

# **Phase IIa Bridge on New Location Alternative Conceptual Alignment Assessment October 19, 2016 Merger Team Informational Meeting**

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## **Introduction**

The April 2015 agreement that settled the Bonner Bridge Replacement Project lawsuits brought forth by the Defenders of Wildlife and the National Wildlife Refuge Association states:

NCDOT shall prepare a report on the Phase II Extension Alternative within one and one-half years of the [lawsuit] dismissals referred to in paragraph l.h. The report shall contain information and evaluation sufficient to support Concurrence Points 2 and 2A for the Phase II Extension, and shall inform the analysis necessary for Concurrence Point 3 and for the Section 4(f) evaluation. The report shall, without limitation:

1. Describe the environmental features of the Phase II Extension study area, including performing new studies or updating existing studies of the topography, coastal condition, wetland and open water habitat, protected species, essential fish habitat, historic properties, and utilities.
2. Identify preliminary corridors that address the Purpose and Need for the project and consider the environmental constraints within the study area, including preparing conceptual/functional designs with horizontal and vertical alignments, edge of pavements, slope stakes, and right of way limits on digital orthophotography, as needed.
3. Include meeting summaries describing recommendations from members of the Merger Team, stating the rationale for retaining or dropping conceptual alternatives. Based on the input from the Merger Team, NCDOT shall identify the alternatives to be carried forward for more detailed design (preliminary level design).
4. Describe the development of the preliminary designs and, after coordination with key federal and State agencies, identify environmental impacts and possible measures to minimize such impacts.
5. Provide cost estimates and identify funding alternatives based on the preliminary design.

The Phase II Extension Alternative refers to an option that extends the Phase IIb Bridge on New Location Alternative (selected as the B-2500B LEDPA) to the north end of the Phase IIa study area. The Phase II Extension Alternative concept was first presented to the Merger Team in a meeting on September 11, 2014. For the purpose of today's meeting and this study, the Phase II Extension Alternative has been renamed as the **Phase IIa Bridge on New Location Alternative**.

The purpose of this report is to document the information used in evaluating the referenced "preliminary corridors" examined to date for discussion with the Merger Team. Based on Merger Team comments today, NCDOT will:

- Select conceptual alignments for preliminary design
- Prepare preliminary designs, cost estimates, and a discussion of funding options
- Prepare an Alternatives Study Report, which could later be used in the context of revisiting Phase IIa Concurrent Points 2 and 2A

The NCDOT study team is updating its biotic community information in the Phase IIa area, delineating wetlands where they have not been previously delineated, and completing additional research on protected species, essential fish habitat, and migratory and other waterfowl characteristics in Pamlico Sound.

The completed Alternatives Study Report will be discussed with the Merger Team at a future informational meeting.

The overall Bonner Bridge Project area is shown in Figure 1. This report presents and examines three conceptual Bridge on New Location Alternative alignments for Phase IIa. They are labeled Alignments A, B and AB. Alignments A and B are separate alignments. Alignment AB begins on the south with Alignment A and switches to the B alignment. These three alignments and the Bridge within Existing NC 12 Easement Alternative (Selected Alternative in the October 2013 *Record of Decision for NC 12 – Pea Island Long-Term Improvements Bonner Bridge Replacement Project Phase IIa*) are shown on Figure 2. The Figure 2 map coverage is noted in Figure 1.

The settlement agreement also states:

NCDOT and FHWA shall not design Phase IIa and Phase IIb of the Project so as to preclude the construction of subsequent phases within Pamlico Sound.

In order to address this requirement, this assessment also presents the opportunities available to extend both the conceptual Phase IIa Bridge on New Location Alternative alignments discussed in this report and the Bridge within Existing NC 12 Easement

Alternative. Figure 2 also shows the following possible “connectors” from the north end of Phase IIa to the new bridge over Oregon Inlet.

- Connectors C and D are two options for connecting the Phase IIa Bridge within Existing NC 12 Easement Alternative to a bridge continuing north in Pamlico Sound
- Connector E illustrates how Alignment A could be extended to a bridge continuing north in Pamlico Sound
- Connector F illustrates how Alignments B and AB could be extended to a bridge continuing north in Pamlico Sound
- Connectors G and H illustrate two possible alignments for extending the other connectors to the new Oregon Inlet bridge

The connectors illustrate the feasibility of extending either the Phase IIa Bridge on New Location conceptual alignments or the Bridge within Existing NC 12 Easement Alternative to Oregon Inlet. Connectors E and F also are considered a factor in the selection alignments to pursue further in this alternatives study because they illustrate how much new bridge would be needed and how much bridge might need to be removed with the extension of each Phase IIa Bridge on New Location Alternative conceptual alignment.

