

INNOVATIVE BRIDGE DELIVERED THROUGH UNIQUE OWNER-FACILITATED DESIGN BUILD PROCESS

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ABSTRACT

The new Penobscot River Crossing on U.S. Route #1 between Prospect and Verona, Maine is being designed and constructed in a unique owner-facilitated design build process that will allow for the delivery of the completed bridge on an extremely compressed schedule. The goal of the project is a durable, aesthetically-pleasing structure that will provide not only a transportation solution, but also economic and historically appropriate solutions for Waldo and Hancock counties and the entire state of Maine.

The new 2,120' long cable-stayed bridge with two pylons, one on each side of the Penobscot River, is located downriver from Bucksport, Maine. Adjacent to the bridge site is Fort Knox, a granite military establishment built in the mid-1800's to protect Maine from British naval attack. The Fort is Maine's busiest historic tourist attraction and soon a pathway will provide access from the Fort to the new bridge. Visitors will have the option of a short ride in a high-speed elevator to the top of the 400' pylon where an observatory will allow for views of the Maine coastal region.

The bridge design, developed through community design workshops, allowed for extensive public involvement and creative partnering among Maine agencies. Both the designer and the joint venture contractor are contracted directly by Maine Department of Transportation and the group jointly executed partnering agreements to speed the design and construction processes. FIGG was selected for the project in July 2003; the Cianbro/Reed & Reed LLC team in November, 2003. The foundation design package was released in December with construction beginning immediately. Design plans will be complete in the summer of 2004 and the bridge will be completed in 2006. We look forward to attending the conference and presenting this exciting bridge project that has been undertaken in a unique and creative fashion.

Keywords: Owner Facilitated, Design Build, Public Involvement, Aesthetics, Segmental, Maine, Speed of Delivery, Cable Stay, Observatory Deck

INTRODUCTION

During a routine rehabilitation of the historical Waldo-Hancock Bridge, the Maine Department of Transportation (MaineDOT) discovered corrosion and broken wires on the existing suspension cables. This prompted the MaineDOT to initiate design and construction of a new bridge to cross the Penobscot River on US Route 1 between Waldo and Hancock Counties. The location of this new crossing is downriver from Bucksport, Maine as shown in Figure 1 and Figure 2.

