Attachment 7:

Identification of the Least Environmentally Damaging Practicable Alternative for the Mid-Currituck Bridge Project, July 2020

WHITE PAPER

Identification of the Least Environmentally Damaging Practicable Alternative

for the

Mid-Currituck Bridge Project
Currituck and Dare Counties, North Carolina

STIP No. R-2576

Prepared for the
North Carolina Turnpike Authority

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Introduction

The Mid-Currituck Bridge project is a complex effort with a long history. Dozens of combinations of bridge locations and roadway improvements have been studied in an attempt to address transportation problems in the Currituck and Dare County portions of North Carolina's Outer Banks, dating as far back as the 1980s. The presence of high-quality environmental features, the unique demands and requirements of a high-volume, high-density tourist area, and the need for effective hurricane evacuation infrastructure, have created a complex transportation challenge.

Recent efforts to address this challenge have been conducted by the North Carolina Turnpike Authority (NCTA) and the Federal Highway Administration (FHWA). Now, having carried out the requirements of the National Environmental Policy Act NEPA), NCTA and FHWA have selected a design concept that will effectively address the most pressing transportation needs in the coastal areas of Currituck and Dare counties. With the publication of a Record of Decision on the project's Selected Alternative, NCTA and FHWA are now ready to submit applications for permits required under the federal Clean Water Act and North Carolina's Coastal Area Management Act.[1]

This white paper is a companion to the other materials included in those permit applications, providing information about the project's Selected Alternative and why it can also be considered the project's "Least Environmentally Damaging Practicable Alternative" (LEDPA). Because its purpose is to distill into a short paper key findings from lengthy original documents, this paper does not include extensive detail. It is instead a collection of summaries, with references to the source reports.

To understand the basis for determining the project's LEDPA, the first section of this paper "tells the story of the project," proceeding chronologically through its key analyses and findings. Next, the relevant requirements of the Clean Water Act (CWA) and North Carolina's Coastal Area Management Act (CAMA) are summa-

[1] In addition, a US Coast Guard permit is required for the construction of the bridge over Currituck Sound addressing navigable clearances for boat traffic. This permit is issued for the NEPA Selected Alternative, once the LEDPA is determined.

rized. This paper concludes with an assessment of the project's alternatives in light of those requirements, leading to the conclusion that the Selected Alternative is also the LEDPA.

A Brief History of the Mid-Currituck Bridge Project

The idea of building a bridge across Currituck Sound to help relieve tourism-related traffic problems has been discussed since at least 1975, when the NCDOT Board of Transportation adopted a resolution identifying a new bridge across Currituck Sound as the most desirable access route to the Currituck Outer Banks. In the 1980s, NCDOT continued to study Outer Banks traffic issues, and in the 1990s prepared an initial feasibility study for a bridge over Currituck Sound. Studies continued into the 2000s, culminating with the current Record of Decision for a Mid-Currituck Bridge, issued in 2019. Key events and documents produced during this time frame are presented in **Figure 1**. A hyperlinked list of those documents is contained in **Appendix 1.**

The Project's Purpose and Need

The adoption of the purpose and need statement is one of the most consequential decisions in the NEPA process because it provides the foundation for identifying alternatives and for selecting the Preferred Alternative.[2] As documented in the Mid-Currituck Bridge project's 2008 Statement of Purpose and Need, three specific problems in the project area established the need for the project. The document states that:

1. The project area's main thoroughfares (US 158 and NC 12) are becoming increasingly congested, and congestion will become even more severe in the future.

2. Increasing congestion is causing travel time between the Currituck County mainland and the Currituck County Outer Banks to increase, especially during the summer.

[2] American Association of State Highway and Transportation Officials (AASHTO). *Defining the Purpose and Need and Determining the Range of Alternatives for Transportation Projects*. Center for Environmental Excellence. 2016. https://environment.transportation.org/pdf/programs/ph07-2.pdf.

FIGURE 1

MID-CURRITUCK BRIDGE

TIME LINE

1970

The NCDOT Board of Transportation resolution identifies a crossing of Currituck Sound as a desirable project.

1980

NCDOT's Outer Banks Environmental Impact Statement considers alternatives for providing a paved road to Corolla and results in building NC 12 from Duck to Corolla. Included is a consideration of a possible Mid-Currituck Bridge option.

NCDOT assesses a Mid-Currituck Bridge in a feasibility study for access over Currituck Sound

1990

FHWA and NCDOT publish a Notice of Intent to prepare an environmental impact statement for a proposed new bridge over Currituck Sound.

A Draft Environmental Impact Statement is issued for the proposed "Mid-Currituck Bridge project."

2000

FHWA and the newly formed NCTA reestablish the NEPA process for the proposed project.

After several years of intermittent activity, FHWA and NCTA rescind the 1995 Notice of Intent and 1998 Draft Environmental Impact Statement because several changes had been made to the project. FHWA and NCTA publish a new Notice of Intent for the reconfigured project.

NCTA prepares the new project's Statement of Purpose and Need.

NCTA prepares the new project's Traffic Alternatives Report, identifying and assessing from the perspective of travel benefits a wide range of bridge, non-bridge, and non-new highway alternatives.

The new project's Alternatives Screening Report is prepared, assessing the wide range of alternatives and documenting the selection of alternatives for detailed study.

2010

FHWA and NCTA issue a new Draft Environmental Impact Statement, documenting the assessment of the Detailed Study Alternatives.

The project's Preferred Alternative Report was prepared, documenting the results of the Draft Environmental Impact Statement EIS comment period and identifying the project's Preferred Alternative.

FHWA and NCTA issue the project's Final Environmental Impact Statement, documenting the conclusions reached over the course of the study, including the selection of a Preferred Alternative.

FHWA and NTCA prepare a draft version of the project's Record of Decision.

NCTA prepares the project's "2040 Traffic Alternatives Report," reflecting the analysis of the wide range of bridge, non-bridge, and non-new highway alternatives.

FHWA and NCDOT prepare a "Reevaluation of Final Environmental Impact Statement Study Report" to ascertain whether a Supplemental Environmental Impact Statement is required. Upon determining that a Supplemental Environmental Impact Statement was not required, FHWA and NCTA issue a Record of Decision for the Mid-Currituck Bridge project.

2020

3. Clearance times for residents and visitors who use US 158 and NC 168 as a hurricane evacuation route far exceed the State-designated standard of 18 hours.

These problems, or unmet needs, led directly to the identification of three primary purposes for the project:

1. To substantially improve traffic flow on NC 12 and US 158.
2. To substantially reduce travel time for persons traveling between the Currituck County mainland and the Currituck County Outer Banks.
3. To substantially reduce hurricane clearance time for residents and visitors who use NC 168 and US 158 during a coastal clearance.[3]

The criteria NCTA established to help measure the ability to meet these purposes are described below.

Improving Traffic Flow—The ability of an alternative to achieve this purpose was established in terms of:

- a reduction in annual millions of vehicle-miles traveled under congested conditions on the project area's thoroughfares in 2035 (LOS E and F are considered congested);
- a reduction in miles of NC 12 and US 158 operating at LOS F on the summer weekday and summer weekend in 2035; and
- a reduction in miles of NC 12 and US 158 operating at a poor LOS F on the summer weekday and the summer weekend in 2035.

As further described in the 2008 Statement, the intent was to measure improvements in travel flow on area's thoroughfare network and its "total operation"—as opposed to achieving a particular level of service on any given link in the network. It further stated that a single Level of Service goal was not established for all segments of NC 12 and US 158 because factors such as high future travel demands, lack of available funding, or potential environmental impacts could make it undesirable or impractical to attempt a project alternative that would eliminate all future summer congestion on the overall thoroughfare network.

[3] As stated in the Purpose and Need document (page 6) "An improvement is considered substantial as opposed to minor if the improvement is great enough to be largely noticeable to typical users of the transportation system and if the improvement offers some benefit across much of the network, as opposed to offering only a few localized benefits."

Reducing Travel Times— The ability of an alternative to achieve this purpose was established in terms of a reduction in summer weekday and weekend travel times in 2035 between Aydlett Road, on the Currituck County mainland, and Albacore Street, on the Currituck Outer Banks, via the Wright Memorial Bridge (US 158). Aydlett Road and Albacore Street were established as the approximate endpoints of a future Currituck Sound bridge, and the travel time for this route was selected as representative of potential travel times for all trips that occur along this route, whether on part of or all of the route. For comparison, the 2035 travel times with a Currituck Sound bridge in place were also established.

Reducing Hurricane Clearance Times—The ability of alternatives to achieve this purpose was established in terms the potential reduction in hurricane clearance time in 2035, with North Carolina's legislated standard[4] of an 18-hour clearance time as a reference point. Clearance time is used because it is consistent with the legislated standard and is a factor in decisions made by emergency management officials to issue an evacuation order.

Development and Screening of Project Alternatives

Federal regulations for NEPA compliance require the project's sponsoring agency to "rigorously explore and objectively evaluate all reasonable alternatives" and to "devote substantial treatment to each alternative considered in detail so that reviewers may evaluate their comparative merits."[5] The project's 2009 Alternatives Screening Report documents the wide range of build alternatives that NCTA assessed as possible ways of meeting the project's purposes. These included not only bridge and roadway combinations but also alternative concepts that would modify the existing transportation system without major roadway or bridge construction. Each of these alternatives is presented below, along with a summary of their screening results.

[4] NC Gen. Stat. § 136-102.7, "Hurricane Clearance Standard." www.ncleg.gov/Laws/GeneralStatuteSections/Chapter136.

[5] 40 CFR 1502.14(b). www.govinfo.gov/content/pkg/CFR-2012-title40-vol34/pdf/CFR-2012-title40-vol34-sec1502-14.pdf.

Alternative Concepts

To help ensure that all potentially viable actions for meeting the project's purposes were examined, NCTA identified and considered several alternative concepts. These included one Transportation Demand Management alternative (Shifting Rental Times), various Transportation Systems Management alternatives, implementation of transit (bus service), and several different options for providing ferry service across Currituck Sound.

Shifting Rental Times (Transportation Demand Management) — Land uses on the Outer Banks of Currituck and Dare counties consist primarily of vacation rental properties and businesses that serve them. The rental properties are typically rented by the week, with peak occupancy from June through August. NCTA's analysis found that approximately 70 percent of the check-ins at those properties occurred on Saturdays, with 25 percent on Sundays and 5 percent on Fridays, and that it is during these summer check-in and check-out days that the highest traffic volumes in the project area occur. The Shifting Rental Times Alternative considered whether shifting arrival times and check-ins to achieve a more even distribution on Fridays, Saturdays, and Sundays would result in sufficient improvement in project area traffic flow to meet the project's purposes.

Transportation Systems Management — TSM is a set of strategies that focus on operational improvements that can maintain or restore the performance of the existing transportation system before extra capacity is needed, without major capital investment.[6] Three TSM options were examined for the Mid-Currituck Bridge project:

1. Optimizing signal timing on US 158 and NC 12 in the project area to improve traffic flow.
2. Adding left-turn lanes or traffic signals at major intersections on NC 12 that provide access to numerous homes.
3. Restricting side-road access through the use of right in-only and right out-only turning movement from local streets, and closing selected intersections to reduce the number of points where drivers must slow down to make turns.

This alternative also included provisions for reversing lanes on US 158, from NC 12 in Dare County to NC 168 in Currituck County, during hurricane clearance events to maximize the efficiency of existing roads.

[6] Federal Highway Administration. "What is TSMO?" www.ops.fhwa.dot.gov/tsmo/#q1.

Bus Transit — Under this alternative, bus transit would be implemented in the project area to reduce traffic volumes on area roads. NCTA did not develop specific design and operational characteristics for this alternative, choosing instead to wait until it could be determined if this alternative would meet the project's travel purposes. The assessment assumed bus transit could capture one percent of trips on the Outer Banks, based on the potential travel time by bus (compared to automobiles) on Outer Banks roads, and by considering other bus systems' trip capture rates.

Ferry Service — Four ferry alternatives were considered as possible alternatives to constructing a new bridge over Currituck Sound. Each of these also included, in addition to ferry service, improvements to various portions of the existing roadway network to reduce hurricane clearance times.

Screening of Alternative Concepts

After analyzing each of the alternative concepts, NCTA concluded[7] that none would meet each of the three purposes of the project.

Shifting Rental Times (Transportation Demand Management) — After assessing this option, NCTA determined that shifting rental times would reduce congestion and improve travel times during summer weekends by only a negligible amount (one percent) and during other times would not provide any reductions or improvements. In addition, this alternative would have no effect on hurricane clearance times. Because shifting rental times would not achieve the purposes of the project, it was dropped from further consideration.

Transportation System Management — While this alternative's contraflow lane would substantially reduce hurricane clearance times and travel times, congestion relief would not be substantial, with only a five percent reduction in overall congestion and between a three and zero percent reduction in the miles of road operating at Level of Service F or worse. Since this alternative would not meet the project's traffic flow improvement purpose, it was dropped from further consideration.

[7] In cooperation with FHWA and the project's environmental resource and regulatory agencies.

Bus Transit — NCTA's analysis found that this option would provide no congestion relief, and, because it would apply only to trips on the Outer Banks, bus transit would have no effect on trips between the Outer Banks and the Currituck County mainland. This alternative would also have no effect on hurricane clearance times. As a result, bus transit was dropped from further consideration.

