AUTODESK

Strategic guide to living capital plans

How modern water and wastewater utilities are replacing static capital studies with continuous planning environments.

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INTRODUCTION

The question that changes everything

You've done the analysis. Your engineers have assessed risk across thousands of assets, ranked priorities, and produced a capital improvement plan. Then your board asks a simple question:

> ***"Why this project, and not that one?"***

If answering that question requires you to go back to a spreadsheet, reconstruct assumptions from a study done eighteen months ago, or call the consultant who built the model, your capital plan has a problem. Not an engineering problem. A workflow problem.

This guide is for utilities that want to close that gap. It's about what it means to move from a capital plan that exists as a document to a capital planning environment that works as a living system to hold up under pressure, evolve with your data, and give your team the confidence to stand behind every decision you make.

The pressure utilities face today

Water and wastewater utilities are being asked to make more defensible capital decisions, with tighter budgets, under greater scrutiny, than at any point in recent memory. Infrastructure is aging faster than it's being replaced. Household bills have grown at more than twice the rate of inflation. Boards, regulators, and ratepayers all want to see the reasoning behind every capital dollar and the consequences of getting it wrong have never been more visible.

The problem isn't engineering expertise. Utilities have capable engineers, inspectors, and planners who understand their systems. **The problem is that the tools and workflows behind capital planning weren't built for the level of accountability now required.**

Fragmented GIS, siloed inspection data, and spreadsheet-based risk models produce a plan that starts aging the moment it's delivered. The status quo is fragile, hard to audit, and nearly impossible to defend under scrutiny.

D+

ASCE's 2025 grade for U.S. wastewater infrastructure

30%

of U.S. utilities have implemented a full asset management plan

Read more about ASCE's U.S. Report Card >>

Sources: ASCE 2025 Report Card for America's Infrastructure (March 2025), Bluefield Research, U.S. Municipal Water & Sewer Rate Index 2024 and 2025 (Feb. 2025)

CHAPTER 1

Why static plans can’t keep up

Most capital plans start with good intentions and solid engineering judgment. The challenge is with the process is built around point-in-time analysis rather than continuous intelligence.

The fragmentation problem

In most utilities, the data that informs capital decisions lives across multiple systems that don’t talk to each other. This fragmentation creates four predictable failure points:

Decisions made from stale data

Inspection results collected last quarter aren’t reflected in the risk model built last year. By the time the capital plan is updated, conditions have changed.

Assumptions that can’t be traced

When a board member asks why a specific project ranked above another, the answer lives in a model built by a consultant who is no longer involved.

Plans become outdated immediately

A capital plan produced through a periodic consulting engagement reflects a moment in time. It begins aging the day it’s delivered.

Collaboration gaps

Engineering, GIS, operations, and leadership are working from different versions of the same data, creating misalignment and eroding confidence.

Evolving the consultant partnership model

Many utilities work with engineering consultants to build and maintain their capital plans, and those relationships bring expertise that matters. The challenge is when the insights that drove those decisions aren’t accessible to the utility team between planning cycles. Conditions change, new inspection data comes in, and leadership asks questions the plan can no longer answer.

A shared, connected environment changes that dynamic. **Utilities and their consulting partners work from the same data continuously**, so the intelligence built through that relationship stays current and useful long after the contract milestone is reached.

What a living capital planning environment looks like

A living capital planning environment isn't defined by a specific technology. It's defined by what it enables: the ability to make capital decisions with current data, document the rationale transparently, and adapt the plan as conditions change without starting over.

Traditional workflow	Living capital planning environment
GIS managed separately from inspection and capital data	GIS aligned with asset data, inspection results, and risk models in a single environment
Inspection data stored in a separate system, reconciled manually	CCTV results and defect codes feed directly into condition scoring and capital prioritization
Risk models built in spreadsheets or desktop tools	Likelihood, consequence, and rehabilitation logic integrated with asset data
Planning based on current condition assessments only	Deterioration forecasting extends visibility beyond current condition
Single-user desktop files, shared via email	Cloud-based, multi-user environment where the whole team works from the same data
Plan updated annually or when a new study is commissioned	Capital plan evolves continuously as new data arrives

The role of connected data

The most important shift in a living capital planning environment is data continuity. When inspection results flow directly into risk models, and risk models connect directly to capital prioritization, the plan reflects reality. When a new inspection uncovers a deteriorating asset, it changes the model. When the model changes, the priorities are updated. Every decision is traceable, documented, and grounded in current data.

