

Project Scoping Technical Report

North Carolina Department of Transportation

Feasibility Studies Unit

SPOT ID H183798

NC 24 Improvements from NC 172 to US 70

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1. Introduction

1.1 General Description

This project explores the feasibility of improving NC 24 from NC 172 to US 70 in Morehead City, a distance of approximately 26 miles. This study was done in conjunction with SPOT ID H150506/171672, improvements to the intersection of NC 24 and NC 58, in Cape Carteret and Cedar Point.

NC 24 is the longest primary state highway in North Carolina, stretching from Charlotte to the Crystal Coast. It functions as a regional connector, serving the Coastal Plains as a major tourism and employment center access route. NC 24 is also a critical element of the Strategic Highway Network (STRAHNET), providing a direct connection between multiple military bases including Fort Bragg Army Base and Camp Lejeune Marine Base, and transportation hubs such as the Port of Morehead City.

The project is located in Onslow and Carteret Counties, where NC 24 passes through the municipalities of Swansboro, Cedar Point, Cape Carteret, Bogue, and Morehead City. Camp Lejeune is adjacent to NC 172 on the western terminus of the project. Marine Corps Air Station Cherry Point – Bogue Landing Field is accessed via NC 24 east of NC 58. There are no parallel routes to NC 24 in the area, and as such, it serves as the economic lifeline in the region. The feasibility study project area is shown in **Exhibit 1**.

Exhibit 1 – Project Area



1.2 Background

The NC 24 corridor is identified as a Strategic Transportation Corridor (STC) within the North Carolina Transportation Network (NCTN). The STC Policy and Map were adopted by the North Carolina Department of Transportation (NCDOT) on March 4, 2015. The purpose of the NCTN is to preserve and maximize mobility and connectivity on a core network of multimodal transportation corridors, promoting environmental stewardship and economic prosperity. NC 24 is designated as Corridor W in the STC Map.

The Carteret County *Comprehensive Transportation Plan* (CTP), adopted in September 2014, is a long-range plan that studied multi-modal transportation needs through the year 2040. The plan designated NC 24 in the project area as an expressway needing improvement. It recommended a multi-use path be added for the length of the corridor in Carteret County.

The Onslow County *Draft CTP* (September 2017) recommended NC 24 be upgraded to an expressway in the project area. The plan identified NC 24 as the only major connection between Swansboro and Jacksonville and into Carteret County.

The *Cedar Point Comprehensive Plan* (2012) noted community concern over traffic safety on NC 24 within the town limits and the need to maintain access to residential communities.

The *Draft Cape Carteret Strategic Plan* (2014) noted there had been an increase in traffic and collisions along NC 24 and identified a goal to create a safe environment for pedestrian and vehicular traffic. A stated goal in the plan was to reduce the amount of vehicular accidents on NC 58 and throughout the town. The plan identified methods such as access management and speed reductions to accomplish this. Citizen surveys noted that traffic was one of the most important issues facing the town.

2. Purpose and Need

The purpose of the proposed project is to improve mobility through the project corridor and reduce congestion. NC 24 is a key corridor at both a regional and state-wide level. It is a hurricane evacuation route, an identified STC, and is part of the military's Strategic Highway Network. Its continued ability provide reliable mobility and operate at an acceptable level of service is critical to support the continued growth of the region.

It should be noted that a Project Scoping Report is a preliminary document that is the initial step in the planning and design process for a candidate project. It is not the product of exhaustive environmental or design investigations. The purpose of this Project Scoping Report is to describe the proposed project, including cost, and identify potential issues that may require consideration in the planning and design phases.

If a candidate project is identified for funding in the State Transportation Improvement Program (STIP), the Project Scoping Report is followed by a rigorous planning and design process that meets the appropriate environmental requirements of the National Environmental Policy Act (NEPA) or State Environmental Policy Act (SEPA).

How does a project get built?

Potential projects are developed in long range plans and are submitted by Metropolitan and Rural Planning Organizations to NCDOT for funding. A feasibility study, such as this report, may be conducted to develop potential concepts and cost estimates. Projects that are submitted to NCDOT are quantitatively scored in the prioritization process established by the Strategic Transportation Improvements law passed in 2013. If funded, a project enters the NEPA/SEPA planning phase, also known as project development. This phase includes the development and evaluation of detailed study alternatives, community impact studies, public involvement, natural resources surveys, and other tasks related to both the National and State Environmental Policy Acts. Once an alternative is selected, final design begins to further refine the design and prepare for right-of-way acquisition and construction.

