

# CAPITAL PLANNING SYSTEM APPLIED TO MUNICIPAL INFRASTRUCTURE

By Michael J. Garvin, P.E., Stephen C. Wooldridge, P.E., Student Members, ASCE,  
John B. Miller, Associate Member, ASCE, and The Honorable Michael J. McGlynn

**ABSTRACT:** Public owners are challenged by limited and constrained capital sources for acquiring and sustaining infrastructure facilities. They also generally lack supporting automation tools and techniques for analyzing capital investment and project execution decisions, elucidating the impact of these decisions in a holistic manner, and leveraging alternative delivery methods and financing means for competitive advantage. An automated decision support system in development at Massachusetts Institute of Technology provides an integrated planning framework for public owners and engineers to confront these issues. The system, called CHOICES, models life cycle cash flows of capital projects using variable delivery methods and finance options and aggregates them with forecasted operating revenues and expenses at a portfolio level. This paper describes the application of CHOICES to a municipality in Massachusetts. Capital program scenarios were developed using pace of execution and alternate funding sources as primary considerations. Development and analyses of the scenarios suggest that the current municipal environment hinders local infrastructure management and procurement. This is a first-order problem; its solution is likely to outweigh the choice of project delivery for many municipal governments, and it forces municipalities to consider a wide array of alternatives for fulfilling local requirements.