Ferry Service — NCTA's analysis of the four ferry concepts found that none would provide more than minimal benefits beyond what could be achieved by improving existing roads alone, and that the cost of achieving those minimal additional benefits would be substantially higher than the cost of any of the roadway or bridge alternatives. In addition, ferry service would not contribute to improving hurricane clearance times and would result in substantial natural resource impacts. For these reasons, NCTA dropped each of the ferry concepts from further consideration.

Existing Road Improvement Alternatives

NCTA examined two alternatives for meeting the project purposes without building a new bridge over Currituck Sound and instead making substantial upgrades to the existing NC 12 and US 158. The first alternative, ER1, was developed in an attempt to achieve Level of Service D (desirable) throughout the study area road network on a typical summer weekday. The second, ER2, was developed to achieve maximum transportation benefits using existing roadways while minimizing community impacts.

Both Existing Road alternatives would:

- Add a third northbound lane on US 158 from the Wright Memorial Bridge to NC 168 as a hurricane clearance improvement or use the center turn lane as a third northbound clearance lane.
- Widen US 158 to eight lanes between the Wright Memorial Bridge and the NC 12 intersection.
- Widen NC 12 from US 158 to Corolla.
    - **ER1** would widen NC 12 to four lanes for the entire length between US 158 and Corolla.
    - **ER2** would widen NC 12 to three lanes from US 158 to the Currituck County line County and to four lanes for the remainder of its length.

Figure 2 shows the improvements associated with these two alternatives.

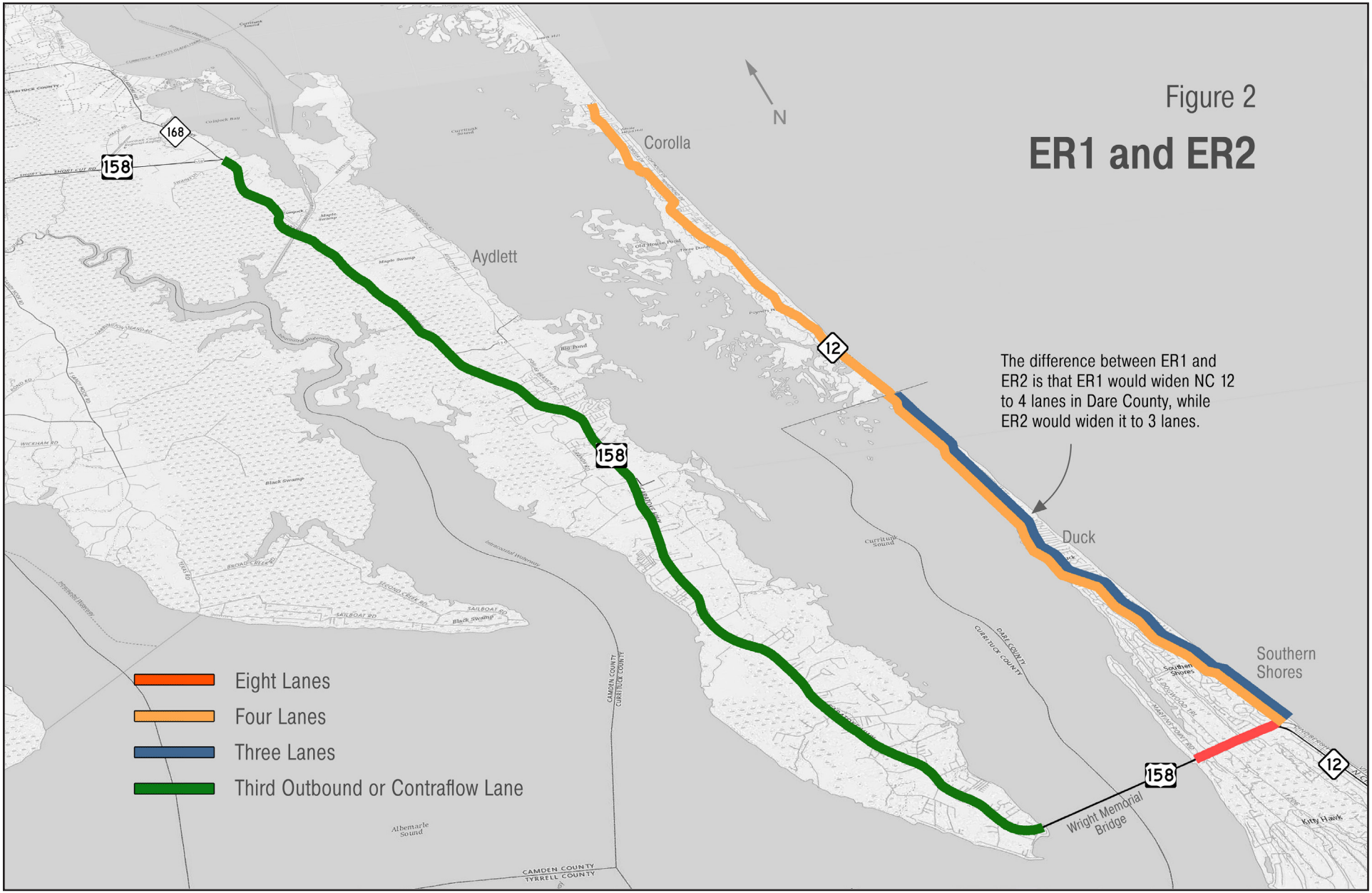
Figure 2
ER1 and ER2
N
Corolla
Aydlett
Duck
Southern Shores
Wright Memorial Bridge
Kitty Hawk
The difference between ER1 and ER2 is that ER1 would widen NC 12 to 4 lanes in Dare County, while ER2 would widen it to 3 lanes.
Eight Lanes
Four Lanes
Three Lanes
Third Outbound or Contraflow Lane
168
158
12
Albemarle Sound
CAMDEN COUNTY
TYRRELL COUNTY
CURRITUCK COUNTY
DARE COUNTY

Screening of Existing Roadway Alternatives

Several benefit and impact categories were used to screen the Existing Road (ER) alternatives. These included the ability to meet the three primary purposes of the project, the extent they would improve system efficiency, their potential impacts on natural and community resources, and their financial feasibility.

Project Purposes — NCTA concluded that both of the Existing Road alternatives would: improve levels of service on summer weekdays and weekends, decrease total annual congested vehicle-miles, and decrease travel times to and from the Currituck County Outer Banks. These benefits would be substantially greater with ER1 than with E2. Hurricane clearance times would also be reduced, but neither alternative would provide enough reduction to achieve the 18-hour clearance standard. The hurricane clearance time reduction was the same with both alternatives.

System Efficiency — Despite meeting the project's purposes, neither of the Existing Road alternatives were found to improve system efficiency. Although traffic would operate at an improved levels of service, annual vehicle-miles traveled in the project area would not be reduced.

Natural Resource Impacts — Because the Existing Road alternatives would not involve a new bridge, they would avoid the environmental impacts associated with crossing Currituck Sound and would not affect wetlands on the Currituck County mainland, east of US 158 (Maple Swamp). Both would require widening NC 12 and US 158 and both would affect other wetlands and natural resources along those corridors. The totals are as follows, in terms of total acres filled:

	ER1	ER2
Wetlands	27.5	27.0
Other High-Quality Natural Resources	19.4	18.4

Community Impacts — The key community impact category for the Existing Road alternatives was found to be relocations. The two alternatives varied considerably in this category, with ER1 requiring 227 total relocations and ER2 requiring 47.

Financial Feasibility — The estimated capital cost of ER1 in 2009 was $658 million. The estimate for ER2 was much lower, at $315 million. Because NCTA lacks authority to toll existing roads in association with this project, and, more importantly, because collecting tolls on roads with multiple uncontrolled access points

would be exceedingly problematic, neither of these alternatives could be funded using toll revenues. As a result, NCTA concluded that because neither Existing Road alternative could be fully financed, neither could be considered an economically viable alternative.

Conclusions — Because the Existing Road alternatives would not improve system efficiency and would not have viable funding mechanisms, NCTA initially concluded that both should be dropped from further consideration. Upon consultation with environmental resource and regulatory agencies, however, several agency representatives stated that ER2 should be retained for detailed study because of its lower cost, lower potential environmental impacts, and because it would provide a way of comparing a non-bridge alternative on an equal basis with the Mid-Currituck Bridge alternatives. As a result, NCTA dropped ER1 but retained ER2 as a detailed study alternative.

Mid-Currituck Bridge Alternatives

Four alternatives for construction of a Mid-Currituck Bridge (MCB) over Currituck Sound were developed—MCB1, MCB2, MCB3, and MCB4. Each included various combinations of improvements to existing roadway segments.

MCB1 and **MCB2** would:

- Construct a two-lane toll bridge across the Currituck Sound in Currituck County.
- Add either a third northbound lane on US 158 between Aydlett Road and N C 168 as a hurricane clearance improvement or use the existing center turn lane as a third outbound clearance lane.
- Widen the section of US 158 on the Outer Banks to six lanes between the Wright Memorial Bridge and Jupiter Trail entrance and to eight lanes from Jupiter Trail to NC 12.
- Widen NC 12
    - **MCB1** would widen NC 12 to four lanes for the entire length between US 158 and Corolla.
    - **MCB2** would widen NC 12 to three lanes from US 158 to the Currituck County/Dare County line and to four lanes for the remainder of its length.

MCB3 and **MCB4** would:

- Construct a two-lane toll bridge across the Currituck Sound in Currituck County.
- Add either a third outbound lane on US 158 between Aydlett Road and NC 168 as a hurricane clearance improvement or use the existing center turn lane as a third outbound clearance lane.
- Widen NC 12 to four lanes for a distance of approximately two to four miles south of its intersection with the Mid-Currituck Bridge.

MCB4 would also:

- Add a third outbound lane on US 158 between the Wright Memorial Bridge and NC 12 (or use the center turn lane as a third outbound clearance lane) as an additional hurricane clearance improvement.

Because MCB3 and MCB4 were developed as bridge-only alternatives, their associated roadway improvements are limited to those necessary to ensure adequate functioning at the project's intersection with NC 12 and to ensure that the project purpose of substantially reducing hurricane clearance time could be met. The only difference between them is the extent of their hurricane clearance improvements.

Figures 3 and 4 show the improvements associated with each Mid-Currituck Bridge alternative.

Screening of Mid-Currituck Bridge Alternatives

The new bridge alternatives were screened against the same set of factors as the Existing Road alternatives: the ability to meet the three primary purposes of the project, the extent they would improve system efficiency, their potential impacts on natural and community resources, and their financial feasibility.

Project Purposes — To a greater or lesser degree, each Mid-Currituck Bridge alternative would meet the three project purposes.

MCB1 was found to provide the highest level of benefit. It would eliminate Level of Service F in the project area on summer weekdays and reduce travel times to and from the Currituck County Outer Banks (via the Wright Memorial Bridge) by 53 percent. Travel times savings for Mid-Currituck Bridge users with the same

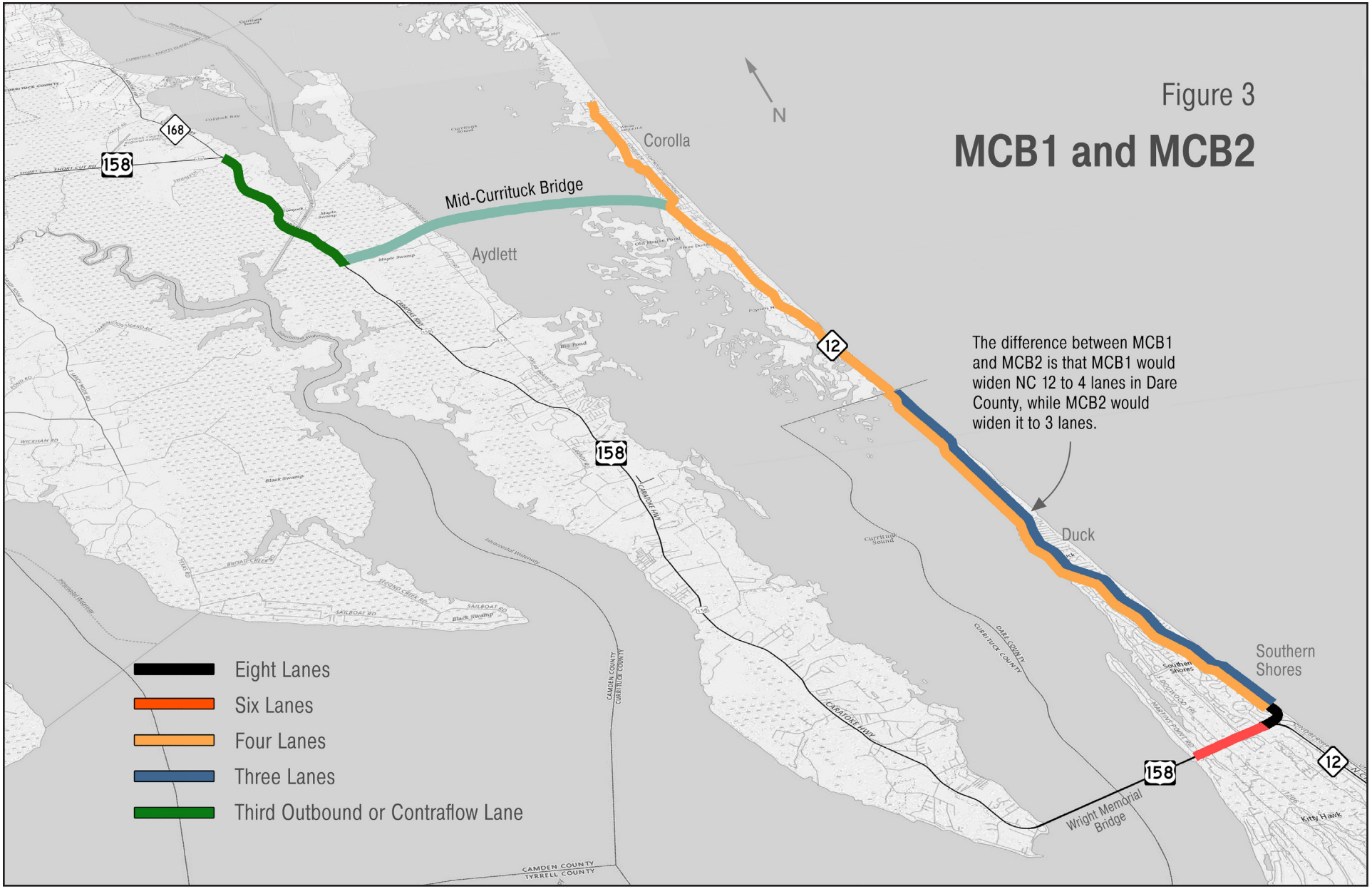
Figure 3
MCB1 and MCB2
N
Corolla
Mid-Currituck Bridge
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168
158
12
The difference between MCB1 and MCB2 is that MCB1 would widen NC 12 to 4 lanes in Dare County, while MCB2 would widen it to 3 lanes.
Eight Lanes
Six Lanes
Four Lanes
Three Lanes
Third Outbound or Contraflow Lane
CAMDEN COUNTY
TYRRELL COUNTY
CURRITUCK COUNTY
DARE COUNTY