CHAPTER 2

Five capabilities that define modern capital planning

Building a living capital planning environment requires five capabilities working together. Each one closes a specific gap in the traditional workflow.

01

Connected GIS and inspection data

When GIS and inspection results share the same environment, condition findings flow directly into **risk scoring without manual exports or reconciliation**. Capital models reflect your actual network, not a snapshot from the last time someone exported a shapefile.

02

Integrated risk and rehabilitation modeling

When risk prioritization and rehabilitation planning live in the same environment, **changing conditions update priorities automatically**. The methodology is documented, consistent, and auditable — so the answer to "why this project?" is always available.

03

Deterioration forecasting

An asset in acceptable condition today but deteriorating rapidly may warrant earlier intervention than one in slightly worse condition that's been stable for years. Deterioration forecasting **extends planning visibility** beyond what inspection data alone can provide.

04

Multi-user cloud environment

When the capital planning environment is shared, engineering, GIS, operations, and leadership all work from the same data. **Institutional knowledge stays in the system** rather than walking out the door when a team member or consultant engagement moves on.

05

Scenario testing and documentation

What happens if the capital budget is cut 15 percent? If a regulatory requirement accelerates a project, how does the rest of the program shift? Scenario testing turns capital planning from a static report into a decision-support tool that can **answer hard questions on demand.**

CHAPTER 3

What defensibility actually means

Defensibility is one of those words that gets used a lot in capital planning conversations without always being defined. It's worth being specific.

A defensible capital plan is one that can answer three questions clearly, at any point in the planning cycle:

- **Why was this project prioritized?** The answer should trace from asset condition and risk scoring to rehabilitation logic to capital ranking with documented methodology.
- **What would change if the budget were different?** A defensible plan supports scenario modeling, so the impact of financial constraints or changes in program scope can be shown, not just estimated.
- **How current is this data?** The answer should be measured in days or weeks, not months. A plan built on data that's more than a year old is difficult to defend to a regulator or a rate-scrutinizing board.

Where defensibility matters most

The following three specific situations that utilities face regularly are where a connected, living capital plan would provide the most impact:

Rate increase proceedings
When a utility requests a rate increase, it must demonstrate that capital spending is necessary, justified, and well-managed. A capital plan backed by connected risk data, consistent methodology, and transparent prioritization gives rate proceedings a foundation that a spreadsheet-based plan simply cannot provide.

Regulatory and consent decree oversight
Utilities operating under consent decrees or increased regulatory oversight face additional scrutiny on capital program management. Regulators expect documentation, traceability, and a clear connection between inspection findings, risk assessment, and rehabilitation planning. A living planning environment provides this by design.

Board and leadership presentations
Leadership increasingly expects capital planning presentations to answer ‘why’ and ‘what if,’ not just ‘what.’ A capital plan supported by a connected, continuously updated environment gives utility directors and asset managers the confidence to answer those questions with the documentation to back it up.

Defensibility isn’t a one-time achievement. It’s the result of a planning environment that maintains **transparency continuously**.

CHAPTER 4

How leading utilities made the shift

Change is hard in any organization, harder still in a public utility where decisions are scrutinized at every level. More utilities are making that call anyway, and the results are reshaping what good capital planning looks like.

Orange County Sanitation District

Orange County Sanitation District serves 2.6 million residents and manages over 380 miles of pipe, treating approximately 190 million gallons per day. Operating at this scale requires capital planning workflows that can support both program-level prioritization and asset-level decision-making simultaneously, and with consistent methodology across the organization.