## **Alignment and Connector Descriptions**

### *Phase IIa Bridge on New Location Alternative Conceptual Alignments*

All of the Phase IIa Bridge on New Location Alternative conceptual alignments assume the following:

- They are more than 300 feet from the estuarine shoreline and (for the most part) no closer than 200 feet from existing marsh islands.
- They have a design speed of 60 mph and a minimum horizontal curve radius of 2,250 feet, per the design criteria of other Bonner Bridge Replacement Project phases.
- Bridging over wetlands, Coastal Area Management Act (CAMA) resources, and the Refuge outside the existing NC 12 easement. The northern bridge approach fill is within the existing NC 12 easement, as was done with Phase IIb Bridge on New Location Alternative (B-2500B LEDPA) and the Phase IIa Bridge within Existing NC 12 Easement Alternative.
- Minimize (to the extent possible) bridging over submerged aquatic vegetation (SAV) beds as depicted on current infrared photography and North Carolina Department of Environmental Quality (NCDEQ) SAV mapping from 2013.

- Avoid Refuge historic features.

As shown on the Figure 2:

- Alignment A (5.04 miles of bridge) parallels the shoreline in the southern portion of the project area before turning back to the shore. It is farther from the estuarine shoreline than Alignment B. This alignment would bridge a marsh island complex as it approaches Pea Island.
- Alignment B (5.38 miles of bridge) parallels the estuarine shoreline closer than Alignment A before moving further into the sound to circumvent the marsh island complex that Alignment A bridges.
- Alignment AB (5.39 miles of bridge) follows the route of Alignment A in the southern portion of the bridge, paralleling the shore further out than Alignment B. As Alignment A turns to go back into the Island, Alignment AB begins to follow the route of Alignment B and circumvent the marsh islands.

There are five horizontal curves with Alignments B and AB and four with Alignment A.

#### *Connectors to Oregon Inlet*

Connector E brings Alignment A back out into the sound in a potential future phase. The connector is 1.45 miles long. If at the time of such an extension, the connection to the Refuge were removed, 0.86 miles of bridge would be removed. The total bridge added or removed is 2.31 miles.

Connector F brings Alignments B and AB back out into the sound in a potential future phase. The connector is 1.27 miles long. If at the time of such an extension, the connection to the Refuge were removed, 1.29 miles of bridge would be removed. The total bridge added or removed is 2.56 miles.

Connectors C and D (associated with the Bridge within Existing NC 12 Easement Alternative) differ in that Alignment C creates as little new easement in the Refuge as possible, but bridges a part of the remains of the historic bridge over New Inlet, while Alignment D requires more new NC 12 easement in the Refuge but avoids bridging New Inlet bridge remains. These alignments illustrate that the opportunity exists to extend the Bridge within Existing NC 12 Easement Alternative north to Oregon Inlet. Evaluation of such an alignment will not occur until a future alternatives study.

Connectors G and H illustrate two ways of connecting to the Oregon Inlet bridge while seeking to avoid SAV beds as much as possible. Evaluation of such alignments will not occur until a future alternatives study.

## Assessment of Phase IIa Bridge on New Location Alternative Conceptual Alignments

The attached table compares conceptual alignments A, B, and AB in terms of their potential environmental impacts based on the following parameters:

- Bridge over Pamlico Sound and the Refuge
- Bridge over SAV and CAMA wetlands
- Proximity to estuarine shoreline
- Proximity to marsh islands
- Proximity to pond dikes (the closest historic feature)
- Wetlands filled

The alignments have the following key differences:

- Alignment A is over Pamlico Sound for a shorter distance (4.53 miles) than Alignments B and AB (4.84 and 4.85 miles).
- Alignments B and AB include a smaller amount of new NC 12 easement within the Refuge, based on both distance and total area: 0.34 miles/4.4 acres with Alignments B and AB versus 0.46 miles/5.67 acres with Alignment A.
- Alignment A would affect fewer SAV beds, bridging 1.52 acres versus 2.85 acres with Alignments B and AB. Alignments B and AB would bridge fewer CAMA wetlands (0.11 miles) than Alignment A (0.07 miles). With a composite of both SAV and CAMA wetlands, Alignment A would bridge 0.43 miles of and shade 2.1 acres of these sensitive biotic communities. Alignments B and AB would have a larger composite impact, bridging 0.67 miles and shading 3.2 acres of these communities.
- Alignments B and AB do not bridge marsh islands. Alignment A bridges a marsh island complex and would present a barrier between the islands. This could fragment the habitat of wading birds in the marsh islands. Alignments A and AB by circumventing the marsh island complex would not have the adverse effect of bifurcating the complex. There are no known feeding grounds on these marsh islands.
- All three alignments traverse the overwash area of the Pea Island breach (0.13 to 0.14 miles bridged), which could affect shorebirds nesting and foraging in the sand. These shorebirds include the protected species piping piper and rufa red knot. However, many of these species have the ability to fly in and out of the wash-over area and would still have access to the sand fan.