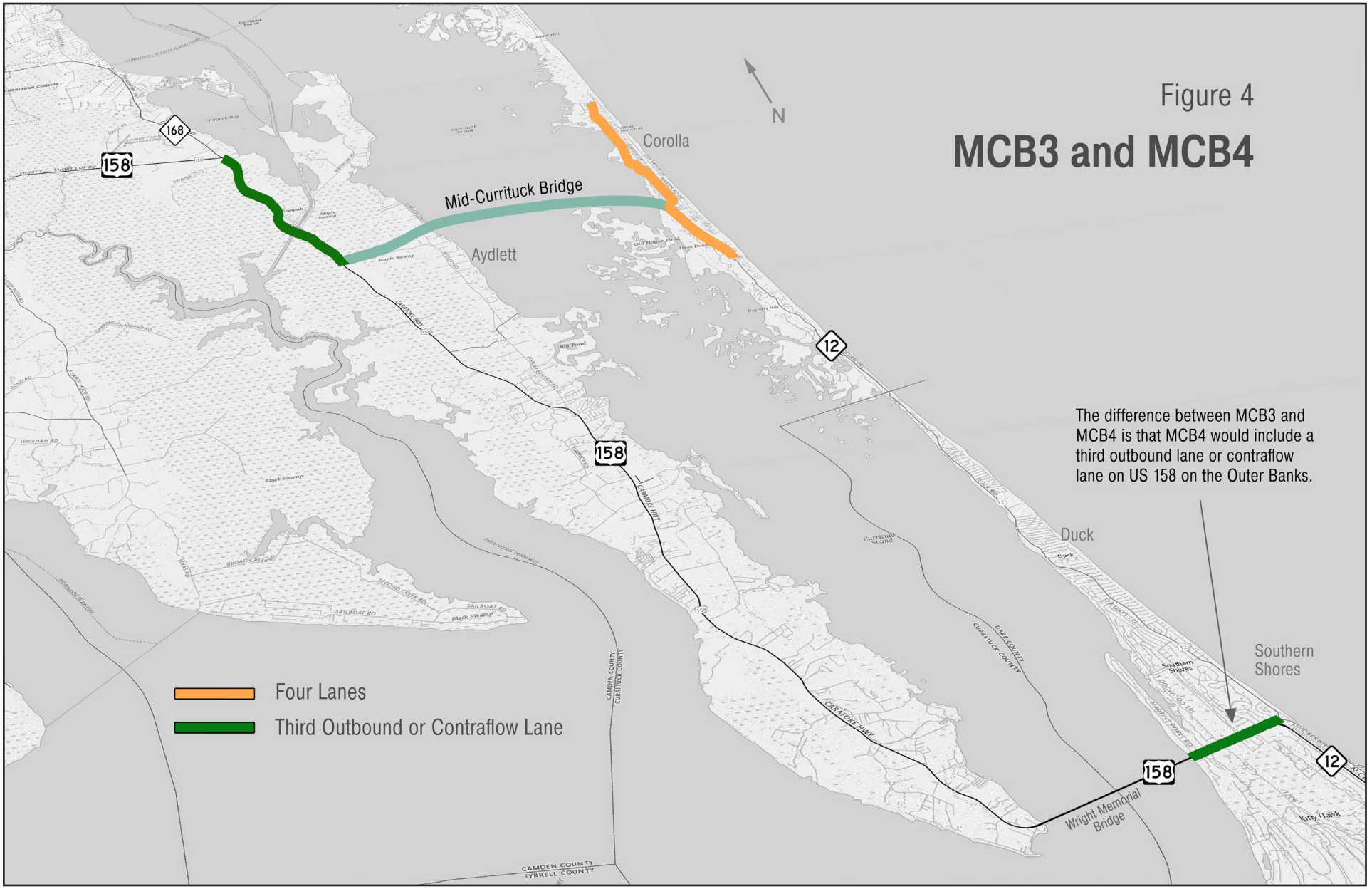
Figure 4
MCB3 and MCB4
N
Corolla
Mid-Currituck Bridge
Aydlett
Duck
Southern Shores
Wright Memorial Bridge
Kitty Hawk
168
158
12
The difference between MCB3 and MCB4 is that MCB4 would include a third outbound lane or contraflow lane on US 158 on the Outer Banks.
Four Lanes
Third Outbound or Contraflow Lane
CAMDEN COUNTY
TYRRELL COUNTY

origin and destination points would be up to 93 percent. Hurricane clearance times would be reduced by the same amount as the Existing Road alternatives, but would do so with only five miles of hurricane clearance-related improvements on US 158, as opposed to the 25 miles required with ER1 or ER2.

The MCB2 alternative's level of benefit was found to be similar but slightly lower than the benefits associated with MCB1. This is because NC 12 would only be widened to three lanes in Dare County.

Because MCB3 would include far fewer improvements to US 158 and NC 12, its travel benefits would be lower than those associated with MCB1 or 2. For example, MCB3 would reduce congested travel by 39 percent, compared to the 66 percent and 52 percent reductions associated with MCB1 and 2. Travel time via the Wright Memorial Bridge would decrease 31 percent, compared to the 53 percent and 44 percent reductions associated with MCB1 and 2. The travel time benefit of using the Mid-Currituck Bridge would be identical to MCB1 and 2. Hurricane clearance times using a third outbound lane would be slower, at 26.6 hours, but would be the same as MCB 1 and 2 if a contraflow lane were used.

With the exception of hurricane clearance times, which would be lower, MCB4 would provide the same benefits of MCB3.

System Efficiency — For many travelers, adding a new crossing of Currituck Sound would shorten the trip length to the Currituck County Outer Banks, reducing the total annual vehicle-miles traveled in the project area. As a result, each of the four MCB alternatives would improve system efficiency.

Natural Resource Impacts — MCB1 would affect the aquatic ecosystems and wetlands associated with Currituck Sound and Maple Swamp, and its widening of NC12 and US 158 would result in other the natural environment impacts. A total of 39.3 acres of wetlands would be filled and 8.5 acres would be bridged. In addition, 24 acres of fill and 6.6 acres of bridging would be required in other high-quality natural resource areas. The MCB2 alternative would require essentially the same impacts. These would be the most extensive of all the alternatives.

Because MCB3 and MCB4 entail fewer roadway improvements, their natural resource impacts would be lower, consisting primarily of wetland impacts (30.8 acres filled and 8.5 acres bridged) and impacts to other natural resources associ-

ated with the Currituck Sound and Maple Swamp areas (6.2 acres of high-quality natural resources filled and 6.6 acres bridged).

Community Impacts — As with the Existing Road alternatives, the key community impact for the Mid-Currituck Bridge alternatives is the relocations of homes and businesses. Although the number of relocations required with MCB1 is still large, at 201, it is lower than the 227 required for ER1 because MCB1 would involve less extensive hurricane clearance improvements.

Because of its less extensive roadway widening, MCB2 would require only 21 relocations. MCB3 and MCB4 would both require only 11 relocations.

Financial Feasibility — At $978 million, MCB1 was found to have the highest estimated capital cost of any build alternative. While toll revenues could fund the Mid-Currituck Bridge component of this alternative, and could likely fund the bridge's required connecting roads, NCTA concluded that those revenues would not be sufficient to cover the costs of the other road improvements required with this alternative. While the estimated capital cost of MCB2 would be considerably lower, at $635 million, the same funding restrictions would apply, with toll revenues not sufficient to fund the entire project.

Because MCB 3 and MCB4 would not involve extensive improvements to roadways beyond the vicinity of the Mid-Currituck Bridge, NCTA concluded that these two alternatives could be fully funded, primarily through toll revenues.

Conclusions — After reviewing the screening results with FHWA and the project's environmental resource and regulatory agencies, NCTA chose to retain MCB2 and MCB4 as the project's Detailed Study Alternatives and to drop MCB1 and MCB3 from further consideration. MCB1 was dropped primarily because of its large number of relocations, relative to the other alternatives, and because its high cost made it not viable. MCB3 was dropped because of its higher hurricane clearance times and because its high cost also made it not viable. Although MCB2 also was considered to be not viable from a cost perspective, the project's environmental resource and regulatory agencies felt this alternative should continue to be assessed because it would provide the best reduction in congestion and best improvement in travel times possible, while avoiding the high number of displacements associated with ER1 and MCB1.

Additional Options for the MCB Alternatives

In addition to broadly examining the Mid-Currituck Bridge alternatives, NCTA conducted analyses for various additional options associated with these bridge crossings. These included alternative locations for the crossing of Currituck Sound and various configurations for the mainland approach road connecting US 158 to the bridge over Currituck Sound.

Bridge Crossing Locations — NCTA re-examined the nine alternative crossing locations that were originally assessed in the project's 1998 study. Of these nine, two were in the extreme northern limits of study area, one was in the extreme southern limits, and six were located approximately in the center. A map of these locations can be found in **Appendix 2**. Upon re-examination, the northern and southern locations were dropped from further consideration and the central options were modified to reduce impacts (see **Appendix 2**).

Because each of the central crossing locations would equally satisfy the project's purposes, NCTA's re-examination focused on potential environmental impacts. On that basis, options C1 and C2 were selected to be part of the project's detailed study alternatives, with the other four dropped from further consideration. Details about this selection process can be found in the 2009 Alternatives Screening Report.

Mainland Approach Road Options — In the area between the project's western terminus, at US 158, and the Currituck Sound bridge location, project cost-related questions regarding toll facility locations, bridging the wetlands in this area (Maple Swamp) or crossing them on fill, the design of the connection to US 158, and other factors, led. NCTA to develop two design concept options for further consideration.

Option A — This option would place the project's toll plaza within the US 158 interchange. The mainland approach road to the bridge over Currituck Sound would include a bridge over Maple Swamp. The bridge's two-lane approach road would pass through the community of Aydlett on fill. (This small community is located on the western shore of Currituck Sound.) There would be no connection to the local road system within Aydlett.

Option B — This option would place the toll plaza in Aydlett, just west of the Currituck Sound bridge, within Aydlett. The approach road between the interchange

and the Currituck Sound bridge would be built on fill within Maple Swamp area, with wildlife passages incorporated into the design. With Option B, the existing Aydlett Road, which runs parallel to the approach road corridor, would be removed and its right-of-way would be restored as a wetland. Motorists who formerly used this road would use the new bridge approach road instead.

Detailed Study Alternatives

With the addition of the two Currituck Sound crossing locations and the two approach road configuration options, the final Detailed Study Alternatives were as follows:

ER2

MCB2/C1
MCB2/C2

MCB4/C1
MCB4/C2

Each bridge alternative could be configured with either approach road Option A or Option B. These Detailed Study Alternatives are depicted on **Figures 5**, **6**, and **7**.

Selection of the Preferred Alternative

Following the public and agency review of the Draft Environmental Impact Statement, NCTA tentatively selected MCB4, with approach road Option A and bridge corridor C1, as the Preferred Alternative. Based in part on public and agency comment, NCTA then refined the preliminary design of MCB4/A/C1 to further avoid and minimize impacts. These refinements included:

- Various design changes at local road intersections on US 158 to improve safety.
- Reducing the amount of four-lane widening along NC 12 from approximately 4 miles to three shorter sections of NC 12 for a total of approximately 2.1 miles.
- Constructing roundabouts instead of signalized intersections at the NC 12 bridge terminus and at one other location. (Terminating the bridge in a roundabout at NC 12 also allowed the C1 bridge alignment to be adjusted to remove curves and thereby reduced its length across Currituck Sound by approximately 250 feet.)

