



# Hydrodynamic Evaluation and Design of Tidal Flushing Improvements for Replacement Channel Opening

## Timber-Span Bridge, Yarmouth, Massachusetts

Bass Creek is a coastal estuary that connects to Cape Cod Bay. An area of salt marsh at the upgradient end of Bass Creek had a restricted connection to the bay due to an undersized tidal culvert. Consequently, water quality was impaired and Phragmites dominated the upgradient reach of Bass Creek.

The Horsley Witten Group, Inc. (HW) completed several phases of restoration work at Bass Creek for the Massachusetts Coastal Zone Management (CZM) Wetlands Restoration Program. The first phase was to evaluate the tidal restriction and provide recommendations for increasing tidal flow to the salt marsh. Field work included deployment of water level pressure transducers to measure the headwater/ tailwater hydrodynamics, delineation of wetlands near the culvert, surveying of features in the vicinity of the culvert, and modeling of the existing tidal hydrodynamics.

This data was used to support hydrodynamic modeling that evaluated a series of alternative replacement culvert sizes and arrive at the most effective solution that would optimize tidal flushing. An open span, timber framed bridge over an enlarged channel opening was selected as the most cost effective and aesthetic replacement option for improved tidal-flushing.

In the second phase of work, HW designed the new channel opening and bridge, secured applicable permits, and conducted construction oversight. Construction was completed in the spring of 2008 and town and state officials, residents and visitors have all been impressed with the project outcome.

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