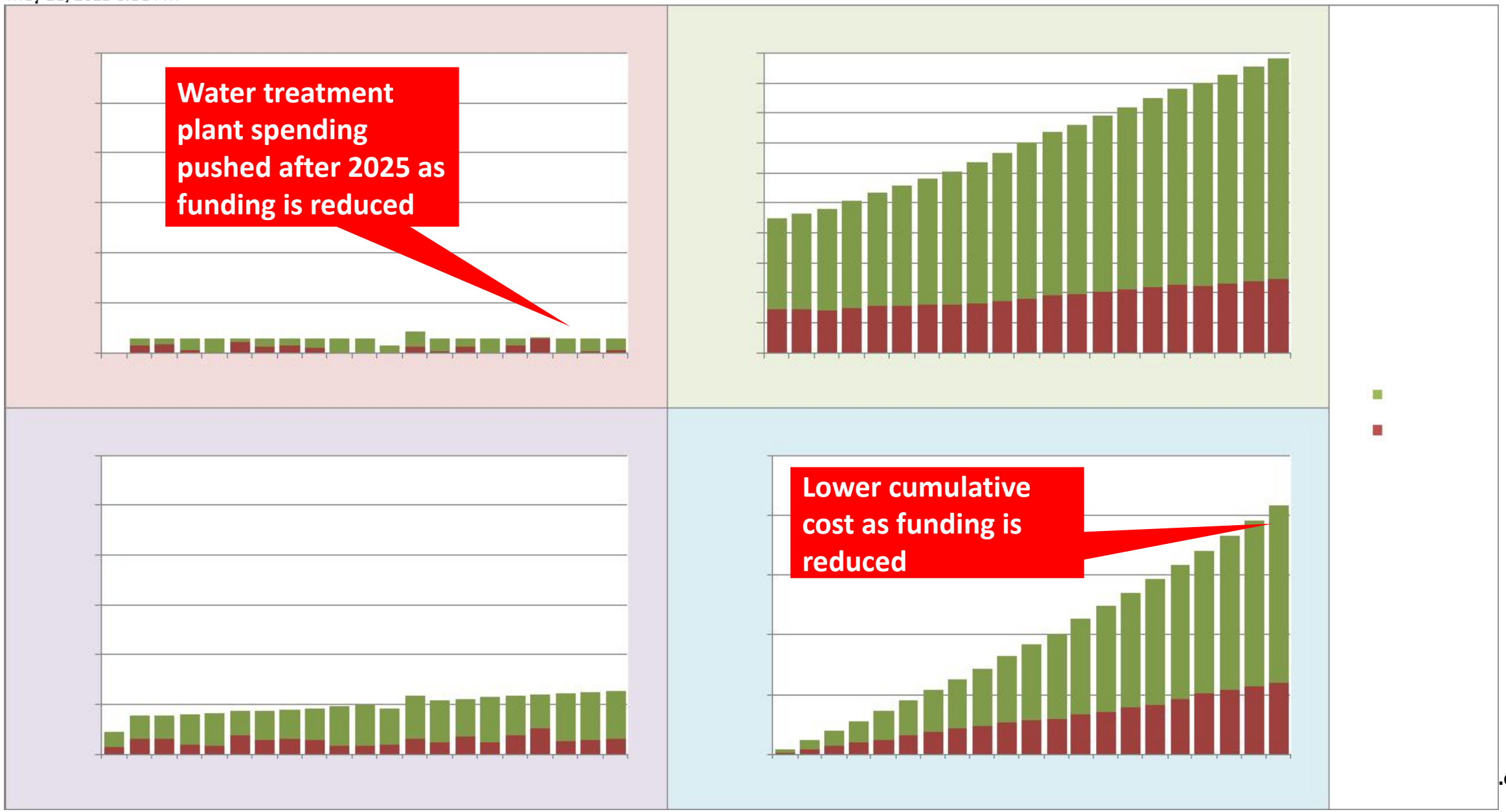
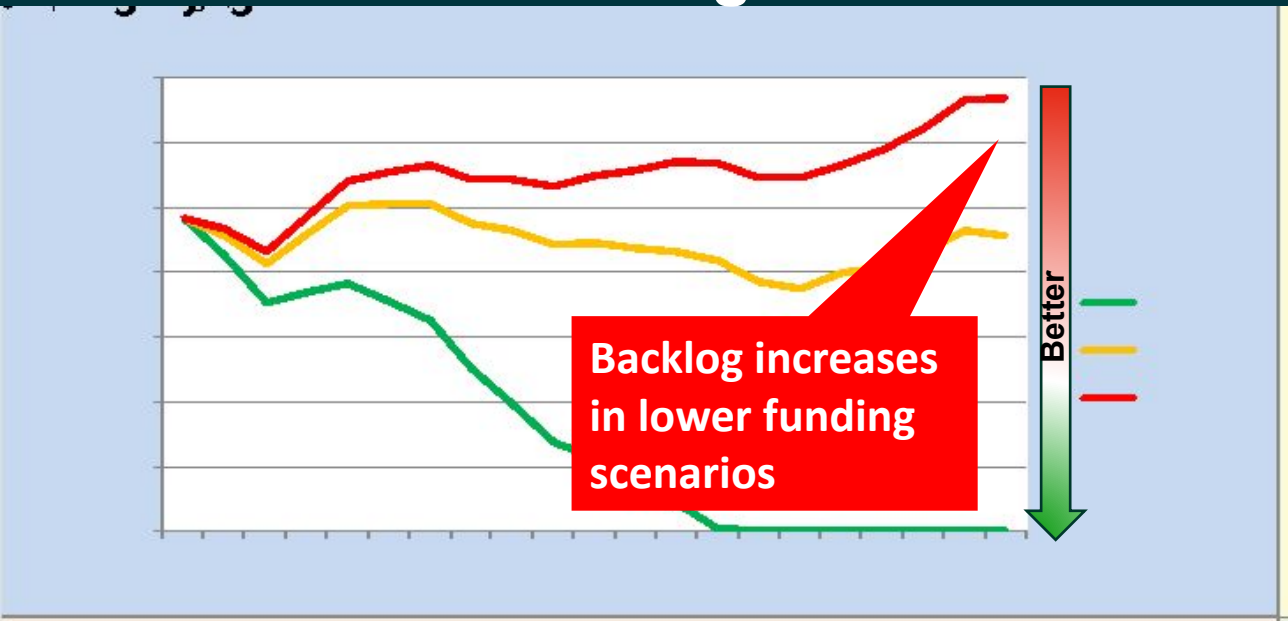