2.1 Previous Studies

A feasibility study, FS-0102A, was prepared in April 2002 for the intersection of NC 24 and NC 58. The report examined the feasibility of converting the at-grade intersection of NC 24 and NC 58 to an interchange. A diamond interchange aligned to NC 58 and a diamond interchange aligned to NC 24 were studied. The study recommended the Do-Nothing Alternative, as traffic projections did not warrant an

interchange based on the design year of 2025. The study noted that in the mid-1960s, prior to the development of Interstate 40, a preliminary design for a diamond interchange with NC 58 as the primary route was conceived and right-of-way was acquired using that design.

A Minimum Criteria Determination Checklist was prepared in November 2018 for STIP Project R-5858. Project R-5858 proposes to construct a second dedicated right-turn lane on each approach and extend the existing merge lane towards the bridge to Emerald Isle. The project is anticipated to begin construction in fiscal year 2021. This project is an interim solution until an ultimate design is chosen for the intersection.

2.2 Adjacent Projects

Other proposed NCDOT Statewide Transportation Improvement Program (STIP) projects included in September 2019 draft of the 2020-2029 STIP adjacent to or within three miles of the project vicinity are included in **Table 1**.

Table 1. STIP Projects in the Vicinity

County	STIP No.	Description	Schedule
Onslow	B-5944	Replace bridge 660077 carrying SR 1509 (Queens Creek Road) over Queen's Creek	ROW: FY 2024 Construction: FY 2025
Onslow	R-5885	Construct superstreet on NC 24 (West Corbett Avenue) from Belgrade-Swansboro Road to Front Street	ROW: FY 2027 Construction: Unfunded
Onslow	R-5885A	Replace culvert under NC 24 east of West Shore Drive	ROW: FY 2020 Construction: FY2021
Onslow	R-5948	Widen SR 1509 (Queens Creek Road) from Jones Road to SR 1565 (Smallwood Road)	ROW: FY 2027 Construction: Unfunded
Onslow	U-5741	Construct access management improvements on NC 24 (Lejeune Boulevard) from NC 24 Business (Johnson Boulevard) to NC 172	ROW: FY 2020 Construction: FY 2024
Carteret	B-5939	Rehabilitate bridge 150006 carrying NC 58 over the Bogue Sound	Under Construction
Carteret	R-5727	Widen and extend SR 1176 (Bridges Street Extension) from SR 1738 (Bridges Street to SR 1147 (McCabe Road)	ROW: FY 2022 Construction: FY 2025*
Carteret	R-5777D	Install broadband fiber along US 70 from I-40 to the Port of Morehead City	ROW: N/A Construction: FY 2020
Carteret	R-5858	Intersection improvements at NC 24/NC 58	ROW: FY 2020 Construction: FY 2021
Carteret	R-5884	Construct roundabout at NC 58 (Emerald Drive) and Loon Street	ROW: FY 2026 Construction: FY 2028
Carteret	R-5886	Construct roundabout at NC 58 (Emerald Drive) and SR 1000 (Coast Guard Road)	ROW: FY 2025 Construction: FY 2027
Carteret	R-5941	Realign intersection of SR 1175 (Bridges Street) at SR 1243 (Barbour Road)	ROW: FY 2025 Construction: FY 2027
Carteret	R-5944	Upgrade intersection of NC 58 (Emerald Drive) and Mangrove Drive	ROW: FY 2025 Construction: FY 2027
Carteret	TA-6717	Purchase vehicles for Carteret County public transit expansion	ROW: N/A Construction: FY 2020
Carteret	TA-6718	Purchase vehicles for Carteret County public transit expansion	ROW: N/A Construction: FY 2020

2.3 Segmentation

The corridor was divided into 9 segments, which are described in **Table 2**. Segment 2 was previously designed under SPOT ID H171581 and has been included in the 2020-2029 STIP as R-5885, with right-of-way acquisition scheduled to begin in Fiscal Year 2027. Segment 4 was designed in conjunction with this project under SPOT ID H150506/H171672. Logical termini were considered during this process but should be re-evaluated as segments become funded.

Table 2. Project Segments

Segment	Location	Length
1	NC 172 to Belgrade-Swansboro Road	4.3 miles
2	Belgrade-Swansboro Road to Front Street	3.1 miles
3	Front Street to west of NC 58	2.9 miles
4	NC 24 at NC 58 intersection	0.7 miles
5	East of NC 58 to Red Barn Road	3.6 miles
6	Red Barn Road to Broad Creek	3.5 miles
7	Broad Creek to Gales Creek	2.6 miles
8	Gales Creek to McCabe Road	3.4 miles
9	McCabe Road to US 70	2.8 miles

2.4 Crash Analysis

Crash data for the three-year period between July 1, 2015 through July 1, 2018 was compiled by NCDOT. Crash data was collected for three locations: NC 24 from NC 172 to the Onslow/Carteret County line, NC 24 from the Onslow/Carteret County line to US 70, and NC 58 within a half mile radius of the intersection with NC 24. **Table 3** shows the crash rate per 100 million vehicle miles traveled (MVMT). The predominant crash type in the project corridor was rear-end collisions as shown in **Table 4**, which are typically associated with stop-and-go conditions along congested corridors.