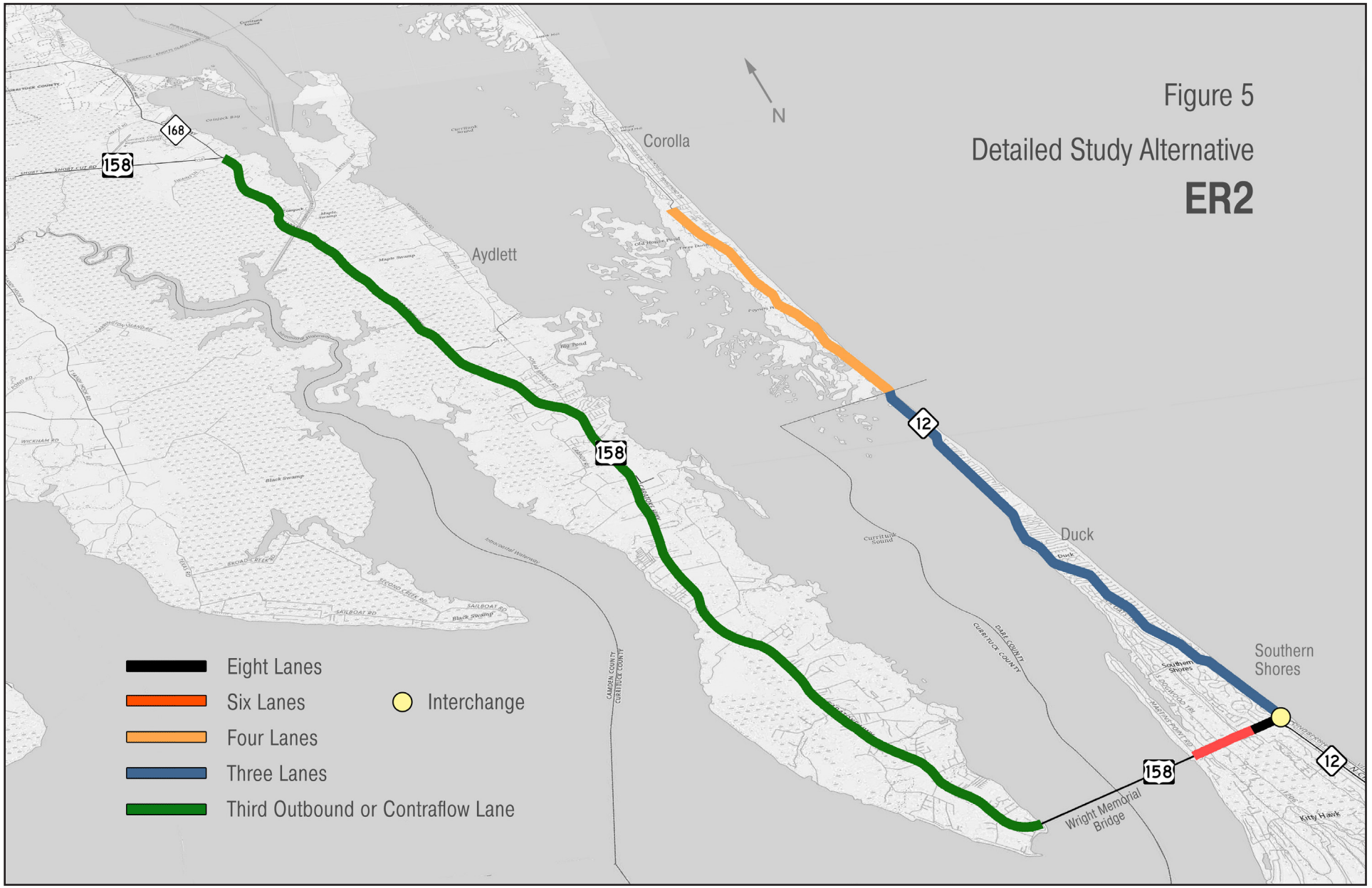
Figure 5
Detailed Study Alternative
ER2
N
Corolla
Aydlett
Duck
Southern Shores
Wright Memorial Bridge
168
158
12
Eight Lanes
Six Lanes
Four Lanes
Three Lanes
Third Outbound or Contraflow Lane
Interchange

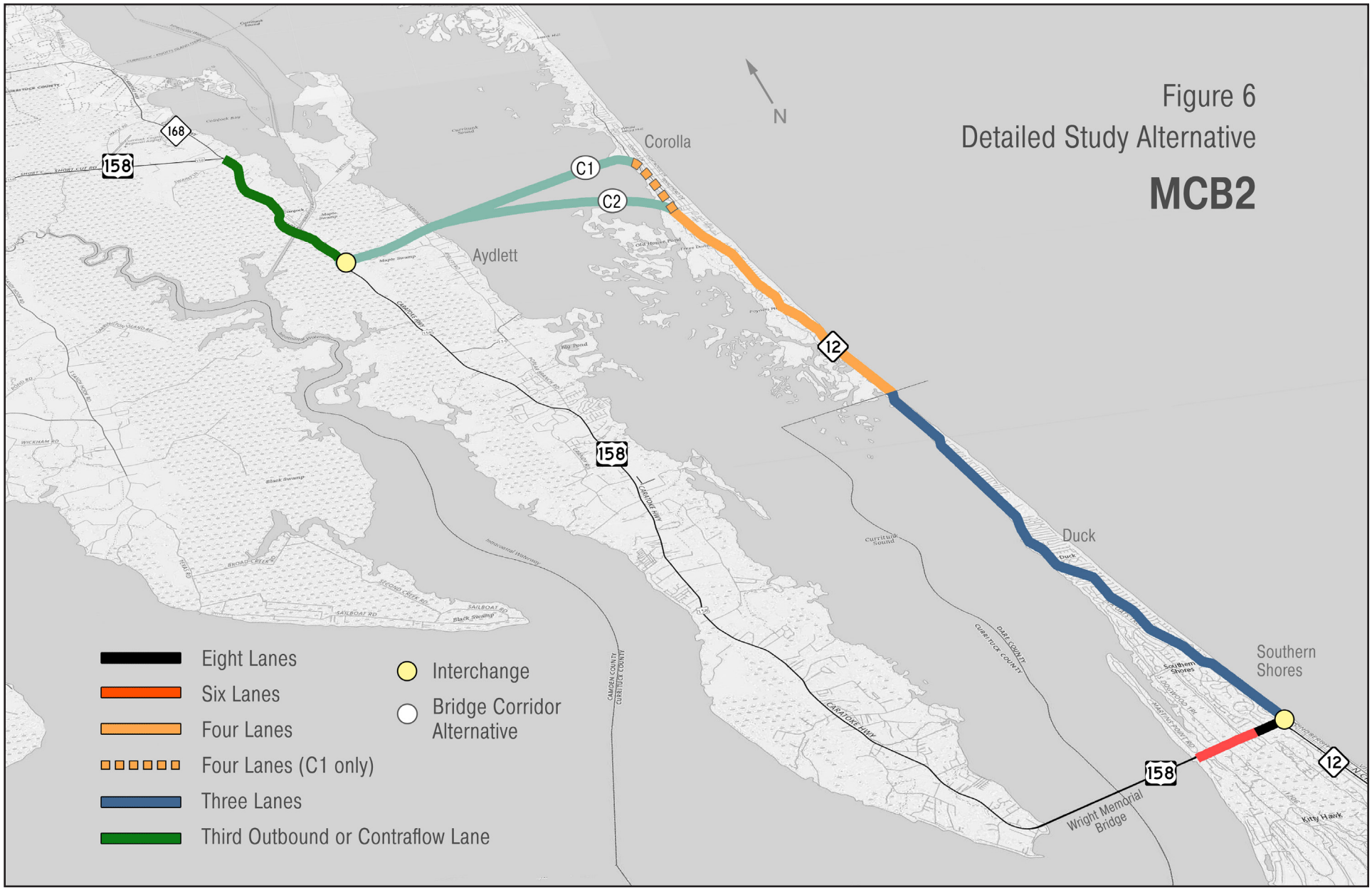
Figure 6
Detailed Study Alternative
MCB2
N
Corolla
Aydlett
Duck
Southern Shores
Wright Memorial Bridge
Kitty Hawk
C1
C2
168
158
12
Eight Lanes
Six Lanes
Four Lanes
Four Lanes (C1 only)
Three Lanes
Third Outbound or Contraflow Lane
Interchange
Bridge Corridor Alternative

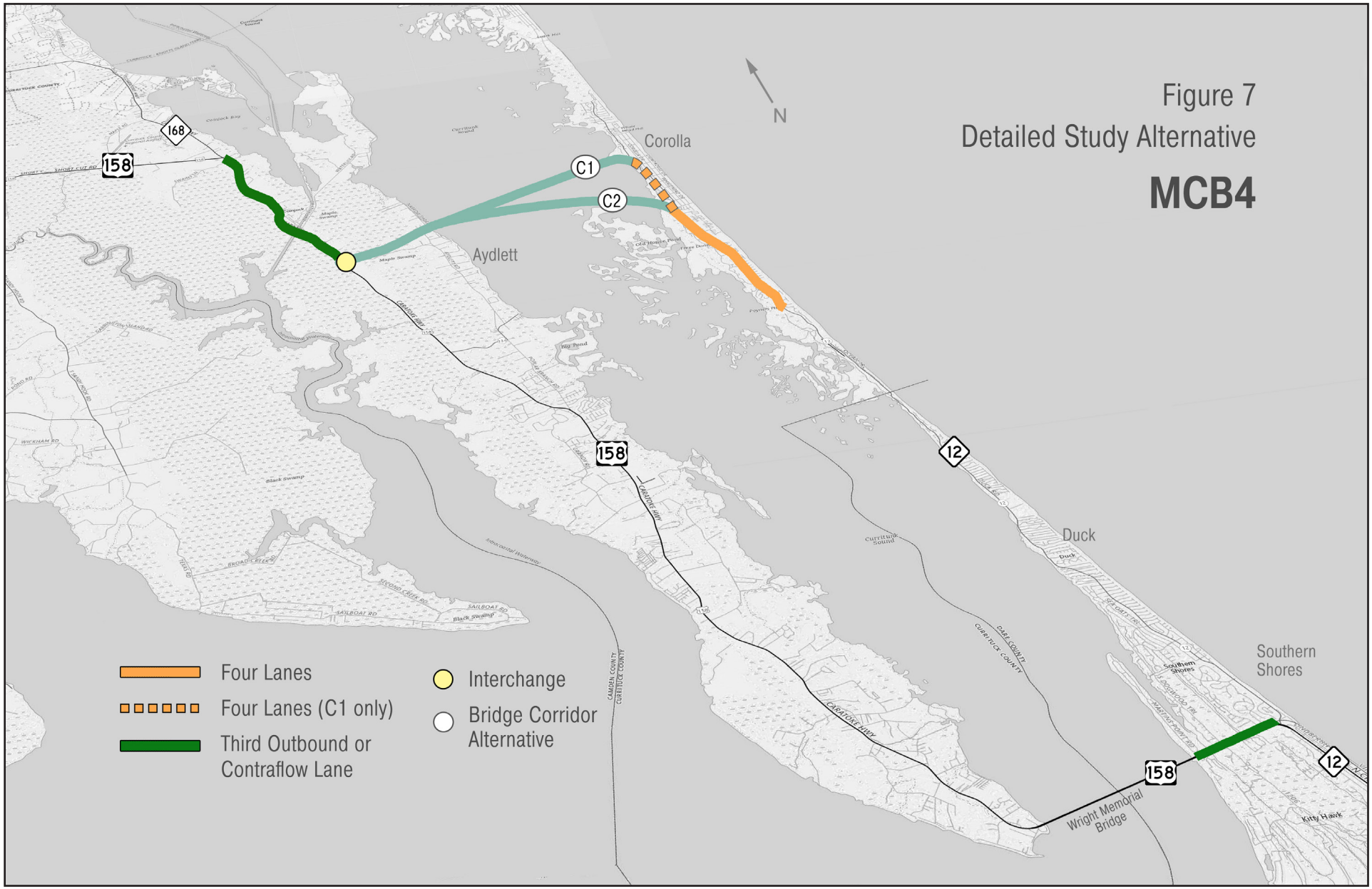
Figure 7
Detailed Study Alternative
MCB4
N
Corolla
Aydlett
Duck
Southern Shores
Wright Memorial Bridge
Kitty Hawk
C1
C2
158
168
12
Four Lanes
Four Lanes (C1 only)
Third Outbound or Contraflow Lane
Interchange
Bridge Corridor Alternative

- Improving hurricane clearance times on the mainland by reversing the center turn lane on US 158 between the US 158/Mid-Currituck Bridge interchange and NC 168.
- Improving hurricane clearance times on the Outer Banks by adding a third outbound lane for a length of about 1,600 feet, west of the NC 12/ US 158 intersection.