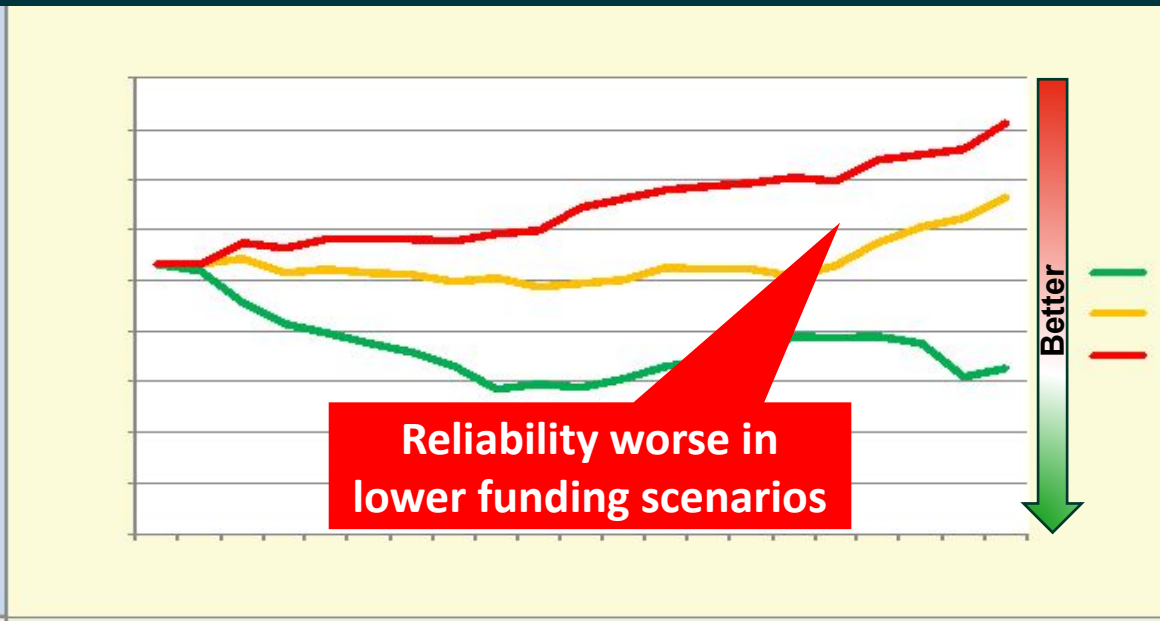
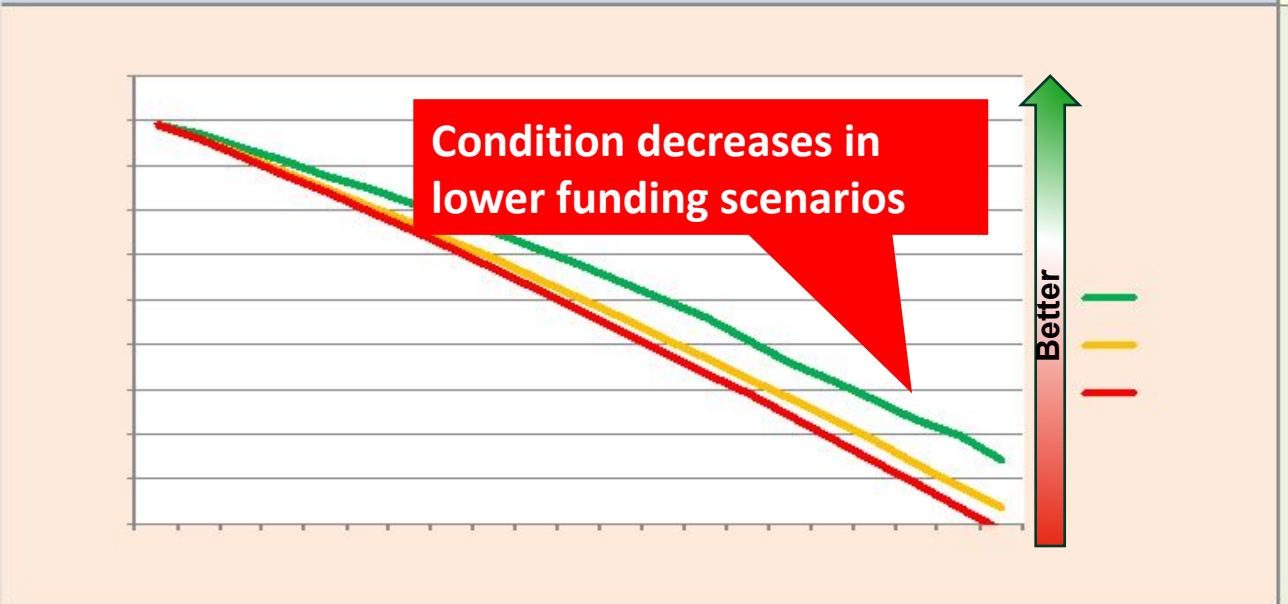