An interactive online map of planning level crash data grouped by intersection is available at the link below. It should be noted that only state-maintained roads are included:
<http://ncdot.maps.arcgis.com/home/webmap/viewer.html?webmap=dc944f1c834f49a18479c17df1f783b9>

Table 3. Crash Statistics

Roadway Segment	Total Crashes	Crash Rate*	Fatal	Type A Injury	Crash Severity**			PDO	EDPO***
					Type B Injury	Type C Injury			
NC 24 from NC 172 to the Carteret County line	329	164.99	1	4	18	63	243	3.97	
NC 24 from the Onslow County line to US 70	620	131.70	3	11	64	113	429	4.82	
NC 58	66	464.59	0	0	2	9	55	2.23	

*Rate = Crashes per 100 Million Vehicle Miles Traveled (MVMT); 2015-2018 (3 years)

**Crash severity is rated Fatal, Class A to C (highest to lowest), or PDO (property damage only)

***EPDO severity index greater than 8.4 is the threshold for locations that have more serious crashes (Chapter 14 of NCDOT TEAS Training Material)

Table 4. Crash Type Summary

Roadway Segment	Crash Type							
	Rear End	Sideswipe	Angle	Fixed Object	Left-Turn	Right-Turn	Head-On	Other*
NC 24 from NC 172 to the Carteret County line	145	28	29	30	56	5	1	35
NC 24 from the Onslow County line to US 70	219	63	51	61	123	23	3	77
NC 58	40	6	4	1	6	1	1	7

*Other types of crashes include collisions while backing up, collisions with moveable objects, pedal cyclists, and pedestrians, parked motor vehicles and animals, ran-off road, overturn/rollover, and other non-collision accidents.

3. Express Design Evaluation

3.1 Design Options

3.1.1 NC 24 Corridor

A reduced-conflict intersection (RCI) treatment was evaluated for the corridor. RCIs, also known as superstreets, cut more than half of the potential locations, or conflict points, where drivers may collide with other vehicles or pedestrians. Drivers on the main road follow their usual paths, but raised medians redirect drivers from the side streets to turn right. When there is a safe opening in traffic, drivers turn right to easily enter the flow of traffic on the main route. To go the other direction, or cross the highway, they pull into a dedicated lane to make a U-turn. Traffic signals may be provided at U-turn locations. RCIs are able to accommodate higher traffic volumes than traditional intersections, requiring fewer property impacts compared to adding travel lanes.

A reverse superstreet is proposed at the intersections of NC 24 and NC 172 and NC 24 and Bogue Sound Elementary School. A reverse superstreet redirects left-turns from the main roadway to U-turn bulbs and allows left-turns from the side street. This configuration is proposed at these intersections due to the potential benefit to traffic operations and access. This design would allow Bogue Sound Elementary School and Croatan High School to maintain their existing traffic circulation patterns.

Did you know?

Eliminating left-turns improves driver safety by reducing the number of points where a crash may occur along a roadway. By re-routing left-turns to U-turn bulbs, more time is available at signalized intersections for traffic traveling along a roadway, improving traffic flow.

The proposed typical section includes a combination of a shoulder section and curb and gutter section. The corridor is proposed to be a shoulder section throughout the entire corridor except in municipal boundaries, where curb and gutter with sidewalk would be applied. Four travel lanes, two in each direction, are proposed.

The proposed design is included in **Appendix B**. It should be noted that U-turn bulb and traffic signal locations are not final and subject to change. This design does not preclude the future installation of sidewalk or a multi-use path, and any sidewalk or multi-use path that is impacted by this project would be replaced by NCDOT.

3.1.2 NC 24 and NC 58 Intersection

Three concepts were evaluated for the intersection of NC 24 and NC 58 under SPOT ID H150506/H17672, developed in conjunction with this feasibility study. These designs are not exhaustive and will require further evaluation during project development if the project becomes funded in the STIP.