- The Alignment A bridge gets closer to the pond dike (85 feet) than Alignments B and AB (730 feet); however, Alignments B and AB stay within views of the sound from the dike for a longer distance than Alignment A before turning south.
- Alignment AB stays more than 200 feet from marsh islands for all but 0.35 mile; this length is 0.53 miles with Alignment A and 0.60 miles with Alignment B. Alignment A bridges marsh island for 544 feet.
- None of the alignments place fill in wetlands.

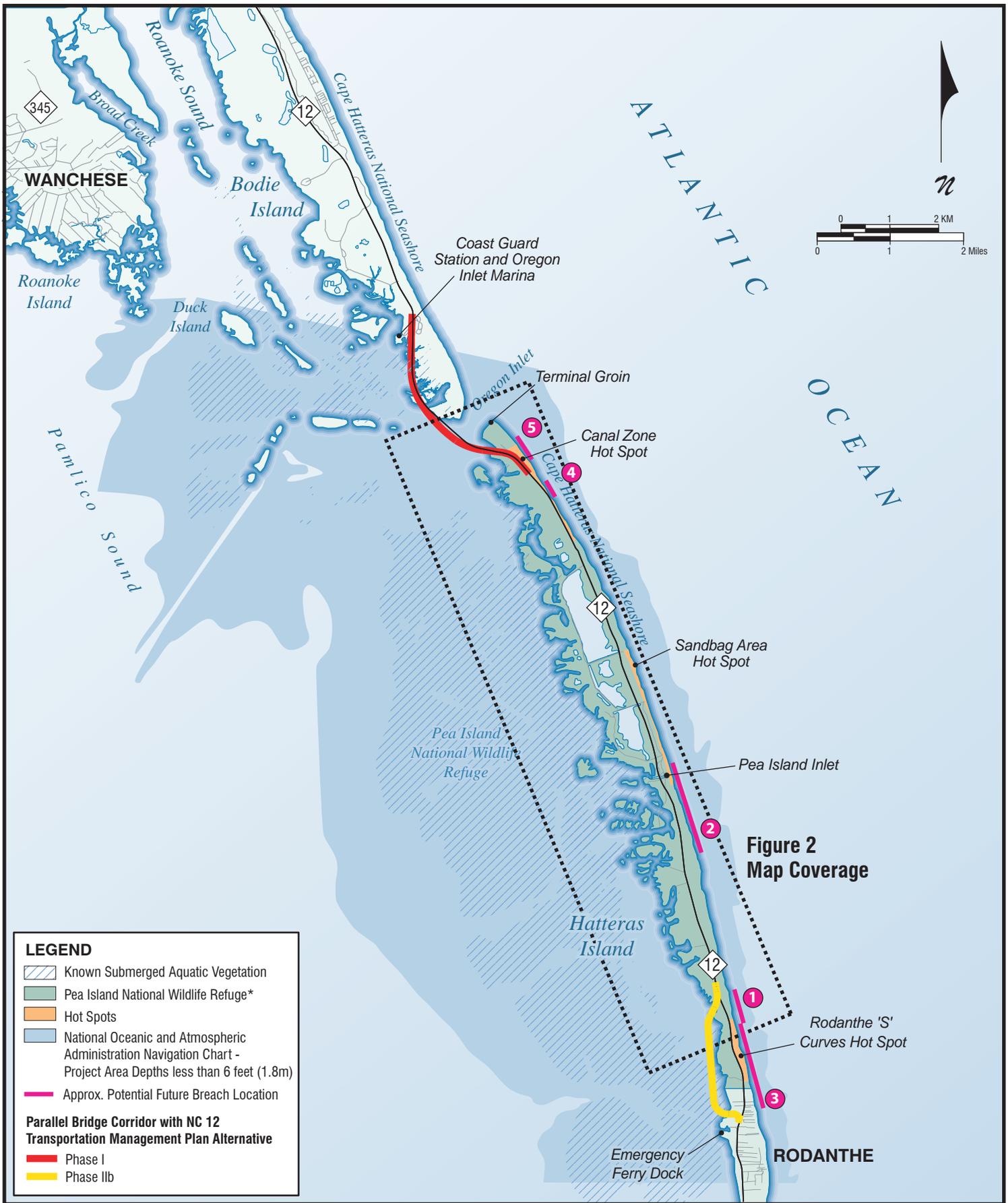
### **Request for Comments**

All three Phase IIa Bridge on New Location Alternative conceptual alignments are feasible. The feedback needed from the Merger Team is as follows:

- Do you have any notable concerns with any of the alignments, and what are those concerns?
- What refinements to the alignments do you suggest be examined?
- Are there other alignments you suggest and why?
- What other important environmental issues need to be considered in the alternatives screening?
- Do you have results of studies you have done in this area that would be useful to the alternatives analysis? Are there persons you think the NCDOT study team should talk to learn more about the study area?
- Other observations and comments?