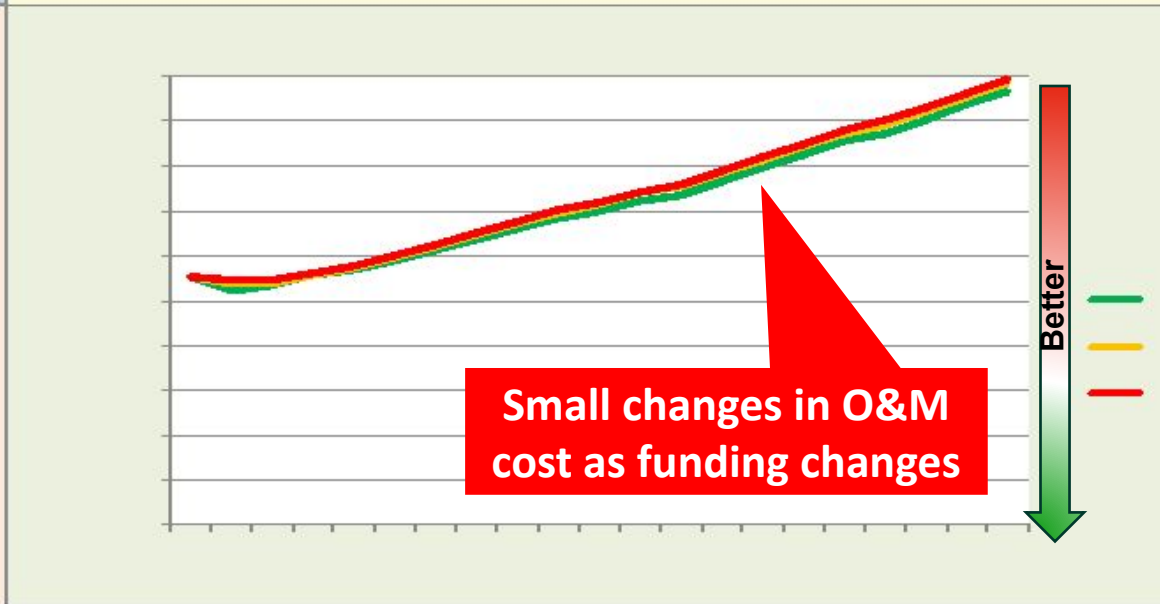
Sewer & Stormwater Assets Findings

Sewer Assets – Summary of Performance Measures x Funding Scenario
Flat Annual $ Funding Scenarios









Sewer & Stormwater Assets

Performance Measures

City and County of Broomfield

21-May-25 Sewer $9M per Yr

Scenario Summary Report - All Assets by Division - Performance Measures

May 21, 2025 4:01 PM

City and County of Broomfield

21-May-25 Sewer $6M per Yr

Scenario Summary Report - All Assets by Division - Performance Measures

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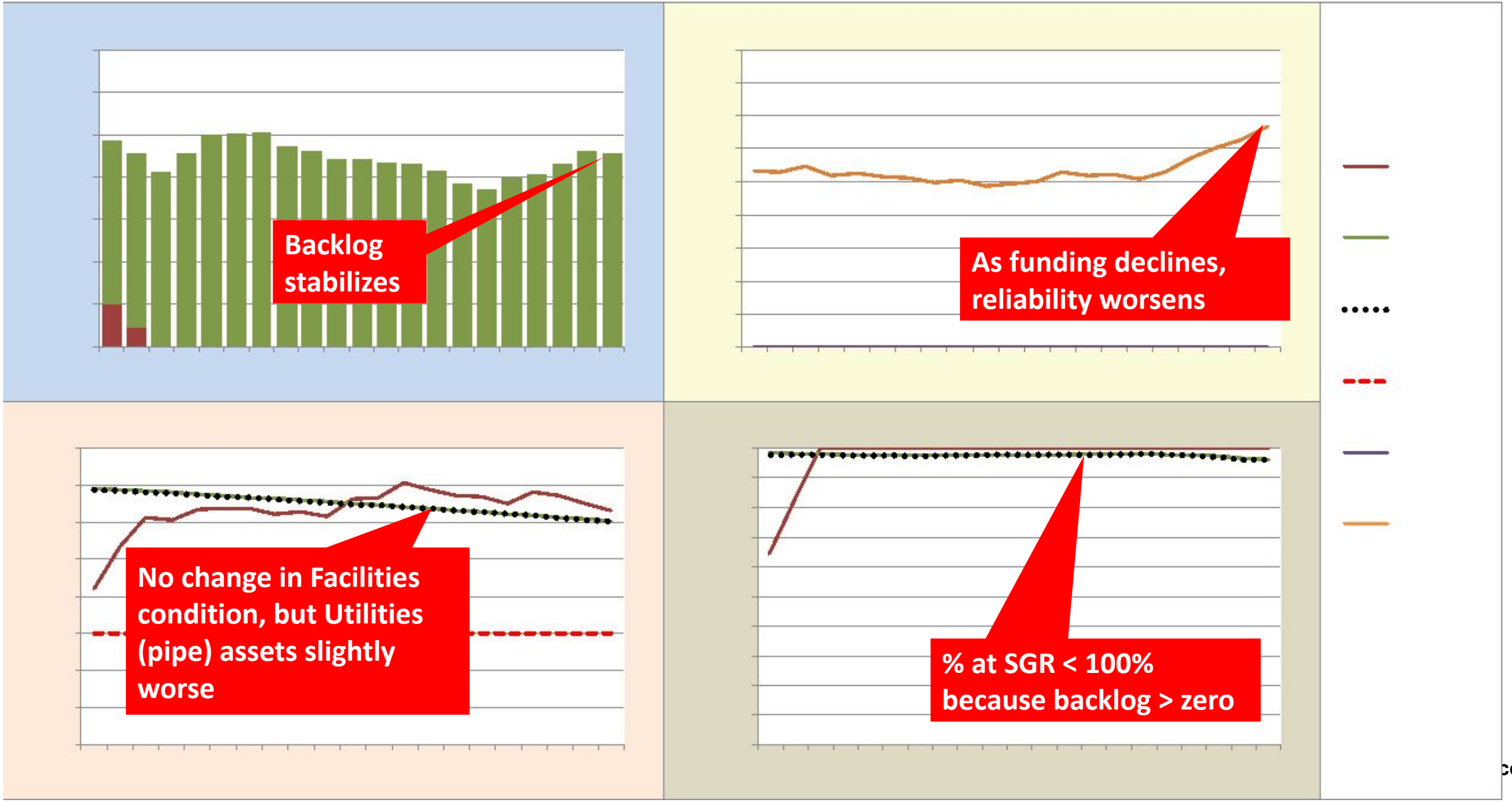