With these modifications in place, the benefits and impacts of this refined design were identified and compared with the other detailed study alternatives. After consulting with FHWA, regulatory agencies, and the public, NCTA selected the refined MCB4, with approach road option A and bridge corridor C1, as the Preferred Alternative. This alternative would also reverse the center turn lane on US 158 to improve hurricane evacuation clearance times. The key considerations that led to this selection are summarized below.

Travel Benefit Considerations — The Preferred Alternative would provide substantial congestion reduction and travel time benefits while minimizing the widening of NC 12. In addition, it would not require widening of US 158 from the Wright Memorial Bridge to NC 12, nor would it require an interchange at the US 158/NC 12 intersection. Future improvements to these facilities could be built at a later date without a total impact greater than that identified for MCB2.

Community Impact Considerations — On the mainland, the Mid-Currituck Bridge alternatives would introduce a visual barrier, in the community of Aydlett. On the Outer Banks, the Preferred Alternative would pass through an unimproved phase of the Corolla Bay subdivision; MCB2 would not be able to make use of this undeveloped area. While the MCB alternatives would have a greater direct impact on communities than would ER2, the Preferred Alternative better addresses citizen and local government concerns related to pedestrian crossings on NC 12 and would result in the fewest changes to property access. The Preferred Alternative would also result in the lowest number of traffic noise impacts of all the detailed study alternatives.

Consistency with Local Land Use Plans — The MCB alternatives were found to be consistent with area land use plans.

Cultural Resource Impact Considerations — There would be No Effect or No Adverse Effect on properties listed on or eligible for listing on the *National Reg-*

ister of Historic Places with the Preferred Alternative, MCB2, or MCB4 with the reversed center turn lane on US 158.

Natural Resource Impact Considerations — The Preferred Alternative would require the least amount of fill in natural upland areas, would have no effect on NC Coastal Area Management Act (CAMA) wetlands, and would not affect wetlands on the shoreline of Currituck Sound. Its impact on other wetlands would be the least among the detailed study alternatives. The Preferred Alternative's increase in impervious surface area is low compared to MCB2, but higher than ER2 (without a third lane on US 158).

Corridor Options — Corridor C1 was included in the Preferred Alternative rather than Corridor C2 for the following reasons:

- It is the shorter of the two corridors.
- It would be the furthest from Currituck Sound's marsh islands.
- It would have lower impacts to known and potential submerged aquatic vegetation areas.
- It would not affect Coastal Area Management Act wetlands.
- It would avoid connecting to NC 12 in an area with an existing concentration of retail businesses traffic.

Approach Road Options — Option A was chosen over Option B because Option A would have lower natural resource and hydrologic impacts and lower community impacts. For example, with Option A, the wetlands associated with Maple Swamp would be mostly bridged. With Option B, fill would be placed in Maple Swamp, and the existing Aydlett Road be removed and its right-of-way used to mitigate for the fill impacts. Option B would also result in a significant encroachment on the 100-year floodplain because of the fill placed in Maple Swamp. Furthermore, Option B would be inconsistent with Currituck County transportation policy because the location of the toll plaza in Aydlett, at the western end of the bridge over Currituck Sound, would enable direct vehicular access between the bridge road across Maple Swamp and Aydlett. For these reasons, the public, Currituck County representatives, and the project's environmental resource and regulatory agencies all preferred Option A over Option B.

Financing and Design Considerations — NCTA anticipated that the Preferred Alternative could be financed using a combination of state appropriation bonds, toll revenue bonds, and private equity.

These results, and details about the process that led to them, are contained in three key documents: the 2009 Alternatives Screening Report, the 2010 Draft Environmental Impact Statement, and the 2012 Final Environmental Impact Statement.

Reevaluation of the Project's FEIS Findings

Following the approval of the 2012 Final Environmental Impact Statement, NCTA prepared a draft version of the project's Record of Decision (ROD). Before it could be approved, however, the NC General Assembly withdrew the project's state funding and the ROD was never published. In 2016, State funding was restored, prompting renewed activity on the project.

Federal regulations require a written evaluation of the findings of a Final Environmental Impact Statement (FEIS) if major steps towards advancement of the project have not occurred within three years of FEIS approval.[8] Although various project development activities had occurred since the FEIS was approved, because a ROD had not been issued, a reevaluation of the FEIS findings was required. The purpose of the reevaluation was to assess changes that might have occurred in the project's setting, travel demand, area plans, laws and regulations, or changes other information or circumstances in the time since FEIS was approved. In so doing, the reevaluation documents whether the FEIS and its Preferred Alternative decision remains valid or if additional analysis, such as the preparation of a Supplemental FEIS, would be necessary to satisfy NEPA requirements.

As a result of the reevaluation's findings, NCTA and FHWA concluded that while a Supplemental FEIS was not required, changes in the project setting and, in particular, a downward trend in traffic volume forecasts, required that the detailed study alternatives be reconfigured to account for these changes. This was done for the Preferred Alternative and ER2 alternative; it was not done for the MCB2 alternative because the original reasons for it not being carried forward—little public support and highest levels of impact—would not be lessened by adjusting for changes in the project setting or traffic forecasts. Bridge corridor C2 and

[8] See 23 CFR 771.129. www.govinfo.gov/content/pkg/CFR-2011-title23-vol1/pdf/CFR-2011-title23-vol1-sec771-129.pdf.

approach road Option B were also not re-examined because their impacts would also not be lessened by adjusting for the new conditions.

Reassessment of Purpose and Need

To determine if the project's original Statement of Purpose and Need remained valid, NCTA re-examined the three specific transportation problems identified in that document to see if they still existed with enough severity to warrant the proposed project. NCTA found that all three needs remained. Even with lower forecast traffic volumes, congestion on US 158 and NC 12 remained an increasingly severe problem and future travel times continued to be far above the uncongested travel times. With respect to hurricane clearance times, NCTA found that the new forecast clearance times already exceeded both the 18-hour goal used in the Final EIS and the 30-hour goal considered appropriate after the National Hurricane Center's decision to change its warning time frame in advance of tropical systems from 24 hours to 36 hours. As a result, NCTA concluded that the need to reduce hurricane clearance times also remained valid.

Because the purposes of the project were based on the need to address those problems, and because those problems remained valid, so did the project's purposes:

- To substantially improve traffic flow on US 158 and NC 12.
- To substantially reduce travel time for persons traveling between the Currituck County mainland and the Currituck County Outer Banks.
- To substantially reduce hurricane clearance times from the Outer Banks for residents and visitors who use US 158 and NC 168 as a clearance route.[9]

Reconfiguration of ER2 and the FEIS Preferred Alternative

As part of the reevaluation, NCTA revisited the design year traffic volumes and found that the current design year (2040) traffic forecasts were lower than the design year (2035) forecasts used during the project's FEIS phase. Because lower future traffic volumes mean fewer improvements would be needed to achieve the

[9] The definition of "substantial" remained unchanged in the reevaluation: "An improvement is considered substantial as opposed to minor if the improvement is great enough to be largely noticeable to typical users of the transportation system and if the improvement offers some benefit across much of the network, as opposed to offering only a few localized benefits."

purposes of the project, NCTA reconfigured the ER2 and Preferred Alternative, in an attempt to achieve the same benefits with fewer impacts.

The Preferred Alternative was reconfigured in two primary ways:

1. The interchange and toll plaza configuration between US 158 and the mainland approach road was revised to reduce impacts to wetlands, whose boundaries changed when re-delineated as part of the reevaluation. The updated interchange design eliminated the need for a median acceleration lane at the US 158/Waterlily Road intersection.
2. Most of the improvements to NC 12 south of those associated with the Outer Banks bridge terminus were eliminated.

Likewise, the ER2 alternative was also modified in two key ways:

1. Fewer improvements to NC 12 were found to be needed.
2. The original interchange at US 158 and NC 12 was downgraded to an improved intersection.

Figures 8 and **9** depict these new configurations.

Analysis of the Updated ER2 and Preferred Alternatives

In general, the revised designs resulted in fewer impacts because the lower future traffic volume projections meant that fewer improvements would need to be made along NC 12 to achieve the project purposes.

Preferred Alternative — As stated in the Reevaluation Study Report, the differences in environmental impacts between the old and updated Preferred Alternative are as follows:

- Decreased or unchanged community and business impacts along NC 12.
- A decrease in new impervious surface areas, from 71.5 acres to 64.3 acres.
- Decreased or unchanged impacts to biotic communities.
- A decrease in the area of submerged aquatic vegetation beds that would be shaded by the bridge, from 3.8 acres to 3.5 acres, and an increase in the area of potential submerged aquatic vegetation habitat that would be shaded, from 4.8 acres to 5.1 acres.
- A decrease in the area of wetlands to be filled, from 8.3 acres to 4.2 acres, but, because its redesign emphasized minimizing wetland fill

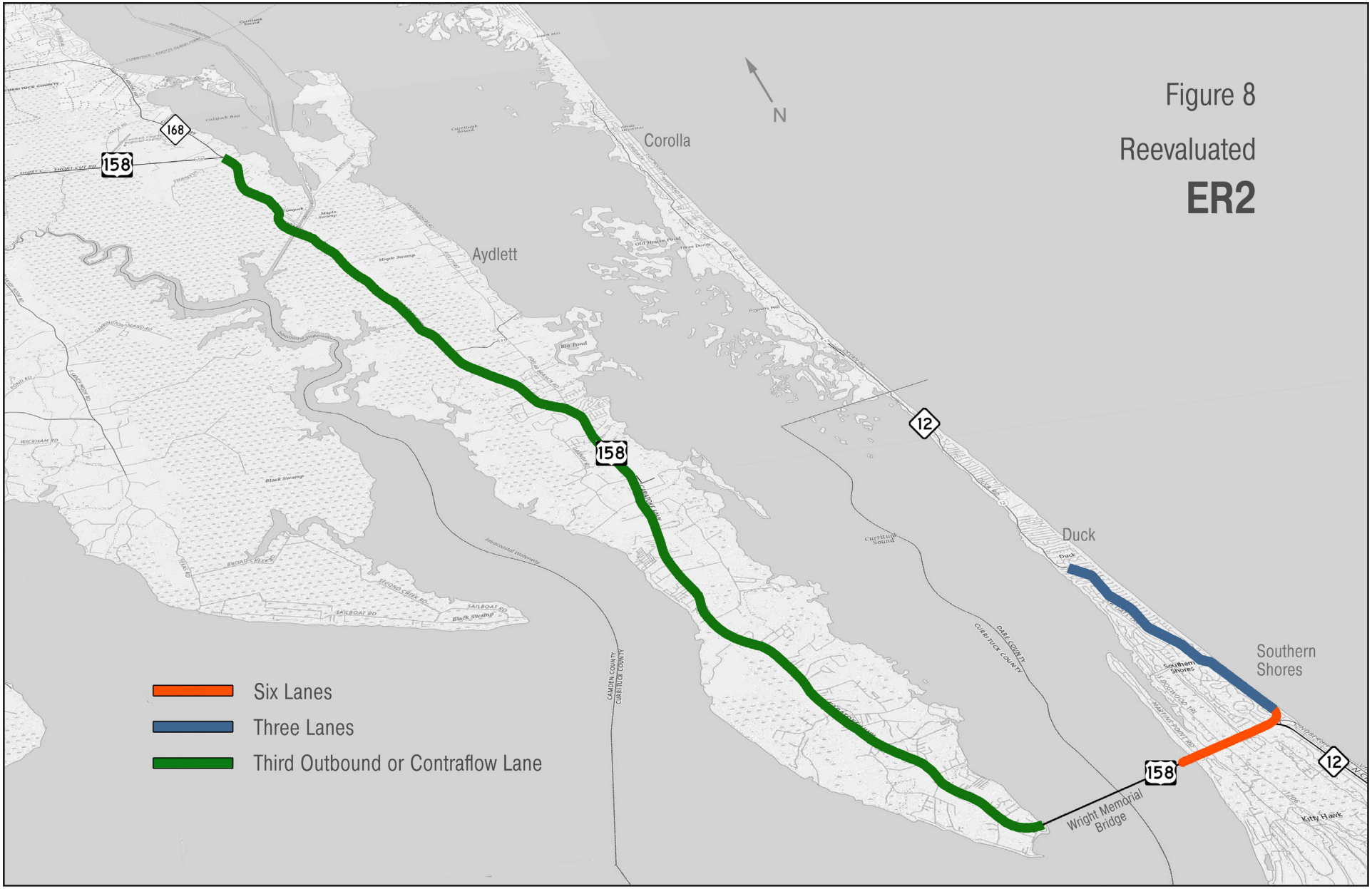
Figure 8
Reevaluated
ER2
N
Corolla
Aydlett
Duck
Southern Shores
Wright Memorial Bridge
Kitty Hawk
168
158
12
Six Lanes
Three Lanes
Third Outbound or Contraflow Lane