The transition to a connected cloud environment improved workflow efficiency for the asset management program and enhanced the organization's ability to prioritize high-risk assets. Critically, it enabled the sharing of condition information and risk scoring in a format accessible to decision-makers across the organization.

Read full story

"Nowadays, OC San has a better toolbox to really prioritize what is risky in the system and allocate our resources there."

OC San Engineer

GHD and Aqua Pennsylvania

Aqua Pennsylvania operates more than 50 wastewater systems across 32 counties. Inspection data was dispersed across disconnected storage, risk analysis required desktop GIS expertise, and capital decisions needed to hold up to the Pennsylvania Public Utility Commission across dozens of individual systems simultaneously.

GHD created a shared environment where CCTV data, risk modeling, and capital prioritization work from the same foundation and is accessible to system managers, inspectors, and planners across the state without requiring GIS expertise to operate. Risk scores and rehabilitation priorities update bi-directionally as new inspection data arrives, and program managers can analyze CIP allocations at the system, regional, or state level. When regulators ask for documentation, the data is already there.

Read full story

"The more and better data you have to make those decisions, but also to present and justify and convince people that this is the prudent way of spending the money, the better off you will be."

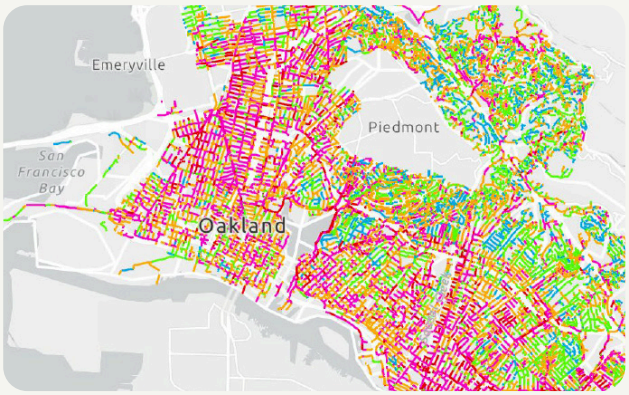
GHD Location Intelligence Team Lead

City of Oakland Public Works

Oakland's public works department manages approximately 940 miles of sewer pipeline with a capital program that requires both rigorous risk prioritization and strong multi-stakeholder coordination. The utility transitioned from a desktop asset management environment to a cloud-based platform, enabling risk prioritization within a shared environment accessible to the full planning team.

The shift produced tangible outcomes in capital planning workflow: **improved multi-user collaboration, stronger data accessibility across departments, and a more transparent connection** between asset condition, risk scoring, and capital decision-making.

Watch presentation



"Our digital tools help us delineate risk throughout the city using a criteria-based system."

City of Oakland Public Works
Supervising Civil Engineer

CHAPTER 5

Getting started

Moving from a fragmented capital planning workflow to a living environment doesn't require a wholesale organizational change. It requires a clear path: connect the data, align the workflow, and build the documentation discipline that makes defensibility sustainable.

Assess your current data landscape

Before you can connect your planning environment, you need to understand what's disconnected. Map your data sources: GIS, inspection management, risk modeling, capital planning. Identify the gaps and reconciliation points. Where is data duplicated? Where does it fall out of sync? Where does institutional knowledge live that should be documented?

Define your risk methodology

Defensibility starts with a documented, consistent risk methodology. Likelihood and consequence criteria should be defined, agreed upon, and applied consistently across the asset base. This doesn't need to be complex, but it needs to be explicit, so that prioritization decisions can be explained to anyone who asks.

Connect inspection data to capital modeling

The most impactful workflow change most utilities can make is eliminating the gap between inspection results and capital prioritization. When CCTV data, defect codes, and condition scores flow directly into risk models, the plan stays current automatically. This is the foundation of a living capital plan.

Build for multi-stakeholder access

A capital planning environment that only one person can access isn't a living system, it's a more sophisticated spreadsheet. Design for collaboration from the start: the engineering team, GIS, operations, and leadership should all be able to see the plan, understand the methodology, and contribute their perspective.