City and County of Broomfield

21-May-25 Sewer $5M per Yr

Scenario Summary Report - All Assets by Division - Performance Measures

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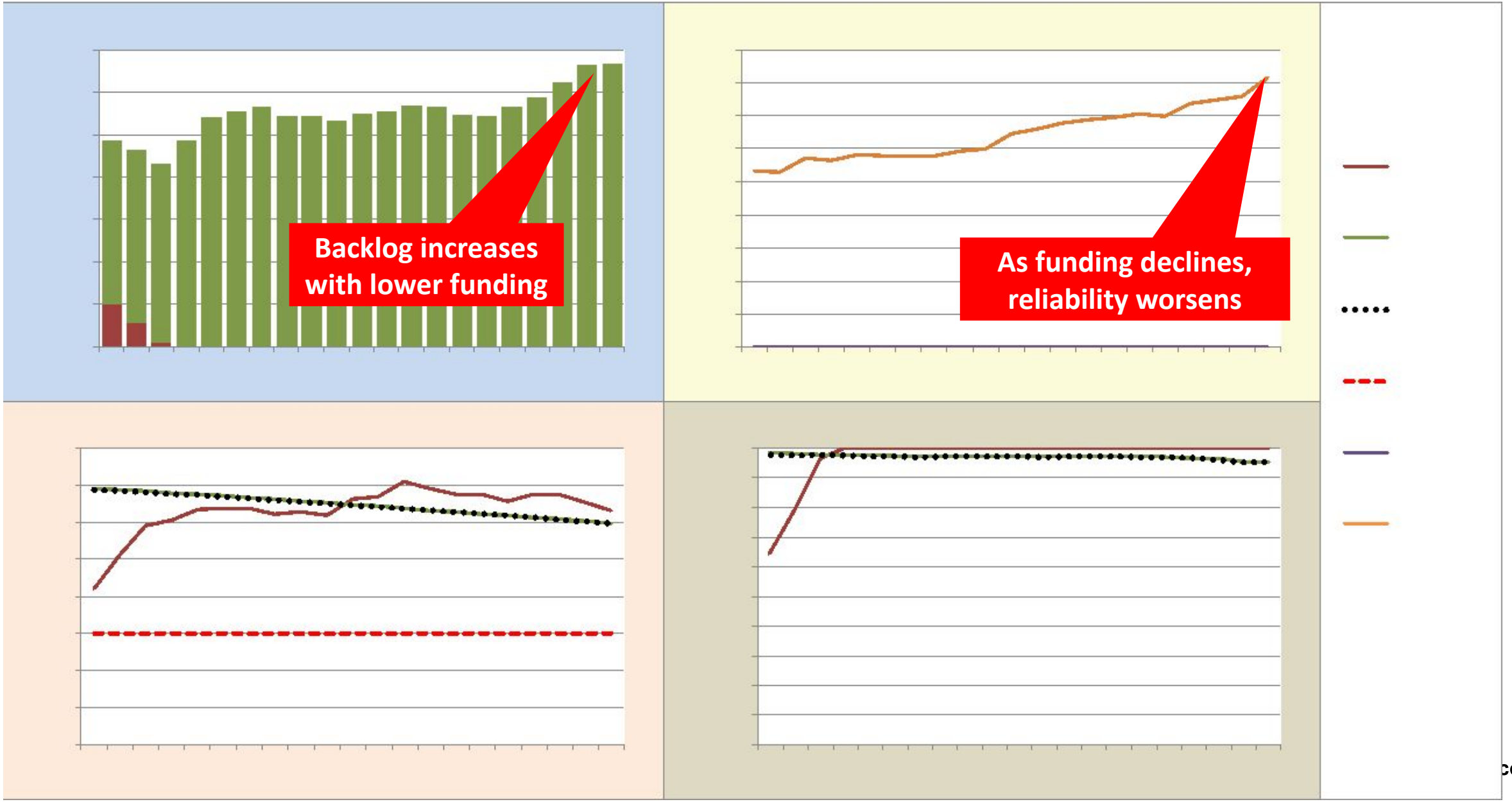

Sewer & Stormwater Assets

Spending Measures

City and County of Broomfield

21-May-25 Sewer $9M per Yr

Scenario Summary Report - All Assets by Division - Spending ($ Millions)