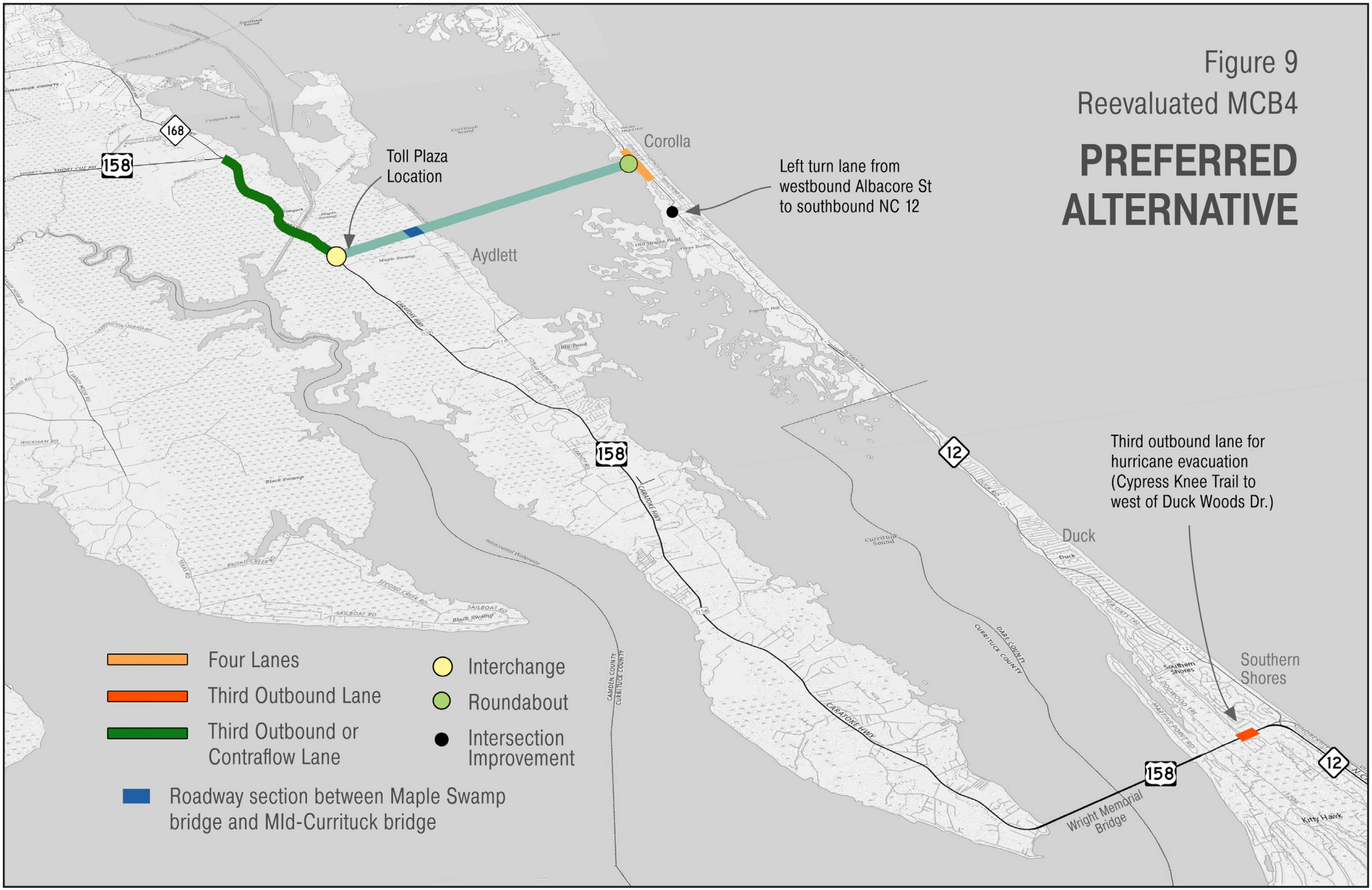
Figure 9
Reevaluated MCB4
PREFERRED ALTERNATIVE
Toll Plaza Location
Left turn lane from westbound Albacore St to southbound NC 12
Third outbound lane for hurricane evacuation (Cypress Knee Trail to west of Duck Woods Dr.)
Corolla
Aydlett
Duck
Southern Shores
Wright Memorial Bridge
Four Lanes
Third Outbound Lane
Third Outbound or Contraflow Lane
Interchange
Roundabout
Intersection Improvement
Roadway section between Maple Swamp bridge and MId-Currituck bridge

impacts, an increase in other impacts in the US 158 interchange area, including:

  - An increase in the amount of agricultural land affected, from 15.3 acres to 22.0 acres.
  - A new 0.1-acre pond impact.
  - An increase in wetland clearing associated with the Maple Swamp Bridge, from 25.5 to 32.9 acres.

- A decrease in the number of noise-sensitive receptors that would receive a traffic noise impact, from 23 to 5.
- A decrease in the number of electric transmission line towers to be relocated, from 4 to 2.

ER2 Alternative — The differences in environmental impacts between the old and updated ER2 alternative are:

- A reduction in community and business impacts along NC 12, except for an increase in home, business, and outdoor advertising sign relocations.
- A decrease in new impervious surface, from 89.0 acres to 33.7 acres.
- A decrease in impacts to biotic communities overall, except for:
  - An increase in impact to jurisdictional streams.[10]
  - An increase in bridge shading at Jean Guite Creek, from 36 feet to 42 feet, or 0.1 acre.
- A decrease in the acres of wetlands to be filled, from 12.6 acres to 8.5 acres.
- A decrease in the number of noise sensitive receptors along NC 12 receiving a traffic noise impact, from 167 to 65 receptors.

Although some impact categories increased under both the revised Preferred and ER2 alternatives, NCTA's coordination with environmental resource and regulatory agencies confirmed that the updated effects create no new issues of significance.

[10] Five additional jurisdictional streams were identified during 2017 surveys that connect to US 158 roadside ditches. The hurricane clearance lane component would affect with fill a total of 99.6 feet of these streams, but the total acres of impact would be less than 0.1 acre. Clearing during construction would occur on 218.5 feet of these streams.

Re-establishment of the Preferred Alternative

Having compared the relative benefits and impacts between the updated ER2 alternative and FEIS alternative, NCTA reaffirmed the selection of MCB4/C1/ Option A as the Preferred Alternative. This comparison included consideration of travel benefits, community and natural resource impacts, other physical characteristic impacts, financing, and design considerations, as described below.

Travel Benefit Considerations — The Preferred Alternative would more effectively benefit summer travel, particularly on summer weekends, than would ER2. The main benefits include:

- Less severe congestion, with traffic demand during periods of congestion generally not exceeding roadway capacities.
- A shorter duration of congestion on NC 12 in Dare County compared to the No-Build alternative (10-12 hours versus 13-15 hours on summer weekends). ER2 would not reduce the duration of congestion on NC 12.
- A lower probability that queues on NC 12 would routinely back up onto US 158.
- A greater reduction in travel times, including:
    - An 11-minute travel time from the mainland to the Outer Banks with the new bridge in place.
    - A 64-minute reduction (from 136 minutes to 72 minutes) in average summer travel time on existing roads from Aydlett Road to the Outer Banks bridge terminus.

ER2 would:

- Not provide the short, 11-minute travel time to the Currituck County Outer Banks provided by the Preferred Alternative.
- Result in only a 19-minute reduction (from 136 minutes to 117 minutes) in average summer travel times.

Community Impact Considerations — On the mainland, the Preferred Alternative would create a visual barrier in the community of Aydlett. On the Outer Banks, the Preferred Alternative would pass through an unimproved phase of the Corolla Bay subdivision. In February 2016, with the approval of the Board of Transportation, NCDOT made an advanced purchase of the land in this Outer Banks area for use as project right-of-way, avoiding the need to relocate any new structures

or utilities that might be in place at the time of construction. ER2 would not affect Aydlett or the Corolla Bay area, and overall neighborhood and community cohesion impacts would be minor under that alternative.

CAMA Land Use Plans — The Preferred Alternative is consistent with area CAMA land use plans in that those plans include a Mid-Currituck Bridge. In addition, the Preferred Alternative does not widen NC 12 in Dare County, avoiding conflicts with CAMA plans. In a 2012 update of their CAMA plan, the Town of Southern Shores included support for a Mid-Currituck Bridge. No other project-area CAMA land use plans were updated during the reevaluation time period.

Easements and Access Impacts — The Preferred Alternative would require the least amount of widening of NC 12. The refined design's reduction in the widening of NC 12 substantially reduced the need for infiltration strips within a permanent drainage easement along NC 12 and reduced the potential for adverse community impacts along NC 12 in general, compared to the design presented in the Final EIS. In addition, the Preferred Alternative would require the fewest changes in access to residential and business properties.

Wetlands — Based on a new delineation of non-CAMA wetlands, in 2016 and 2017, and on the refined design, the Preferred Alternative's impact is now 4.2 acres. The updated number for ER2 is 8.5 acres. The Preferred Alternative would not affect CAMA wetlands, nor would it affect wetlands on the shore of Currituck Sound.

Hydrology — The Preferred Alternative would have only a negligible effect on surface water hydrology and no effect on the groundwater hydrology in Maple Swamp, nor would it effect storm surge elevations. This remains the case because no changes were made in the design during the reevaluation that would add fill to surface waters or Maple Swamp. The impact was minimized with the Preferred Alternative by bridging Maple Swamp.

Traffic Noise Impacts — The Preferred Alternative would result in 5 residences receiving a traffic noise impact, compared to the 165 along NC 12 that would result from ER2.

Accelerated Sea Level Rise — The Mid-Currituck Bridge component of the Preferred Alternative would reduce the impact of accelerated sea level rise by pro-

viding an alternate route to and from the Outer Banks, should elevated sea levels result in a breach of NC 12 in the narrow portion of the Outer Banks near the Dare/Currituck County line.

Financing Considerations — The FEIS concluded that the Preferred Alternative could potentially be financed using three funding sources: state appropriation bonds, toll revenue bonds, and private equity. At the time of the reevaluation, one potential funding scenario was identified, which included a combination of toll revenue bonds, a TIFIA loan, GARVEE bonds, and State Matching Funds. The ability of the State of North Carolina to build, operate, and maintain the Preferred Alternative is not affected by this change. For the ER2 alternative, the funds allocated in the preliminary Plan of Finance for this project that are not supported by toll revenues ($191.7 million) would not be adequate to construct the project.

Other Design Considerations — With the Preferred Alternative, hurricane clearance traffic control measures would be needed on US 158 for only approximately five miles between the Mid-Currituck Bridge and NC 168 and 1600 feet west of the US 158/NC 12 intersection, instead of the 27 miles with ER2, thus reducing environmental impacts.

More information on the comparison between the updated Preferred Alternative and the updated ER2 can be found in the 2019 document Mid-Currituck Bridge Reevaluation of Final Environmental Impact Statement Study Report.

Designation of the Project's Selected Alternative

NCTA prepared a Record of Decision for the Mid-Currituck Bridge Project in March 2019. The main decision statement is paraphrased as follows:

> FHWA and NCDOT have identified the Selected Alternative for the Mid-Currituck Bridge Study in Currituck and Dare counties. The Selected Alternative is the Preferred Alternative identified in the FEIS, with design revisions based on the findings of the FEIS reevaluation. The Final EIS Preferred Alternative was MCB4/C1 with Option A, as refined between the Draft and Final EIS. The proposed action is included in NCDOT's 2018-2027 State Transportation Improvement Program as STIP Project No. R-2576 and is also included in the Comprehensive Transportation Plan for Currituck County. In those plans, the proposed action is defined as a bridge in Currituck County across Currituck Sound from the mainland to the Outer Banks.

Key Requirements of the Section 404, 401, and CAMA Regulations

Three environmental resource and regulatory agency approvals are required for construction activities associated with the Mid-Currituck Bridge project. The US Army Corps of Engineers (USACE) must issue a permit under Section 404 of the Clean Water Act, the North Carolina Division of Water Resources (NCDWR) must issue a certificate of compliance under Section 401 of the Clean Water Act, and the NC Division of Coastal Management (NCDCM) must approve the project under the NC Coastal Area Management Act.[11]

While the wording of each of these regulations and rules varies, each requires that the alternative that would cause the least harm to aquatic or coastal resources must be chosen unless that alternative is found to be not practicable/practical or would otherwise have significant adverse environmental consequences. Although the term is not actually used in any of the regulations, in practice this alternative is referred to as the Least Environmentally Damaging Practicable Alternative, or LEDPA. Agencies cannot issue permits for any alternative other than the LEDPA.

The sections below describe why, when applying these regulations and rules, it is reasonable to conclude that the Selected Alternative is also the LEDPA.

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act requires a permit before dredged or fill material may be discharged into Waters of the United States.[12] The activity requiring discharge into Waters of the US must be the least environmentally damaging practicable alternative to the proposed action. This "No Practicable Alternative" requirement calls for a three-part determination:

1. Is the alternative "practicable"?
2. If it is practicable, does it cause "less adverse impact to the aquatic ecosystem" than other alternatives?

[11] In addition, a US Coast Guard permit is required for the construction of the bridge over Currituck Sound addressing navigable clearances for boat traffic. This permit is issued for the NEPA Selected Alternative, once the LEDPA is determined.

[12] US Environmental Protection Agency. "Permit Program under CWA Section 404." www.epa.gov/cwa-404/permit-program-under-cwa-section-404.

3. If it is practicable and causes less adverse impact to the aquatic ecosystem, does it have "other significant adverse environmental consequences"?