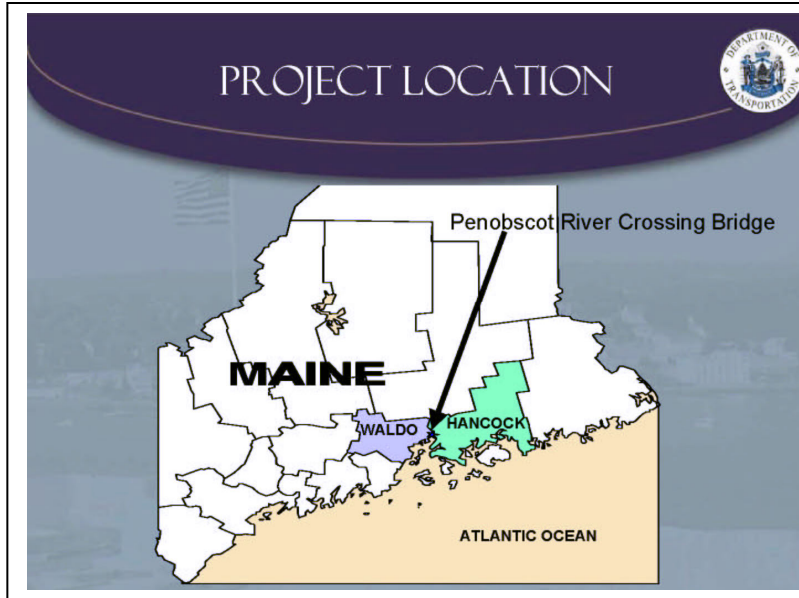


Figure 1 – New Penobscot River Bridge Location

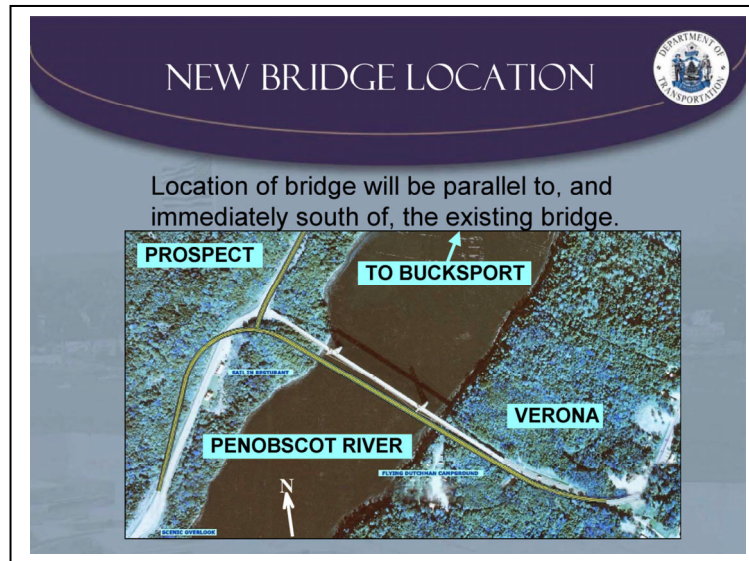


Figure 2 – New Penobscot River Bridge Alignment

After an extensive public involvement program, the design of a new cable stay bridge has been selected to span the entire Penobscot River. Given the historical significance of the existing Waldo-Hancock Bridge, the MaineDOT and entire community are interested in creating a new icon for the region. Not only does this need to be a landmark bridge, it also needs to be designed and constructed quickly, given the concern of the existing bridge condition.

The MaineDOT established early in the project a goal of designing and building a safe, durable cable stayed bridge that meets with regional and regulatory approval, has the lowest life cycle cost, and is open to traffic with an aggressive schedule. To accomplish this goal, the MaineDOT created a unique owner-facilitated design-build process that provides for concurrent design and construction activities.

BRIDGE FEATURES

The new Penobscot cable-stayed bridge is 2,120' long with two pylons, each founded on land at the edge of the river. The roadway provides for one lane of traffic, along with a multi-use lane in each direction. An elevation view of the new bridge is shown in Figure 3.