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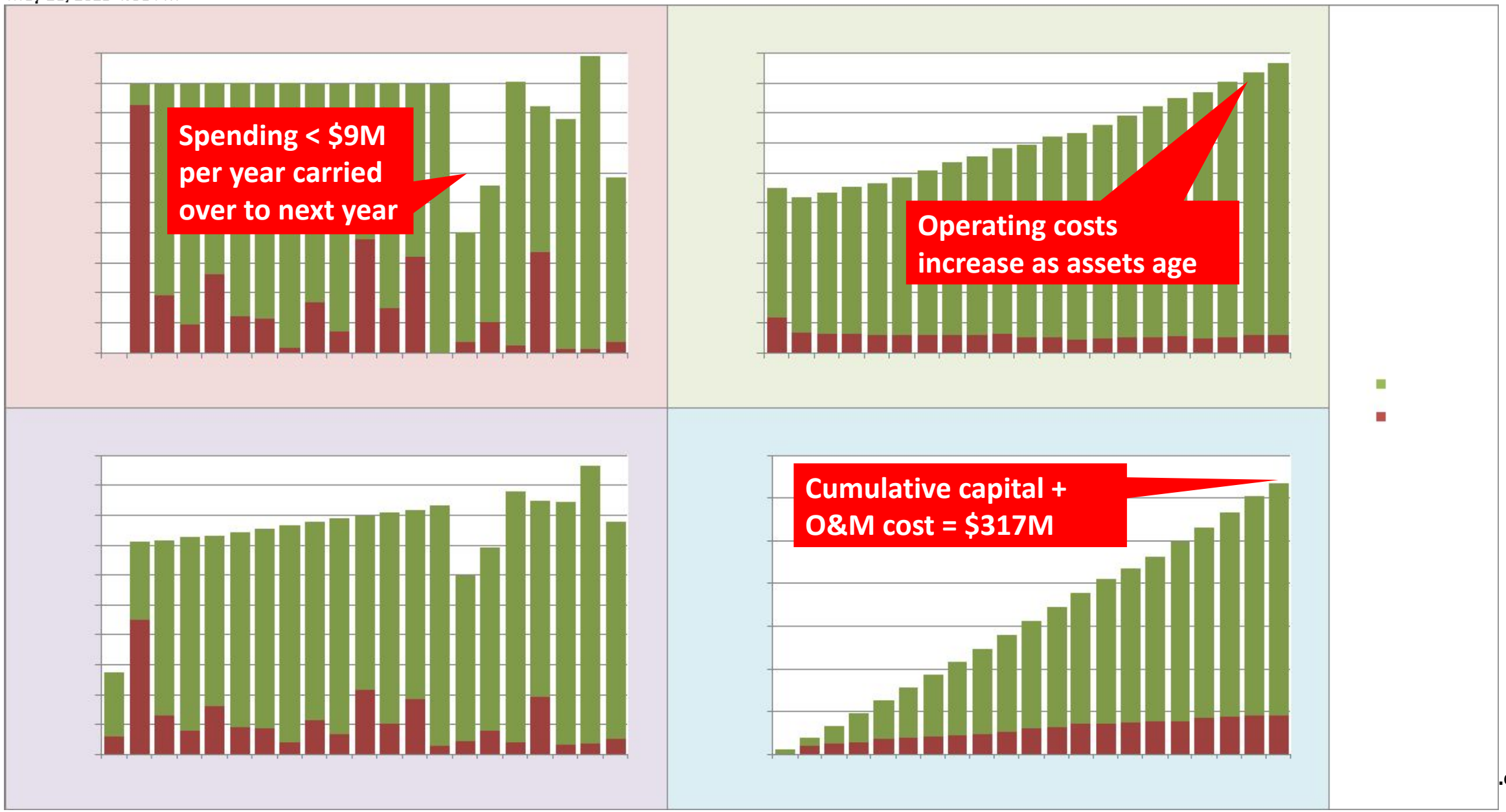

City and County of Broomfield

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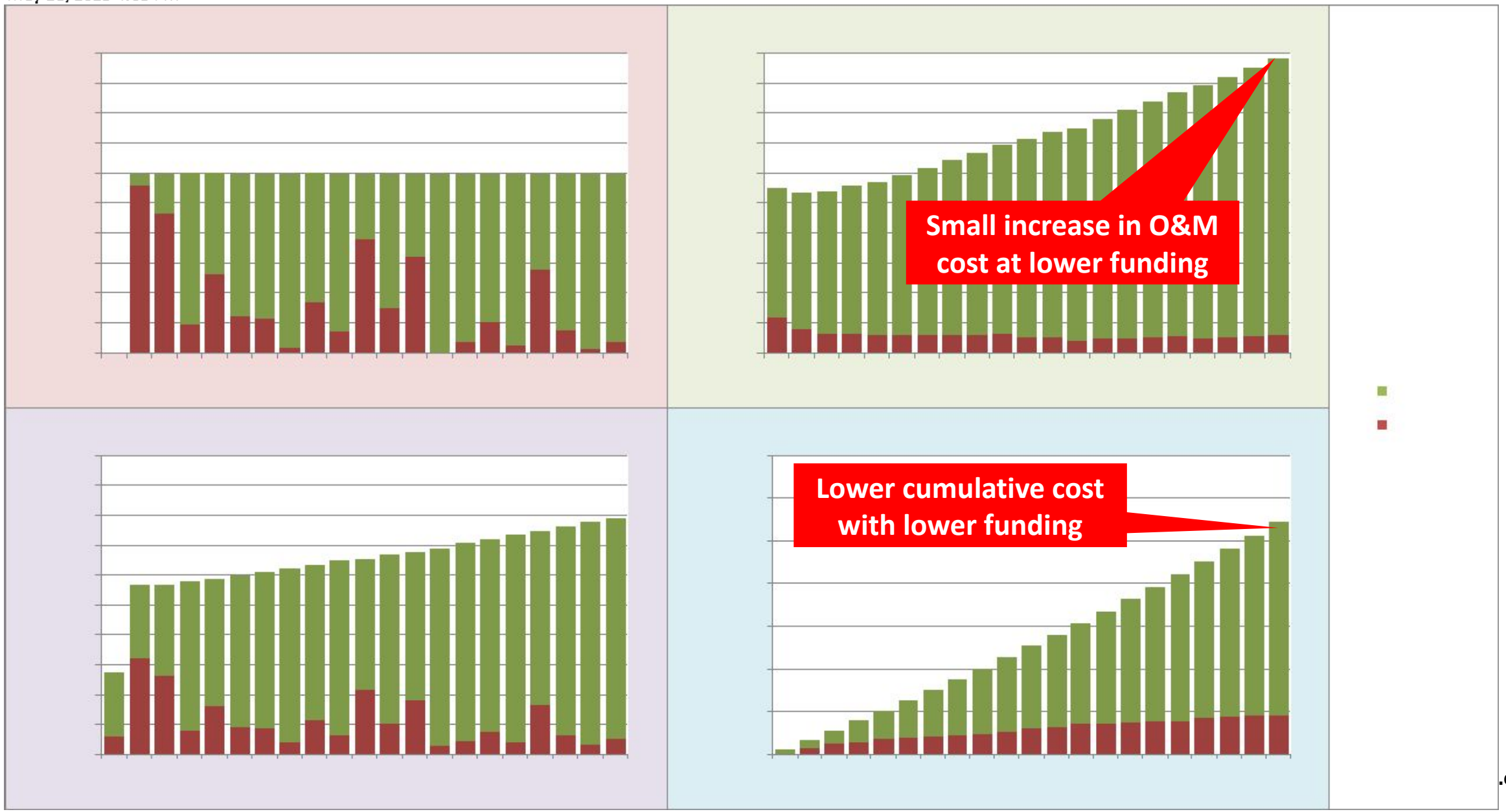