1. Practicability — An alternative is considered practicable if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."[13] In its guidance document on Section 404, AASHTO notes that "the definition of "practicable" leaves substantial room for interpretation; it is not possible to reduce an analysis of practicability to a simple formula or computation; case-by-case judgments are required."[14] AASHTO's guidance does, however, provide a few "general lessons" that can be gleaned from the regulations, case law, and practical experience.

First, the USACE has not established a "bright line" for determining how much additional cost is required to support a finding that an alternative is not practicable. Judgment is made on a case-by-case basis, weighing the additional cost along with other factors. Likewise, there is no definition of "logistics" in the guidelines, nor has USACE or the US Environmental Protection Agency issued guidance defining this term. The US Court of Appeals for the 10th Circuit has, however, held that relocations can be considered when assessing logistics, as well as when assessing cost.[15] Under this court decision, the social impacts associated with relocating homes and businesses can be considered in their own right, as part of the "logistics" element of practicability, not just as an aspect of cost.

Another consideration when determining practicability is whether a particular alternative satisfies the purposes of the project, as identified in a project's Statement of Purpose and Need. If an alternative would not achieve the project's purpose, it must be dropped from consideration during the NEPA process and therefore cannot be evaluated as a possible LEDPA. Apart from these NEPA considerations, however, USACE is responsible for determining a project's "overall project purposes." If the Corps is not satisfied with the purpose and need as

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[13] 40 CFR § 230.3(q). www.govinfo.gov/content/pkg/CFR-2015-title40-vol25/pdf/CFR-2015-title40-vol25-sec230-3.pdf.

[14] The main source of information in this section is the 2016 AASHTO document *Applying the Section 404(b)(1) Guidelines in Transportation Project Decision-Making*. AASHTO: Center for Environmental Excellence. www.environment.transportation.org/pdf/programs/ph14-2.pdf.

[15] Utahns for Better Transportation v. U.S. DOT, 305 F. 3d 1152 (10th Cir. 2002) ("Impact on existing development would appear to fall within both the cost and the logistics portion of the practicable definition.") https://environment.transportation.org/clue/case_details.aspx?case_id=52.

defined during the NEPA process, the Corps has the authority to define the "overall project purposes" as it sees fit for the purposes of Section 404 decision making.

2. Least adverse impact on the aquatic environment or ecosystem — The terms "aquatic environment" and "aquatic ecosystem" mean "waters of the United States, including wetlands that serve as habitat for interrelated and interacting communities and populations of plants and animals."[16] Among all alternatives that meet the definition of practicable, the one that would have the least adverse impact on the aquatic environment or ecosystem must be deemed the LEDPA; a Section 404 permit cannot be issued to any other alternative.

3. Other Significant Adverse Environmental Consequences — Although the definition of "practicable" does not expressly allow for consideration of impacts to other environmental resources (e.g., endangered species), an alternative that is otherwise practicable can still be rejected if it causes other significant adverse environmental impacts. In other words, impacts to other environmental resources are relevant in Section 404 decision-making, but as a distinct factor, separate from the assessment of practicability, and separate from the assessment of impacts to the aquatic ecosystem.

Section 401 of the Clean Water Act

Section 401 of the CWA requires states to certify that for projects where discharge originates in that state, the project is in compliance with existing water quality requirements.[17] In North Carolina, the 401 Water Quality Certification is issued by the NC Division of Water Resources. NCDWR follows a process whose rules are similar to the Section 404 process.[18] The NCDWR rules, which use the word "practical" instead of practicable, define the practical alternative in the following statement: "A lack of practical alternatives may be shown by demonstrating that, considering the potential for a reduction in size, configuration or density of the proposed activity and all alternative designs, the basic project purpose cannot be

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[16] 40 CFR § 230.3(b). www.govinfo.gov/content/pkg/CFR-2015-title40-vol25/pdf/CFR-2015-title40-vol25-sec230-3.pdf.

[17] US Environmental Protection Agency. "Basic Information on CWA Section 401 Certification." www.epa.gov/cwa-401/basic-information-cwa-section-401-certification.

[18] North Carolina Administrative Code, Title 15A (Environmental Quality), Chapter 02 (Environmental Management), Subsection 02H.0506 (Review of Applications). http://reports.oah. state.nc.us/ncac.asp.

practically accomplished in a manner which would avoid or result in less adverse impact to surface waters or wetlands."[19] A related rule states that a Certification shall be issued for an activity which "has no practical alternative …, or impacts less than three acres of Class WL wetlands" (i.e., freshwater wetlands).[20]

North Carolina Coastal Area Management Act

The Coastal Area Management Act states that the NC Division of Coastal Management "shall deny an application for a permit upon finding [...] In any case, that considering engineering requirements and all economic costs there is a practicable alternative that would accomplish the overall project purposes with less adverse impact on the public resources."[21] Additionally, 113A-120(a)(8) States that "In any case, that the development is inconsistent with the State guidelines or the local land-use plans." If, after required coordination with local governments, resource, and permit agencies, a proposed project is found to be inconsistent with the Rules of The Coastal Resources Commission or with a local CAMA Land Use plan(s), a permit cannot be issued.

Why the Selected Alternative Qualifies as the LEDPA

Applying the key factors in each of the three regulations discussed above leads to the conclusion that the Selected Alternative is also the LEDPA. The reasoning behind this conclusion is described below.

Broad Range of Alternatives Considered — To ensure that a potential LEDPA is not overlooked, the range of alternatives must be appropriately broad. The alternatives that were examined over the course of this project included Shifting Rental Times (i.e., Travel Demand Management), Transportation System Man-

[19] ibid, subsection (f)

[20] ibid, subsection (c)(1)

[21] North Carolina Statutes. Coastal Area Management Act of 1974. (subsection 120 (a)(9)). Although not defined in the statute, one can infer from Section 113A-120, (Grant or denial of permits), subsection (a)), that "public resources" include direct or cumulative effects on coastal wetlands; estuarine waters; renewable resource areas (water, food or fiber); and historic, cultural, scientific, environmental or scenic values; and natural systems. www.ncleg.net/EnactedLegislation/Statutes/ HTML/ByArticle/ Chapter_113A/Article_7.html.

agement options, four different ferry options, bus transit, various combinations of improvements to existing roads, and several combinations of Currituck Sound bridge locations and road improvement options. These alternatives were re-examined during the reevaluation, taking into consideration the new traffic forecasts and stakeholder comments about how these alternatives might be revised or combined with other alternatives to increase their travel benefit. Given the range of alternatives examined, FHWA and NCTA concluded there are no potentially practicable alternatives that were not considered.

The Alternatives Not Carried Forward Would Not Quality as the LEDPA — Ten of the 13 initial alternatives were not carried forward as Detailed Study Alternatives and were dropped from further consideration. They were eliminated because they would not achieve one or more of the project purposes or would result in substantial environmental impacts compared to other alternatives. Either of these conditions is a valid reason for an alternative not qualifying as the LEDPA. These alternatives were re-examined during the reevaluation, and this finding was affirmed.

Detailed Study Alternative MCB2 is Not Practicable — MCB2 would include approximately 15 miles of widening on NC 12, resulting in substantially higher relocation and other community impacts. Consideration of these logistics factors could reasonably be grounds for considering MCB2 not practicable. Furthermore, compared to the Selected Alternative, it would result in more extensive impacts to several components of the aquatic environment, including submerged aquatic vegetation, wetlands, and CAMA areas of environmental concern (see Table S-1 in the project's 2012 Final Environmental Impact Statement). It was for these reasons that MCB2 did not become the Selected Alternative and it is why, by definition, it would not qualify as the LEDPA.

Bridge Corridor C2 is Not Practicable — Of the two bridge corridor alternatives, C2 was dropped because it would be longer and would cause community impacts at its connection to NC 12. Furthermore, it would be closer to environmentally sensitive marsh islands, would have a greater impact on submerged aquatic vegetation, and would affect CAMA wetlands whereas C1 would not. For these reasons, C2 cannot be considered the least environmentally damaging of the two corridor options and thus could not be a component of the LEDPA.

Approach Road Option B is Not Practicable — Of the approach road options, Option B was dropped because it would have higher natural resource and hydro-

logic impacts, including significant encroachment on the 100-year floodplain. As a result, it cannot be considered a practicable alternative, nor can it be said that it would not result in other adverse environmental consequences, thus it could not be a component of the LEDPA.

Detailed Study Alternative ER2 Does Not Qualify as the LEDPA — Several factors combine to make the Existing Road 2 Alternative either not practicable or not reasonable. For these reasons it does not qualify as the LEDPA. These factors can be grouped into two categories: cost and public interest.

Cost

The current plan of finance for the Selected Alternative includes a combination of toll revenue bonds, a TIFIA loan, GARVEE bonds,[22] and State Matching funds. Under ER2, toll revenues bonds could not be used because imposing tolls on local roads is not a viable option. Absent this funding source, NCDOT Division 1 funding would be required, which would be neither adequate nor reasonable because it would require delaying or dropping most other Division 1 projects.

Under the Section 404 regulations, excessive costs, relative to other alternatives, can render an alternative not practicable. As noted earlier, the Corps has not established a threshold, or "bright line," for determining how much additional cost is required to support a finding that an alternative is not practicable. Judgment is made on a case-by-case basis, weighing the additional cost along with other factors. In the case of the EB2 alternative, these cost-related other factors are render ER2 not practicable under Section 404.

This is also true under Section 401, which states that "A lack of practical alternatives may be shown by demonstrating that ... the basic project purpose cannot be practically accomplished in a manner which would avoid or result in less adverse impact to surface waters or wetlands," and that a Certification shall be issued for an activity which "has no practical alternative ..."[23] Because of the inability to reasonably fund ER2, it can be concluded that there is no practical alternative other than the Selected Alternative.

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[22] GARVEE bonds would not be repaid with toll revenues. Instead, they would would be repaid using federal funds that are expected to be received in the future. Even with the use of GARVEE bonds, motor vehicle tax funds would not be adequate to fund ER2.

[23] North Carolina Administrative Code, Title 15A (Environmental Quality), Chapter 02 (Environmental Management). http://reports.oah. state.nc.us/ncac.asp.

Public Interest

The US Army Corps of Engineers' Standard Operating Procedures for the USACE Regulatory Program state that "Once the project has been determined to comply with Section 404 regulations, the project must also be evaluated to ensure that it is not contrary to the public interest. There are 20 public interest factors listed in 33 CFR 320.4(a)(1). [...] The district must evaluate the project in light of these factors, other relevant public interest factors, and the interests of the applicant to determine the overall balance of the project with respect to the public interest."[24] Among the 20 factors are land use and the needs and welfare of the people.[25]

The land use and welfare of the people factors are relevant to ER2. There are also other "public interest factors" and "interests of the applicant" that are relevant to the ER2 assessment. Taken together, these include: level of benefit, conformity with local comprehensive plans, and local government preferences.

1) Level of benefit – While ER2 was found to meet the project's three specific purposes, it would provide a lower level of benefit than any Mid-Currituck Bridge alternative. Compared to the Selected Alternative, ER2 would provide for less traffic congestion relief, longer durations of congestion on NC 12, the least reduction in the severity of congestion on summer weekends, and would not substantially diminish the likelihood that traffic queues would extend from NC 12 to US 158. In addition, ER2 would provide only a 19 minute improvement in travel times between the mainland and the Outer Banks[26] in 2040, compared to a 47 minute savings with the Selected Alternative.[27]

2) Conformity with local comprehensive plans – ER2 would conflict with adopted land use plans in the towns of Southern Shores and Duck. In a letter to NCTA, the Town of Duck indicated that widening of NC 12 through Duck "would be contrary

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[24] Department of the Army, U.S. Army Corps of Engineers. 2009. *Standard Operating Procedures for the USACE Regulatory Program.* In: Memorandum for Commanders, Major Subordinate Commands, and District Commands. Page 21. www.spd.usace.army.mil/Portals/13/docs/regulatory/qmsref/eis/Regulatory%20SOP%20July%202009.pdf.

[25] 33 CFR 320.4(a)(1). https://www.govinfo.gov/app/details/CFR-2012-title33-vol3/CFR-2012-title33-vol3-sec320-4.

[26] Measured from US 158 at the Mid-Currituck Bridge interchange location to Albacore Street on the Outer Banks.

[27] Federal Highway Administration and North Carolina Turnpike Authority. Reevaluation of Final Environmental Impact Statement. January 2019. Page 8. https://www.ncdot.gov/projects/midcurrituck-bridge/Documents/reevaluation-feis.pdf.

to the efforts we have made to establish and maintain our Town's vision."[28] (See Section 3.2.1.4 of the 2019 Reevaluation Study Report). Because the ER2 alternative would likely be inconsistent with these plans at the time of permit decision, it could not be chosen as the LEDPA because it could not receive the required CAMA Permit.

3) Local Government Preferences – ER2 would also conflict with the formal wishes of local governments. Specifically, the Albemarle Commission passed a resolution in support of building a bridge over Currituck Sound, and the Currituck County Board of County Commissioners adopted a resolution indicating their strong support for the construction of a bridge over Currituck Sound. In the letter from the Town of Duck mentioned above, the Town also expressed support for a Currituck Sound bridge.[29]

In summary, the Section 404 regulations limit the issuance of a permit to the least environmentally damaging practicable alternative, provided that alternative is not contrary to the public interest. In considering the land use and general welfare implications of ER2 relative the Selected Alternative, along with the criteria of "other relevant factors and the interests of the applicant," it must be concluded that ER2 is not in the best public interest and therefore cannot be selected as the LEDPA.

