Frances Appleton Pedestrian Bridge

The Frances "Fanny" Appleton Bridge is new a 750' (228m) long multi-use walkway located on the banks of the Charles River in Boston, MA. It connects the historic Beacon Hill neighborhood to the Esplanade Park. The contemporary arch bridge crosses over Storrow Drive, an arterial roadway that separates the city from the river. As one of the main connections to the riverfront, the bridge attracts many visitors, including approximately half a million people during the 4th of July annual celebration along the river.

The Appleton Bridge replaced an existing bridge, which was too narrow and not ADA compliant. The pre-existing bridge also had inadequate access stairs and could not accommodate multi-use. Conflicts between pedestrians and bicyclists were common. The width of the crossing was increased from 7' to 14'. The bridge consists of a contemporary tubular steel arch with a span of approximately 222' (68m) over the parkway. The main steel superstructure of approximately 550' (167m) is continuous without any joints and its shape in plan follows a curvilinear alignment. The bridge placement and overall geometry was carefully selected to comply with the ADA maximum slope requirements and avoid impacting large trees in the parkland as much as possible. The overall length of the bridge is approximately 750' with several entry points and connections to the existing network of walkways along the Charles River Esplanade.

One of the goals for the new pedestrian bridge project was to achieve visual transparency and lightness to allow views of the park, river and adjacent historic landmark Longfellow Bridge. The slenderness of the bridge was balanced against creating a structure that would potentially have issues with pedestrian induced vibrations. During the design process multiple iterations of the structural system were performed to achieve the "maximum" comfort range for pedestrians while eliminating the need for future supplemental measures, such as installing tuned mass dampers. The final design includes the creative use of a lightweight concrete deck with foam filled stay-in-place forms and appropriate foundation details.

The elegant steel superstructure consists of steel girders, which are curved in two directions, branching into two curved staircases and a scenic overlook plaza near the river. The bridge's steel fit up required careful planning during the final design phase as construction over a busy arterial road necessitated a detailed erection plan and sequencing. Stresses were evaluated in all structural members during both fabrication and erection. The major challenge of this unique bridge was the fabrication of the steel structure and its overall constructability. The bridge design includes complex curves and welded connections.

The main steel arch has a unique shape being wider at the crown and narrower at the abutments, which allows the size of the anchoring abutments at the park level to be minimal in size. The arch also includes a series of inclined struts creating a unique aesthetic truss effect. The arch is the longest bridge span over Storrow Drive connecting the city to the riverfront. The crossing is also higher than any other existing bridge along the highway corridor opening views and incorporating appropriate vertical clearances. The arch was brought to the site in pieces and assembled during overnight hours to reduced traffic impacts. The unique arch was welded in place in order to avoid using visible bolted connections increasing its visual appeal. The bridge approaches include Y-shaped piers which visually match the main architectural theme creating a visually unified structural system. Aesthetic lighting is also included to increase the sense of safety and appeal at night.

The new signature Appleton pedestrian bridge has quickly become a source of pride for the community due to its technical ingenuity, elegant detailing and context sensitive design, which perfectly integrates into Boston's landscape and historic riverfront.

Credits:

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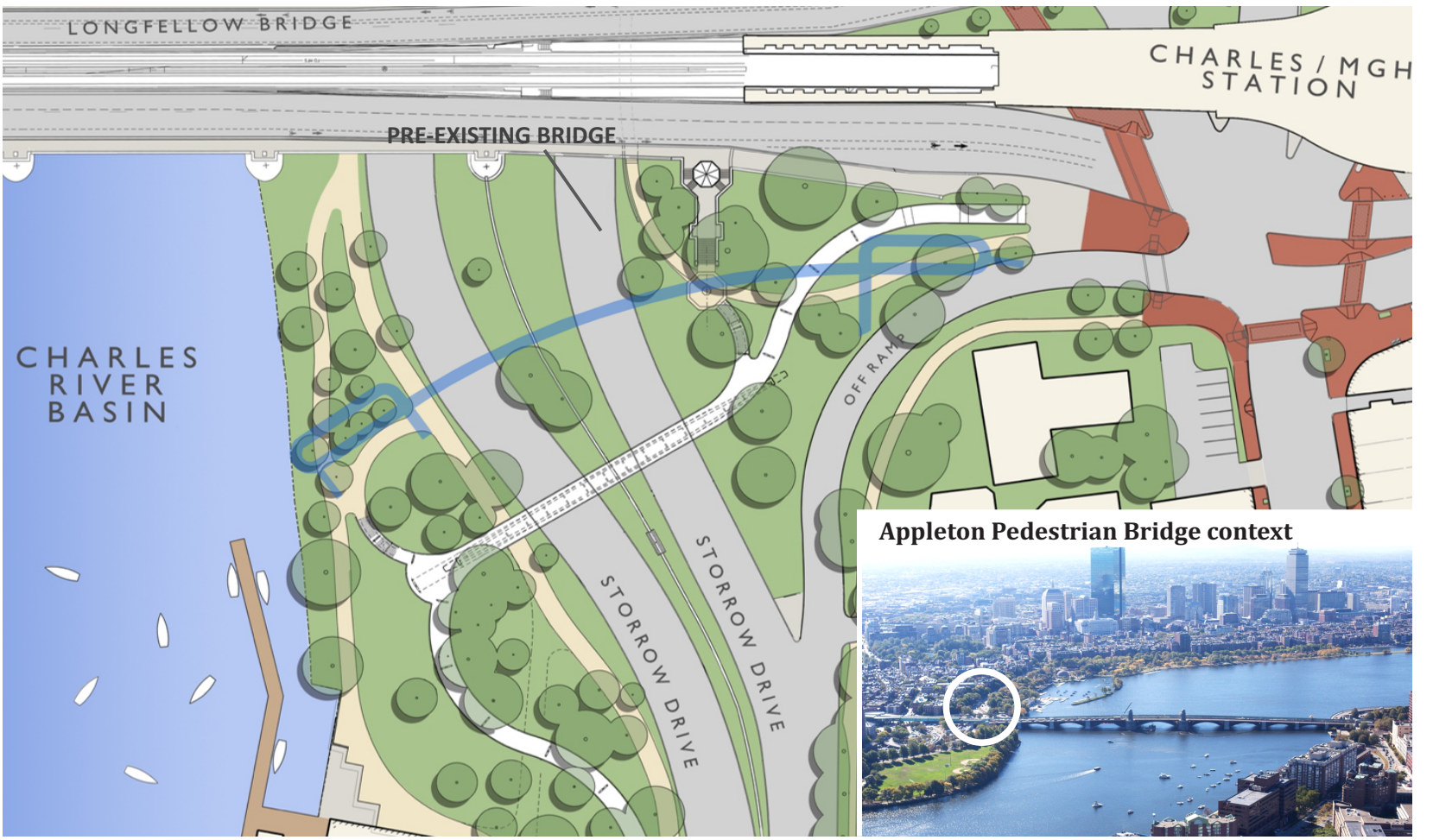
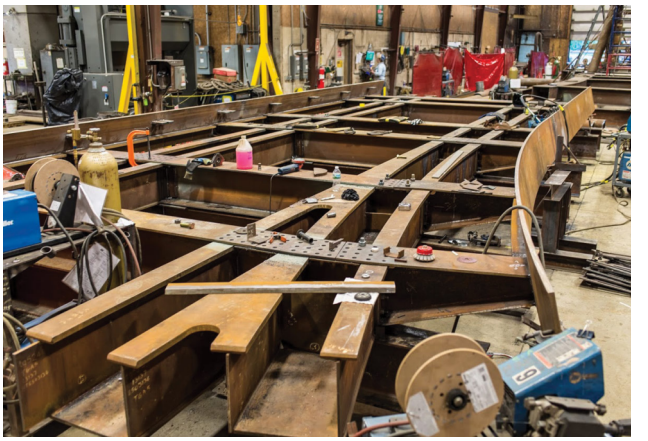
Designer: Rosales + Partners - Miguel Rosales - mrosales@rosalespartners.com - 10 Derne Street - (617) 601-6202

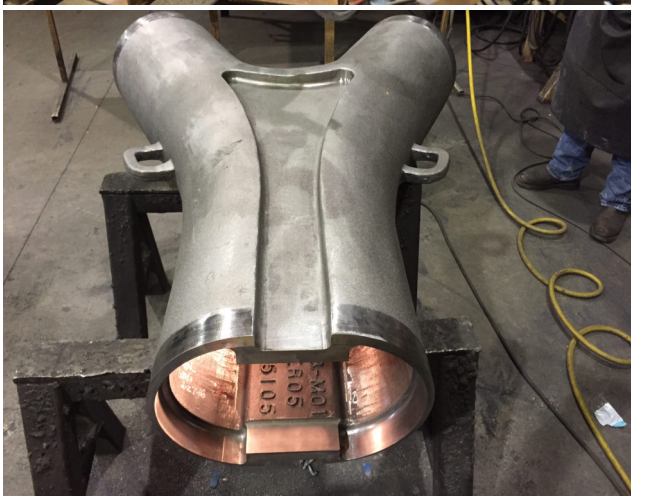
The Frances Appleton Pedestrian Bridge

Appleton Pedestrian Bridge plan



Appleton Pedestrian Bridge context





Construction, staging and steel elements detailing

Appleton Pedestrian Bridge at night

Appleton Pedestrian Bridge at night

Appleton Pedestrian Bridge in context

Appleton Pedestrian Bridge steel arch over Storrow Drive

Appleton Pedestrian Bridge approach ramp