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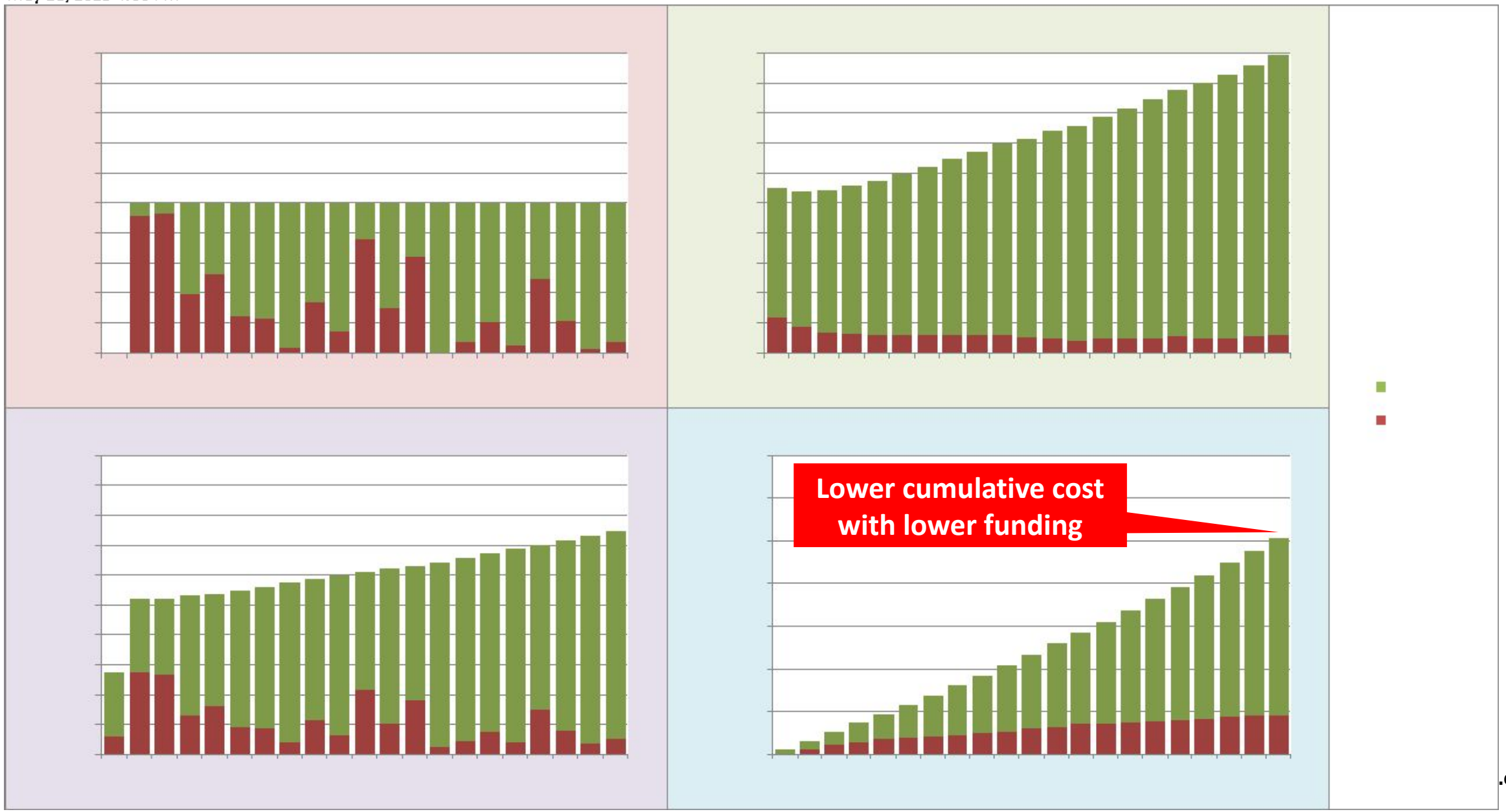
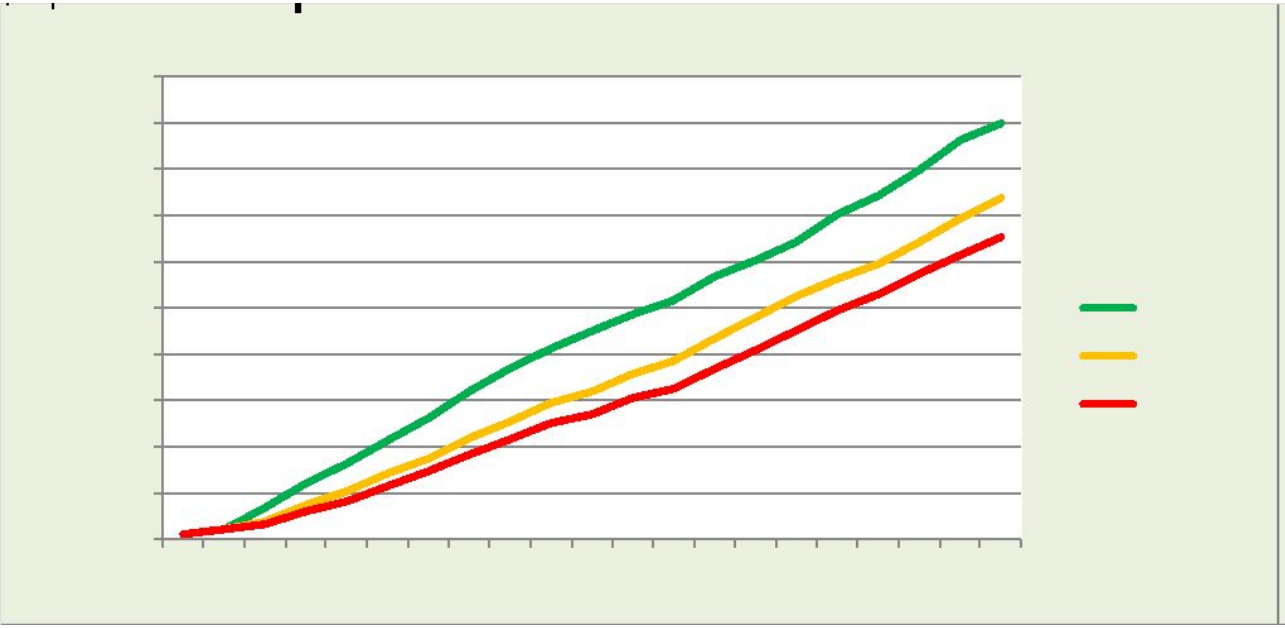
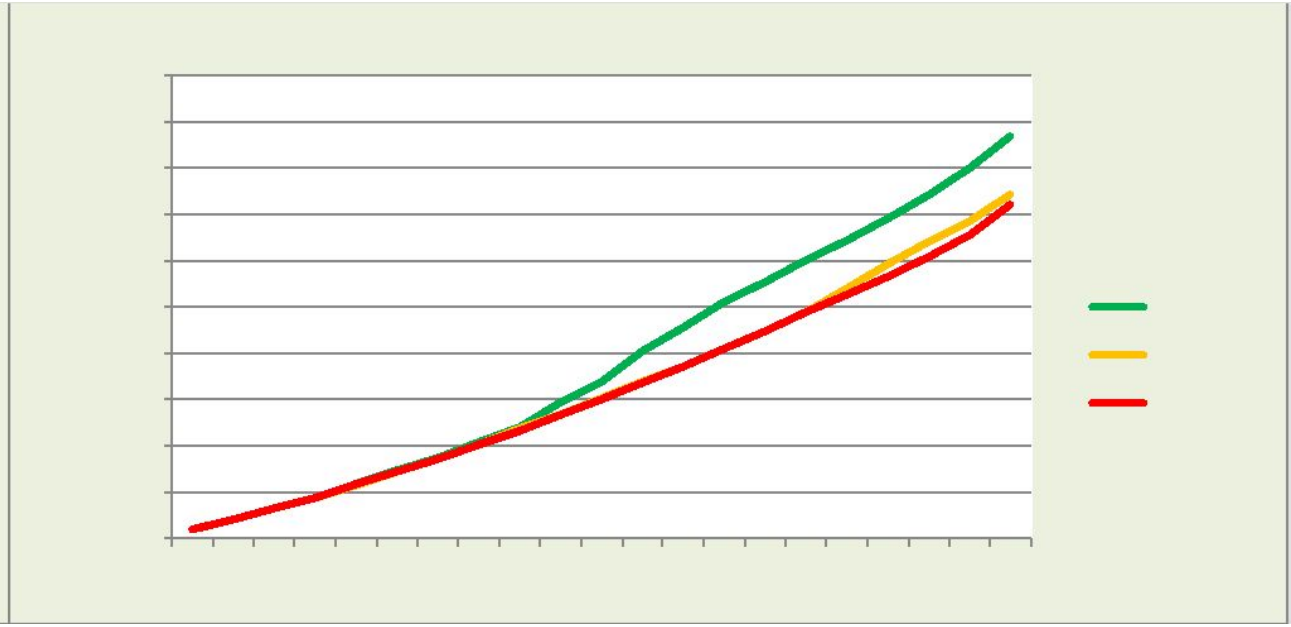