Impacts to Aquatic Resources

Aside from the cost and public interest factors just described, both ER2 and the Selected Alternative would result in a certain level of impact to aquatic resources, as shown below:[30]

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[28] Federal Highway Administration and North Carolina Turnpike Authority. Stakeholder Involvement for FEIS Technical Report, Volume 1. 2011. Page A-94. https://connect.ncdot.gov/projects/MidCurrituckBridgeDocuments/Stakeholder%20Involvement%20for%20FEIS%20Technical%20Report%20Vol%202%20December%202011.pdf.

[29] NCTA conducted extensive stakeholder involvement activities throughout the project's NEPA process, including outreach to environmental resource and regulatory agencies, local governments, non-governmental organizations, and the public. Both support and opposition to the project surfaced as a result of these efforts. Concerns that were raised about the project's potential effects were addressed in the project documentation, or will be addressed as the project advances. Details can be found in the project's Stakeholder Involvement Techical Report.

[30] Federal Highway Administration and North Carolina Turnpike Authority. Reevaluation of Final Environmental Impact Statement. January 2019. Pages 4-18 to 4-19. www.ncdot.gov/projects/mid-currituck-bridge/Documents/reevaluation-feis.pdf.

	ER2	Selected Alternative
Wetlands	12.6	8.3
CAMA Wetlands	0.7	0
Submerged Aquatic Vegetation (actual)	0	3.8
Submerged Aquatic Vegetation (potential)	0	4.9

As these acreages indicate, the impact on aquatic resources would be low with either alternative, and those associated with ER2 would not be substantially lower that those with the Selected Alternative.

During the project's NEPA and permitting process, concerns were raised about the potential for direct and cumulative impacts on water quality for both the Selected Alternative and ER2. In response, NCTA and FHWA committed to minimizing stormwater, groundwater, and wastewater impacts to the greatest practicable extent, regardless of the alternative selected, through strict enforcement of Best Management Practices, both during construction and as a part of ongoing operation and maintenance of the facility.

Conclusion
Given that ER2: 1) is not practicable from a cost standpoint; 2) is not in the best public interest; and 3) would not result in substantially lower impacts to aquatic resources than the Selected Alternative, it can reasonably be concluded that ER2 does not qualify as the LEDPA.

The Selected Alternative is Practicable — FHWA and NCTA, in cooperation with the project's environmental resource and regulatory agency representatives, chose the reevaluated FEIS Preferred Alternative as the Selected Alternative for implementation of the Mid-Currituck Bridge Project. As described in the Record of Decision, this alternative is MCB4/C1/Option A, along with reversing the center turn lane on a portion of US 158 to improve hurricane clearance times. This decision was made by comparing against the other alternatives the key findings associated with travel benefits, natural resource impacts, community impacts, public involvement comments, and financing and design considerations. In so doing, FHWA and NTCA have determined that the Selected Alternative is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." The Selected Alternative is thus

practicable, as defined in the Section 404 and CAMA regulations, and practical, as defined under Section 401.

The Selected Alternative Qualifies as the LEDPA

The conclusion that the Selected Alternative qualifies as the LEDPA is based on the following conclusions:

1. an appropriately broad range of alternative concepts and bridge and roadway options was considered;
2. each alternative concept failed to meet the purposes of the project or would cause other significant environmental impacts;
3. the initial bridge and existing roadway alternatives that were not selected for detailed study were dropped because they also failed to meet the purposes of the project or would cause other significant environmental impacts, or because other alternatives would achieve the same purposes more effectively;
4. the MCB2 and ER2 alternatives were both found to either not be practicable/practical or to have other significant adverse environmental consequences; and
5. the Selected Alternative was found to be practicable/practical.

FHWA and NCTA have concluded that the Selected Alternative (MCB4/C1, Option A) should also be designated as the Least Environmentally Damaging Practicable Alternative.

APPENDIX 1

Hyperlinked List of Key Project Documents

2008 Alternatives Screening Report April 2008.pdf

2008 Statement of Purpose and Need October 2008.pdf

2009 2035 Traffic Alternatives Report March 2009.pdf

2009 Alternatives Screening Report October 2009.pdf

2010 Draft Environmental Impact Statement March 2010.pdf

2011 Preferred Alternative Report January 2011.pdf

2011 Stakeholder Involvement for FEIS Technical Report Vol 1 .pdf

2011 Stakeholder Involvement for FEIS Technical Report Vol 2 .pdf

2012 Final Environmental Impact Statement January 2012.pdf

2018 2040 Preferred Alternative Traffic Report - final.pdf

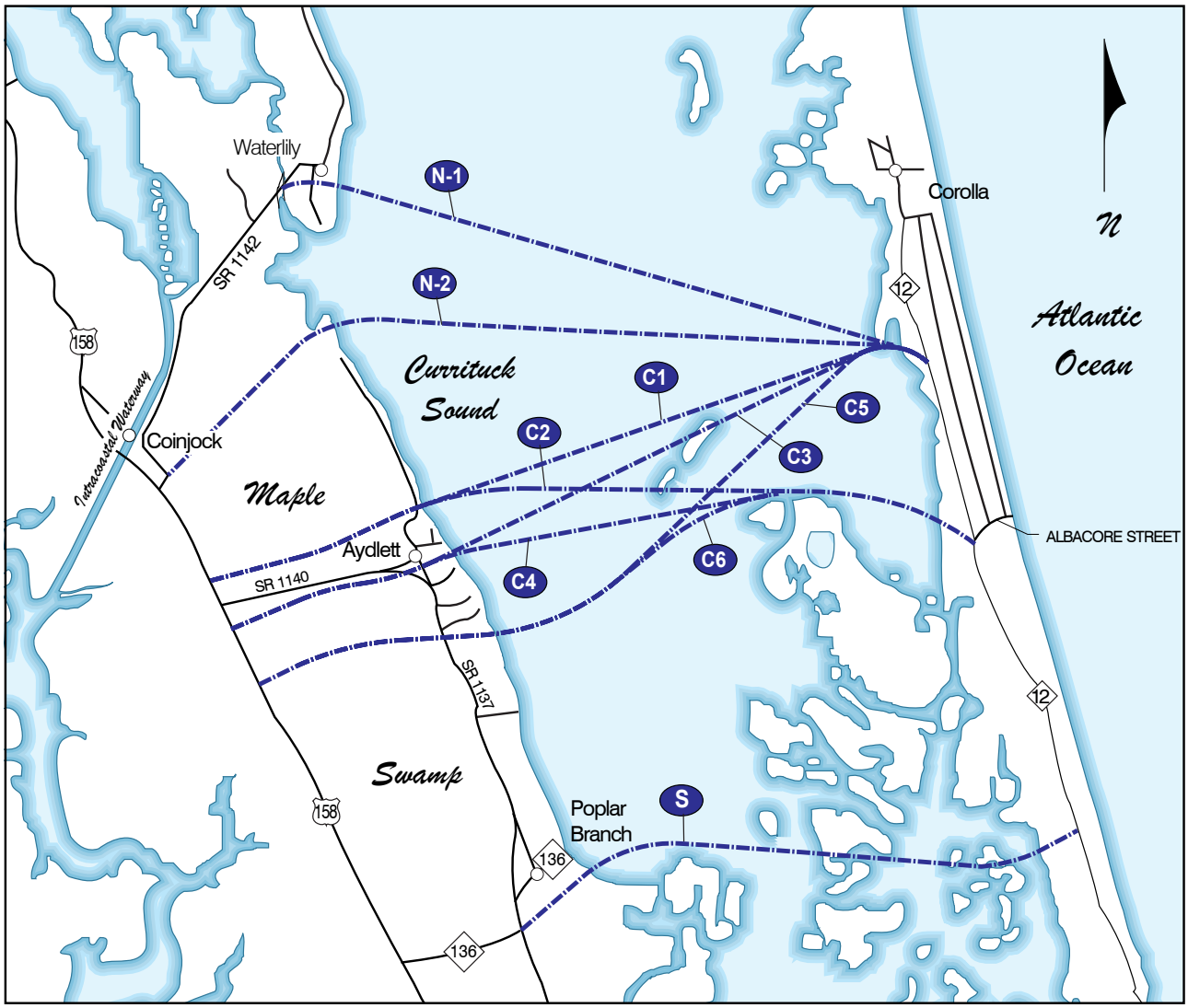
2019 Final-Reevaluation-FEIS Study Report and Appendix.pdf

2019 Final-Reevaluation-FEIS.pdf

2019 Record-of-Decision.pdf

APPENDIX 2

Alternative Bridge Corridor Location Maps



Legend

Corridor Alternatives

North

- **N-1** SR 1142/Corolla Bay
- **N-2** Between Waterlily and Aydlett/Corolla Bay

Central

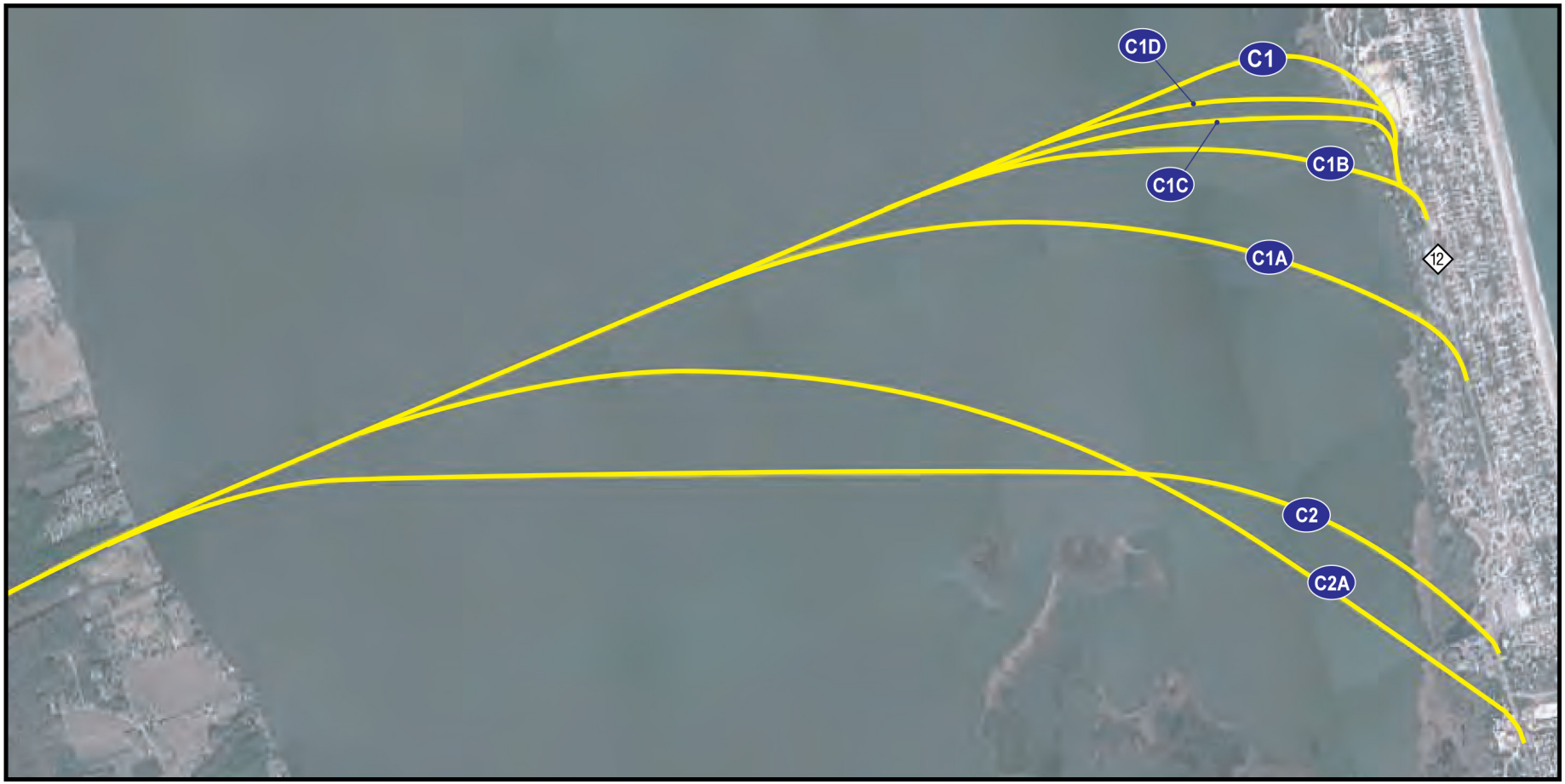
- **C-1** Parallel to Power Line/Corolla Bay
- **C-2** Parallel to Power Line/Albacore Street
- **C-3** Parallel to SR 1140/Corolla Bay
- **C-4** Parallel to SR 1140/Albacore Street
- **C-5** Between Aydlett and Poplar Branch/Corolla Bay
- **C-6** Between Aydlett and Poplar Branch/Albacore Street

South

- **S** NC 136/The Currituck Club

1995 Preliminary Corridor Alternatives

Not to Scale



LEGEND

Bridge Corridors

C1 and C2 Alignment Options