Challenge: Optimize Water Mains Long-Range Renewal Plans

The City of Regina manages an inventory of approximately 1,155 km of water mains, about 30% of which were constructed 50 years ago. In face of increasing demand and limited financial resources, the City needed to develop optimized 20-year risk-based renewal plans for its ageing water mains inventory to minimize risks, maximize network performance, and ensure service reliability. Although the City has been undertaking several initiatives to optimize water main renewal projects, current approaches often relied on subjective and heuristic methods to prioritize projects and were not capable of generating optimized long-term renewal plans. The City needed a solution that can support risk-based multi-objective optimization to maximize network-level condition, minimize risk, and minimize lifecycle costs. The City required the solution to be capable of accurately determining funding needs to meet performance and risk targets, and identify annual optimal project lists over a 20-year planning horizon.
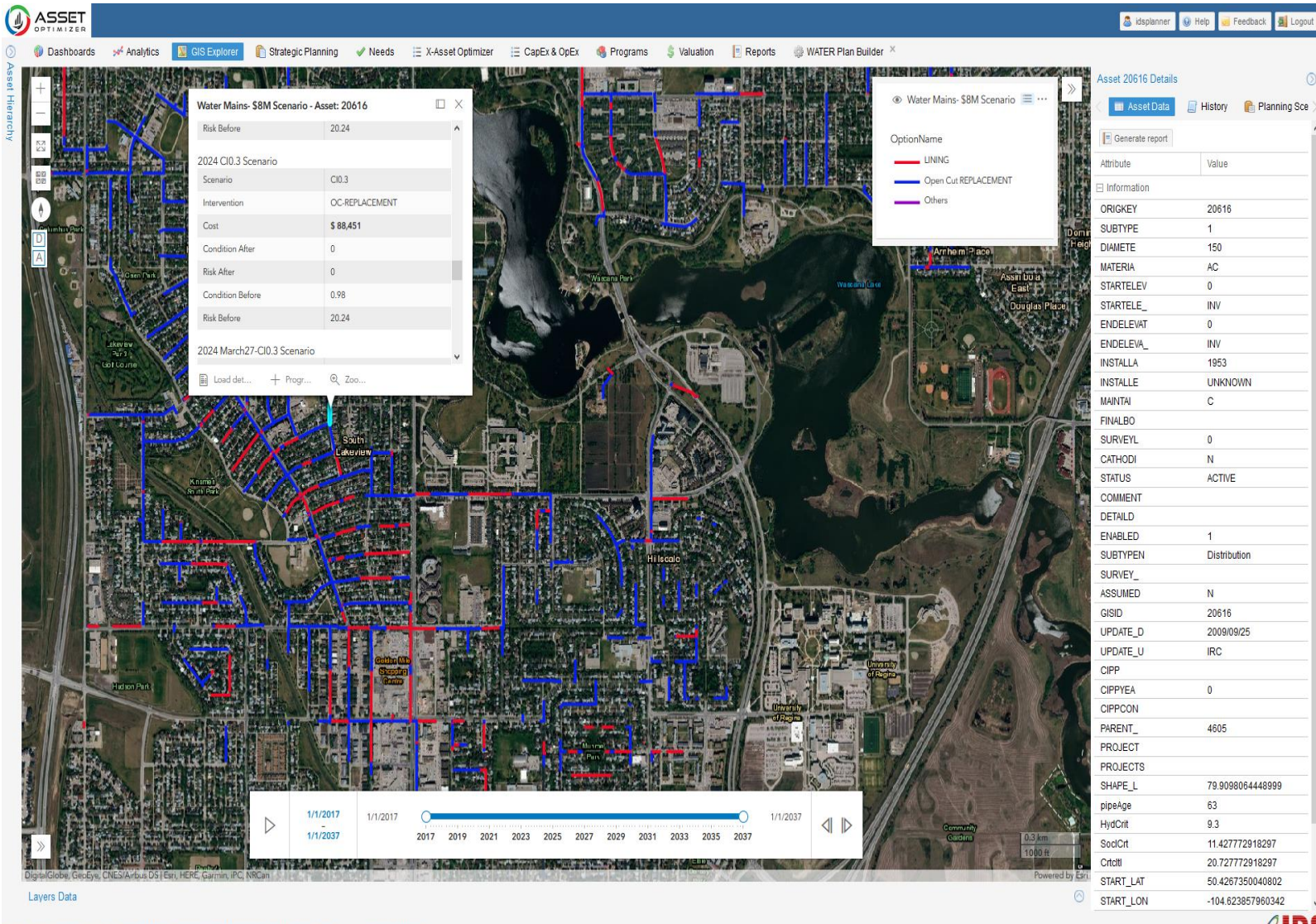
Solution: Asset Optimizer™

IDS Asset Optimizer™ GIS-centered cloud-based software was used to support lifecycle modeling and asset management planning of the City's water network. Asset Optimizer™ was then used to perform in-depth data analysis and develop data-driven deterioration and risk models. The deterioration models for various pipe groups were developed to forecast the rate of deterioration (i.e., growth of pipe break rate) based on historical break data. The consequence of pipe break was assessed based on multiple criteria such as pipe's location, diameter, level of service criticality, number of affected customers, etc. The forecasted condition and criticality of each pipe segment was used to calculate a risk metric. Two renewal actions were defined: open-cut replacement and lining using cured-in-place (CIPP). The cost of renewal actions was assumed based on historical data and industry average. Benefits were defined in terms of condition improvement increments.

Optimal annual project lists under multiple planning scenarios were generated and analyzed to assess the impact of various funding levels, and to determine funding needs to meet performance and risk targets. Detailed analysis of various scenarios helped to accurately quantify relationships between funding levels and system-wide condition and risk metrics and to optimally select projects where mostly needed. This analysis supported the development of objective, defensible, and optimized water mains renewal plan that is aligned with the City policies and service goals.

For More Information

To learn how Asset Optimizer™ can help your organization optimize long-range asset investment plans and make better decisions, contact us today at +1 (306) 790-1415 or visit www.ids.consulting