Sewer & Stormwater Assets

Cumulative Capital + O&M Costs

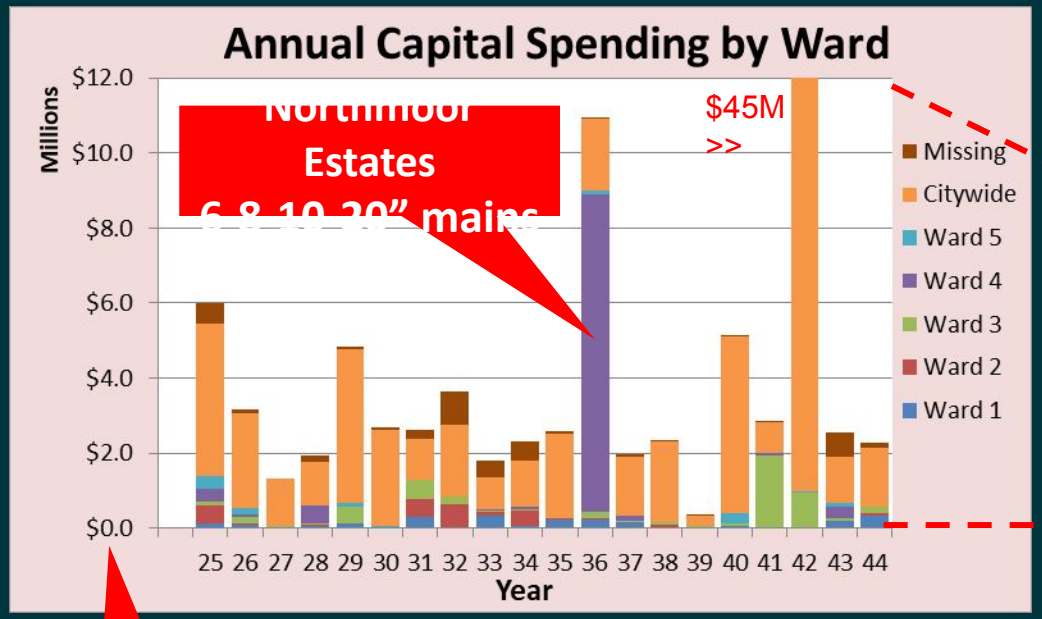
Cumulative Capital + O&M Costs
Sewer and Stormwater