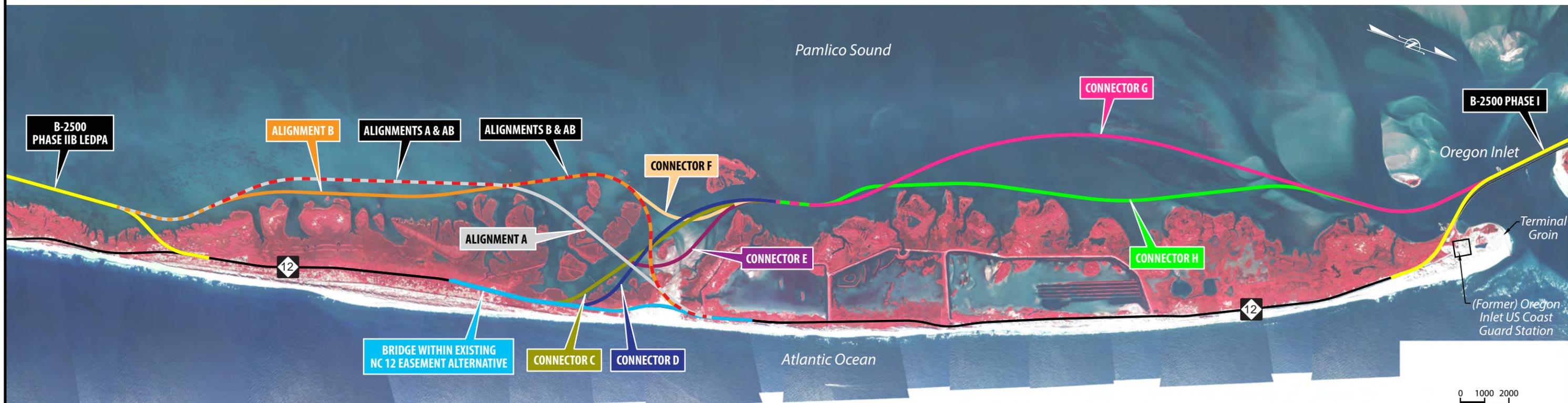
**Comparison of Conceptual Phase IIa Bridge on New  
Location Alternative Alignments**

	Alignments		
	A	B	AB
Total Bridge Length (miles)	5.04	5.38	5.39
Bridge Over Pamlico Sound (miles)	4.53	4.84	4.85
Bridge Over Refuge (miles)	0.46	0.34	0.34
Total Bridge Deck Area	24.45	26.07	26.16
Additional 100-Foot NC 12 Easement in Refuge (acres)	5.67	4.40	4.40
Bridge Over SAV Beds (miles)	0.32	0.60	0.60
Bridge Deck Over SAV beds (acres)	1.52	2.85	2.85
Bridge Over Breach Overwash (miles)	0.14	0.13	0.13
Fill In Wetlands (acres)	0.00	0.00	0.00
Bridge Over CAMA Wetlands (miles)	0.11	0.07	0.07
Bridge Deck Over CAMA Wetlands (acres)	0.58	0.38	0.38
Closest Distance to Shoreline (excluding marsh islands) (feet)	365	303	365
Bridge within 400 Feet of Shoreline (miles)	0.44	0.30	0.30
Bridge within 200 Feet of Marsh Islands (miles)	0.53 (bridges marsh island for 544 feet)	0.60	0.35
Distance to Closest Refuge Historic Feature (pond dike) (feet)	85	730 (however, in views from the dike longer than Alignment A)	730 (however, in views from the dike longer than Alignment A)
Design Speed (mph)	60	60	60
Minimum Horizontal Curve Radius (feet)	2,250	2,250	2,250
Number of Horizontal Curves	4	5	5



VICINITY MAP

Figure 1



**CONCEPTUAL ALIGNMENTS FOR PHASE IIa BRIDGE ON NEW LOCATION ALTERNATIVE ALIGNMENT STUDY**

Figure  
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