Establish continuous update discipline

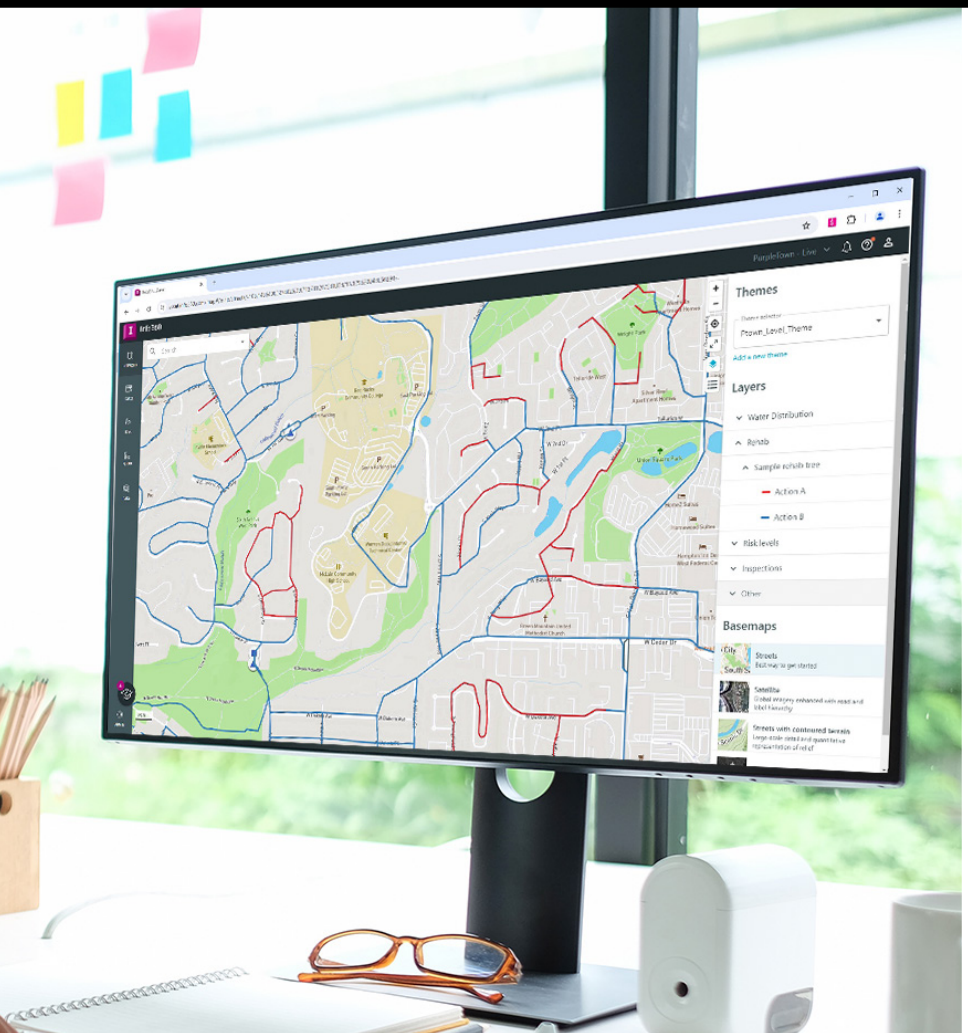
A living capital plan stays current because new data continuously enters the system. Establish a cadence for integrating inspection results, updating risk scores, and reviewing capital priorities. The goal isn't a quarterly refresh, it's a system where the plan reflects the most current picture of your assets at all times.

Ready to see what connected capital planning looks like?

Autodesk Info360 Asset brings together GIS, inspection data, risk modeling, and rehabilitation planning in one collaborative environment. See how utilities and consulting firms are using it to make faster, more defensible capital decisions.

Visit www.autodesk.com/info360-asset to learn more.

Info360 Asset



Streamline workflows and eliminate data silos with platform integrations

Connect your asset data with Info360 platform integrations. Bring your systems together to streamline workflows, improve collaboration, and support faster, more confident decision-making.

Key integration partners:

esri

VAPAR

pipes