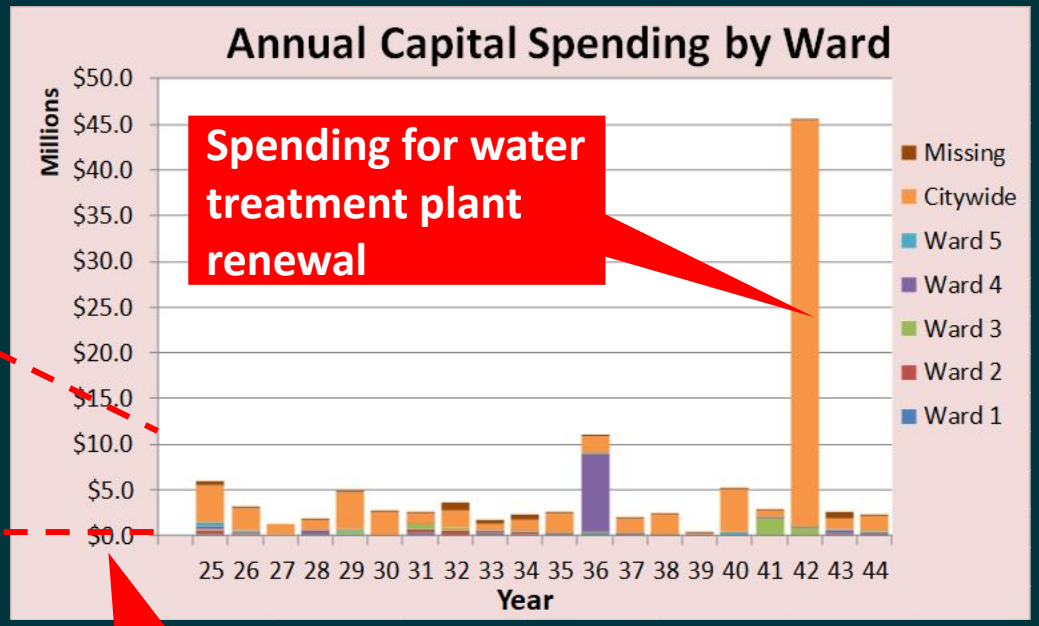


Spending by Ward

Projected Capital Spending by Ward – Water - $6M per Year Scenario

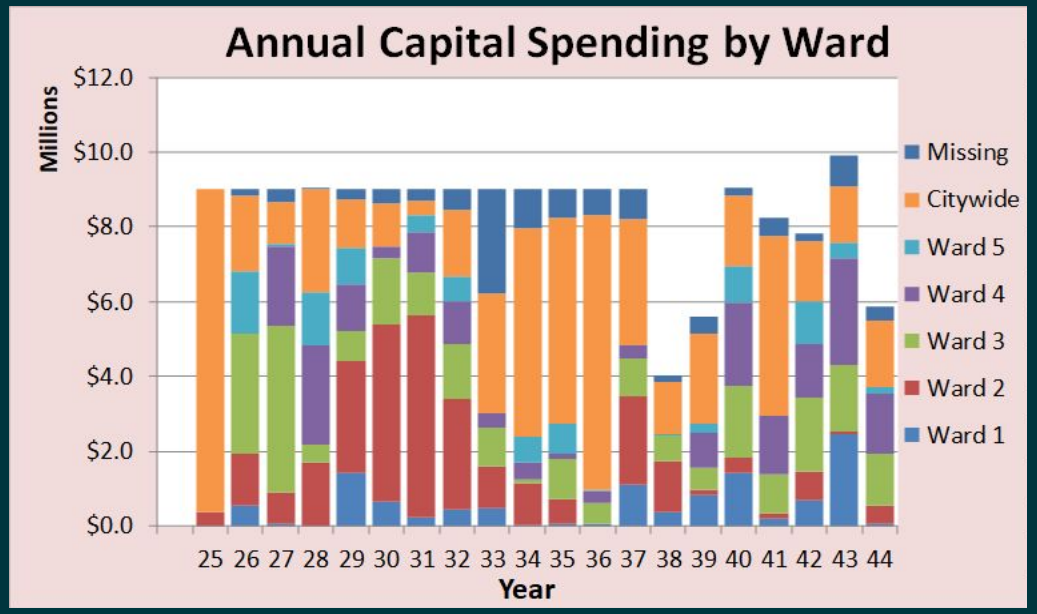


Same scale as Sewer spending on next slide



Scale showing magnitude of Water Treatment Plant spending

Projected Capital Spending by Ward – Sewer & Stormwater - $9M per Year Scenario



Conclusions

Conclusions

- Recommend continuation of current spending levels for renewal / replacement of existing water and sewer & stormwater assets.
  - Water = $6M per year (2025 $)
  - Sewer & Stormwater = $9M per year (2025 $)

- Funding below these levels will result in following undesirable outcomes …
  - Increasing backlog
  - Decreasing condition
  - Decreasing reliability
  - Increasing maintenance costs in operating budget for …
    - Preventive / scheduled / proactive inspection and maintenance
    - Corrective / unscheduled / reactive repair

Discussion

AECOM

Delivering a better world