

# ENR

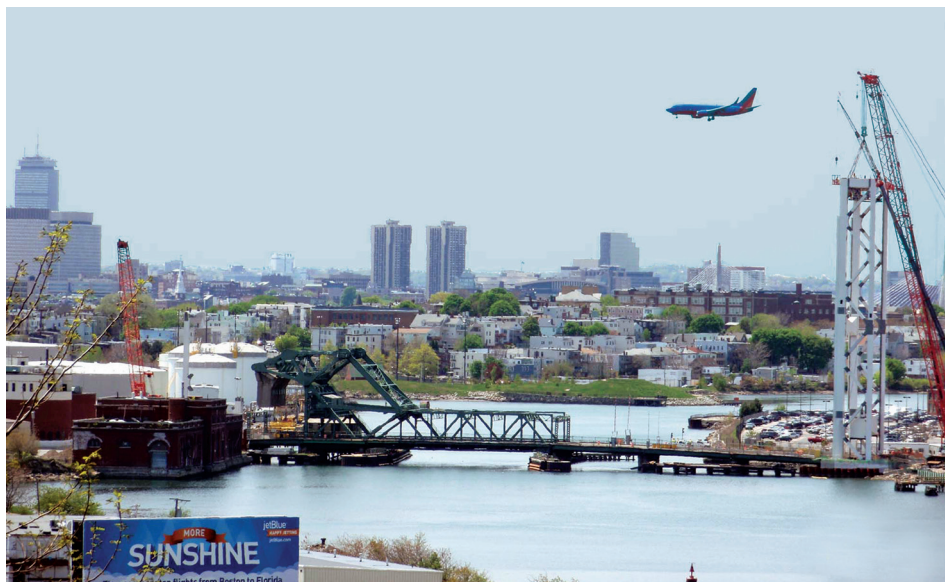
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## BRIDGES

# New Boston Crossing Will Open Up Room For Dredging



**LIFT BRIDGE FUELS REGION** A historic lift bridge is being replaced to allow for smoother passage of the fuel barges which supply 60% of the region's residential heating fuel as well as Logan International Airport.

Replacement of the historic 76-year-old, 120-ft-long Chelsea Street Drawbridge in East Boston will smooth the journey not only of 20,000 daily motorists but of barges supplying fuel for Logan International Airport and the northeast region.

The project will double the width of the Chelsea River Federal Channel and provide 175 ft of vertical clearance. The old bridge restricted shipping to a 96-ft section of the channel.

The \$125-million Massachusetts Dept. of Transportation project began in 2009. It was originally slated for completion this month, but was rescheduled for April due to overall scope, says Dan Casalento, MassDOT Boston-area construction engineer. "This is our first time to install a permanent lift bridge," he says. After demolishing the old bridge last summer, crews rolled two steel segments of the new 450-ft, 1,200-ton lift span onto temporary transfer rails between two 212-ft-

tall towers, says Jack Pecora, project manager for J.F. White, Framingham, Mass. "Other lift spans have been floated in using the tides, but this is likely the first time in New England to launch a 450-ft span with a 140-ft cantilever," he adds.

"We pushed the bridge up with a hydraulic jack 3.5 ft at a time, blocked the ends and used a steel wedge to engage the rollers," Pecora says. "Once the lift span was in final position, we connected its four corners to bridge wire ropes that ran over an enormous sheave to bridge counterweights, and raised the bridge."

The old Chelsea Street Bridge was one of only four bascule designs developed by Joseph Strauss and may have been the only Strauss heel trunnion bascule bridge in the state, according to the Historic American Engineering Record. The new bridge, designed by HNTB Corp.'s Boston office, will link the cities of Chelsea and Boston over Chelsea Creek.

Three years into the project, J.F. White requested a change in erection method since lack of clearance for larger vessels made it difficult to float the bridge in on barges, says Craig Finley, managing principal of Finley Engineering, Tallahassee, the construction engineer. "We proposed assembling in the parking lot on the Boston side of the existing bridge since working on land is more efficient."

Crews pre-assembled the new crossing on land near the old bridge, Pecora says. The upper tower sections of the bridge were also pre-assembled and erected as a single 200-ton column element. The step required additional engineering by Georgetown, Mass.-based Saugus Construction, but eliminated elevated height risks for workers, Pecora says.

Jerry Pfunter, assistant technical director at Finley, says his team used Lusas software to create a 3-D model of the truss. "The software allowed us to analyze the truss for varying support conditions created in the launch," he says. "Each member of the truss had to be analyzed during each phase of the launch."

The truss moved on the bogey, with vertical hydraulic jacks and horizontal launching cylinders "like monstrous roller skates," Finley says. "Tolerances were tight and loads were heavy."

Each tower is built on 5-ft-dia drilled shafts, socketed up to 50 ft into the bedrock with some over 100 ft deep, says Cassaletto says. The deck and sidewalks have been poured; remaining work includes joints, rail, and steel barriers.

The project goes hand-in-hand with a \$4.6-million U.S. Army Corps dredging project that will begin after J.F. White removes the piers and the old fender system and has completed new shoreline bulkheads for MassDOT, says Mike Deegan, project manager for the Corps' New England District in Concord, Mass.

The 34,700-cu-yd dredging project, expected to begin this month, will take 10 days and require closing the channel to all oil terminal traffic, along with intense coordination. "Sixty percent of the city's heating fuel is delivered to oil terminals through the channel," Deegan notes. ■

By Johanna Knapschaefer