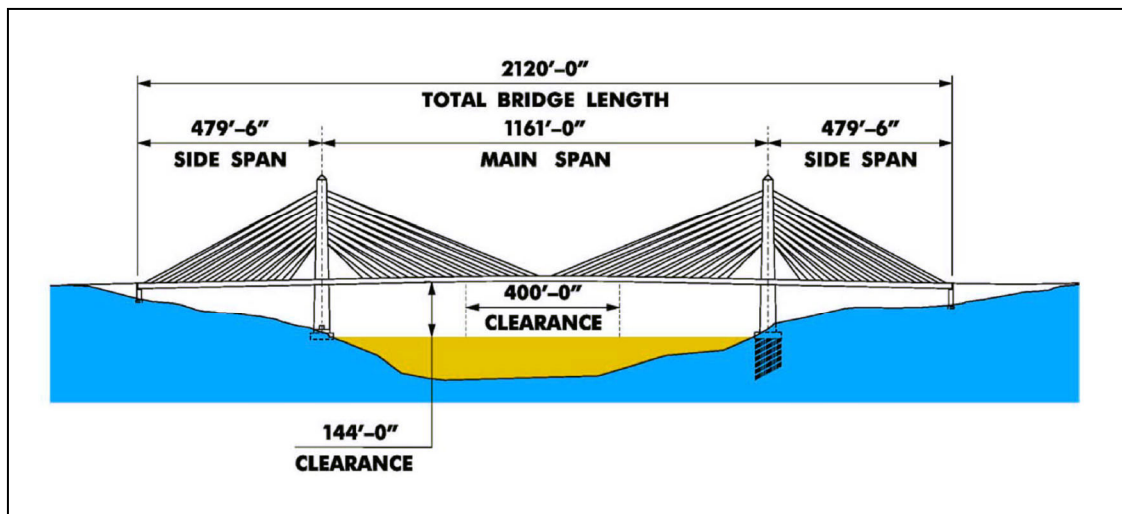


Figure 3 –Proposed Penobscot River Bridge Elevation View

The bridge design has evolved through design workshops that have allowed for extensive public involvement and creative partnering among the State of Maine government agencies. Out of this interaction came the suggestion that the bridge should emphasize the historical significance of the site. Adjacent to the bridge site is historic Fort Knox (see Figure 4). The Fort is a granite structure built in the mid-1800's that served as a military post to protect Maine from British naval attack. It serves as one a popular historical tourist attraction in Maine.

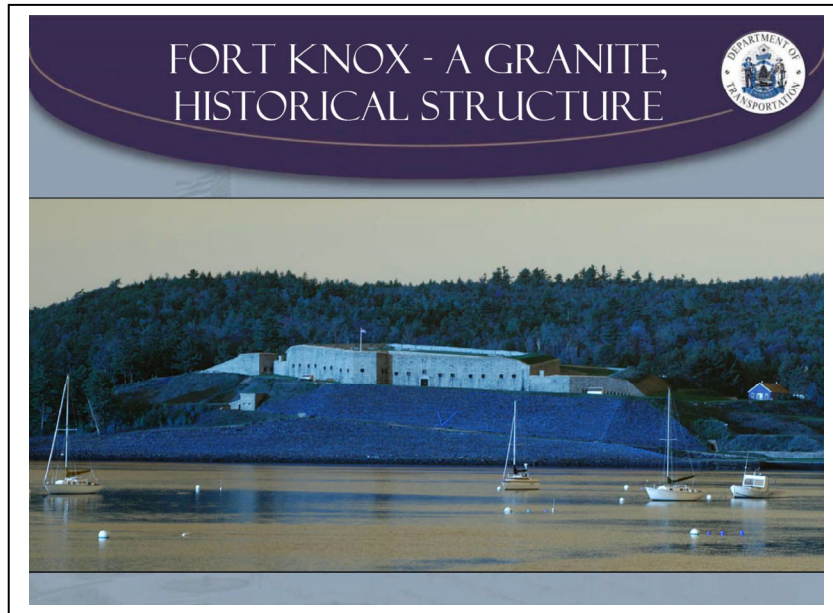


Figure 4 – Historical Fort Knox

Interactions with the Maine State Historic Preservation Commission provided a rich historical background. This included the following historical connections to the region. General Knox, for whom the Fort is named, served with distinction as President Washington's Commander of Artillery and the nation's first Secretary of War. President Washington, our first President, was honored with the Washington Monument, a major symbol for our country. There are many monuments in Maine that are similar to the Washington Monument, with an obelisk shape. The Fort, like the Washington Monument, is partially constructed of granite quarried in Maine, an industry with historical significance.

During the first public workshop, when voting for a project design theme, participants indicated an interest in focusing the project on granite and the philosophy that "form follows function". This direction, when coupled with the historic richness of the site, helped evolve the shape and details of the bridge pylon. In addition, the economic interests of the local communities and State agencies resulted in exploring the placement of an observation deck at the top of a pylon to attract tourists. As a result, the project design now includes a pathway that will provide access between the Fort and the new bridge. Once at the base of the new bridge, visitors may ride an elevator to the top of the 400' tall bridge pylon where an observatory deck will provide a view of the gorgeous Maine coastal region (see Figure 5.) This will be particularly attractive for viewing the wonderful fall colors of Maine.

