ABC Innovative Projects

Parker River Bridge					
Location	Parker River National Wildlife Refuge on Plum Island, an eight-mile stretch of land just off the Massachusetts coastline				
State	Massachusetts				
Owner	U.S. Fish and Wildlife Service				
Year ABC Built	2007				
State ID #	N100108PDDOTNBI				
NBI #	N100108PDDOTNBI				
Coordinates	***Latitude:*** 42.762244		***Longitude:*** -70.848267		
Contact Person	Khoa Nguyen, P.E. Bridge Engineer FHWA Western Federal Lands Highway Division Phone: 360-619-7669 Email: Khoa.Nguyen@dot.gov				
Mobility Impact Time	***ABC:*** N/A – new bridge for facility entrance road		***Conventional:*** N/A		
Impact Category	*Tier 1*	*Tier 2*	*Tier 3*	*Tier 4*	*Tier 5*
Primary Driver(s)	• minimized environmental impacts • improved material quality and product durability				
Description	• 90-ft-long and 30-ft-wide three-span continuous-for-live-load precast slab beam bridge (30 ft – 30 ft – 30 ft) • Urban location • Average Daily Traffic count: N/A • Traffic management alternative, if constructed conventionally: no existing bridge and, therefore, no existing traffic volume to maintain ***New Bridge:*** The Parker River National Wildlife Refuge is a bird, plant, and wildlife sanctuary. It is a wetlands habitat that supports wildlife and delicate ecosystems. A new Visitors Center was constructed and required an entrance road connecting it to the state highway. The only point of entry was across 90 ft of designated coastal wetlands that required a bridge rather than conventional fill-in construction. The two-lane bridge was constructed under the Federal Lands Highway program. The FHWA Eastern Federal Lands Highway Division worked in partnership with the US Fish and Wildlife Service to design and construct the bridge. ***Construction Method:*** The bridge consists of precast concrete piles, abutments, pier caps, and slab beams. A local precaster and construction contractor were selected to provide casting, delivery, and construction services. The 32-ft-long precast abutments weighed 40 tons and were cast as a single unit monolithically with 8-ft-long wingwalls. The two 30.5-ft-long precast caps are each 3-ft deep and 2.5-ft wide. The abutments and caps had pile blockouts that allowed a 2-ft-deep pile embedment into the caps, with 6-inch-diameter concrete vents that extend to the top surface. A 5000 psi concrete mix was used for all prefabricated substructure components. The 30 span-length adjacent prestressed slab beams are made of 7000 psi concrete and are each 29 ft long, 3 ft wide, and 12 inches				

	deep. An alignment template was used to drive the twenty 18-inch-square 30-ft-long precast prestressed piles. Each pile was cut to elevation as needed, and a 3-ft-long dowel was inserted in the center of the top surface. The abutments and caps were lowered over the pile assemblies and grouted into position. The slab beams were erected onto elastomeric bearing pads, shear keys were grouted, a tie rod was threaded transversely through precast holes in the middle of each span and stressed with hydraulic jacks to perform as a unit, and the recesses at tie rod anchorages were filled with non-shrink epoxy grout. A waterproof membrane strip was placed on top of the longitudinal joints between the beams as an added measure of protection against water leakage through the joints. An 8-inch-thick cast-in-place high-performance concrete (HPC) deck was cast over a mid-depth mat of steel reinforcement to complete the composite section, and a raised sidewalk was cast.
High Performance Materials	• High performance concrete (HPC) deck
Photos	  

Project Planning	*Decision-Making Tools*	*Site Procurement*	***Procurement***	*Contracting*
	•	•	• Design-bid-build	•

Geotechnical Solutions	*Foundations & Walls*	*Rapid Embankment*
	•	•

Structural Solutions	***Prefabricated Bridge Elements & Systems***			*Construction*
	Elements	*Systems*	***Miscellaneous***	•
	• Adjacent slab beams • Precast pile caps • Precast abutment stems • Precast wingwalls	•	• Grouted keys • PT ducts, not grouted • CIP pockets in precast substructure	

Costs	The low bid was $893,000.

Funding	***Federal only***	*State only*	*Federal and State*	*Other*
	X			

Incentive Program ($)	*Highways for LIFE*	*IBRD*	*SHRP2*	*Other*

Contract Plans	**Complete Set:**	Contract Drawings (link to pdf)	**ABC *:**	
Specifications	**Complete Set:**	Not available.	**ABC *:**	
Bid Tabs	Tabulation of Bids (link to pdf)			
Schedule	**Engineer's:**	Not available.	**Actual:**	

Other Related Information	"Use of Prefabricated Elements and High Performance Concrete on Low Volume Road Bridges, Parker River Wildlife Refuge, Massachusetts" FHWA Office of Federal Lands Highway (link to DVD)
Photo Credits	U.S. Department of Transportation, Federal Highway Administration, Eastern Federal Lands Highway Division

* Specific to the ABC used in the project.