All of these considerations were balanced by cost implications as explored with the contractor on the design-build team. Through all these interactions the bridge has evolved into a final form that will be a distinctive cable stay bridge that is sure to attract attention.

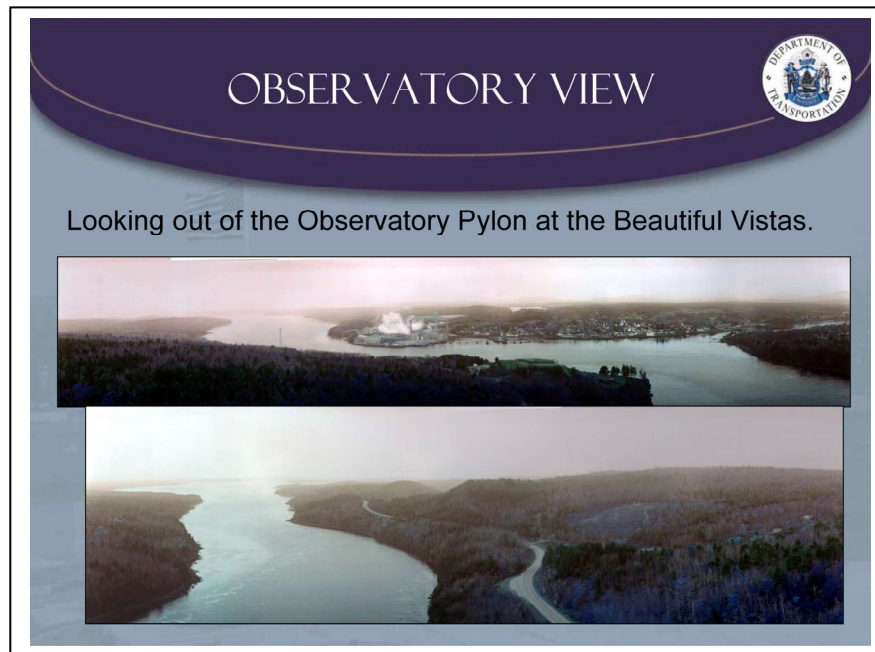


Figure 5 – View of Maine Coast from Pylon Observatory

OWNER-FACILITATED DESIGN BUILD PROCESS

In order to quickly advance this project, MaineDOT selected both a designer and contractor, each contracted directly with the MaineDOT. The combination of owner, designer and contractor is identified as the Design Build Team (DBT) and the group jointly executed partnering agreements at the beginning of the project. Members of the DBT pledged a commitment to coordinate with each other in the interest of concurrently advancing the design and construction processes.

Two contractors resident in Maine, Cianbro Corporation and Reed & Reed formed a Limited Liability Company (LLC), which was selected in November 2003 for construction of the bridge. The foundation contract package as designed by FIGG was released through the MaineDOT in December, with construction beginning immediately. A lower pylon contract was then negotiated and signed in May 2004 with an immediate Notice-to-Proceed from the owner. Final Design was completed in the August 2004 with construction continuing to progress towards a scheduled bridge completion in 2006.

As design progressed, the LLC was consulted for input concerning price related review of proposed design features. This interaction helped guide the design towards an efficient solution that could be constructed at a reasonable price. The owner was intimately involved

throughout all these meetings to provide project direction with their preferences as they evaluated both design quality and price considerations. This three-way interactive process has provided the owner with the typical design-build benefit of a timely completed project with the additional benefit of maintaining control over the entire process and final product.

CONCLUSION

The Maine Department of Transportation has combined an extensive public involvement program with a unique owner-facilitated design build process to create a landmark bridge that will serve the transportation needs of the region and as a tourist destination within Maine.

A rendered view of the completed bridge is shown in Figure 6.



Figure 6 – Rendering of Proposed Penobscot Bridge as Viewed from Fort Knox