The three concepts evaluated are described below:

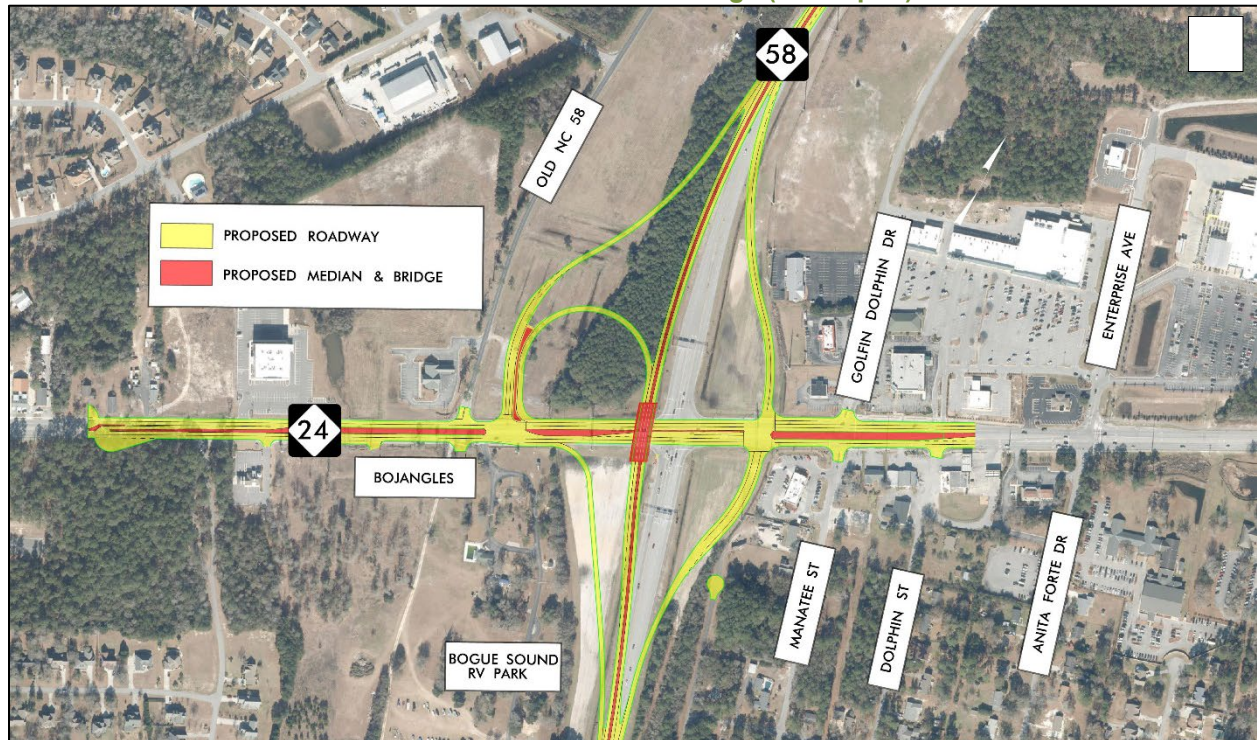
Concept 1 – Diamond Interchange (NC 58)

Concept 1 proposes the intersection be converted to a diamond interchange aligned to NC 58, with a loop in the northwest quadrant as shown in **Exhibit 2**. Under this option, NC 58 would be converted to a grade-separated, free-flowing roadway. Medians are proposed on NC 24 and NC 58. The following intersections on NC 24 would be converted to right-in/right-out:

- Old NC 58
- Golfin Dolphin Drive/Manatee Street
- Dolphin Street

Due to the inclusion of a median, all driveways are proposed to be converted to right-in/right out within the project limits. Drivers wishing to make a left-turn would utilize U-turn bulbs located east and west of the interchange. The entrance to Bogue Sound RV Park would be relocated, with a proposed connection to NC 24 at the Old NC 58 intersection adjacent to Bojangles.

Exhibit 2 – Diamond Interchange (Concept 1)



Concept 2 – Diamond Interchange (NC 24)

Concept 2 proposed the intersection be converted to a diamond interchange aligned to NC 24. Due to anticipated substantial right-of-way impacts and feedback received from municipalities, this option has been deemed impracticable and **will not be carried forward**. It has remained in the study to be used during the comparison of impacts. More information on this concept is included in **Section 3.2**.

Concept 3 – Continuous Flow Intersection

Concept 3 proposes to convert the intersection to a partial continuous flow intersection (CFI), shown on **Exhibit 3**. This option would keep both NC 24 and NC 58 at-grade. A CFI, also known as a displaced left-turn intersection, separates left-turning traffic several hundred feet from the main intersection. The left-turning traffic is directed to a separate roadway that runs parallel to the main road. Because left-turning traffic is now outside of the through movement traffic, left-turns and through movements can occur simultaneously. This design requires fewer traffic signal phases than a conventional intersection, meaning traffic on the main highway stops less frequently. Because left-turning traffic is separated from the main traffic flow, the intersection is safer.

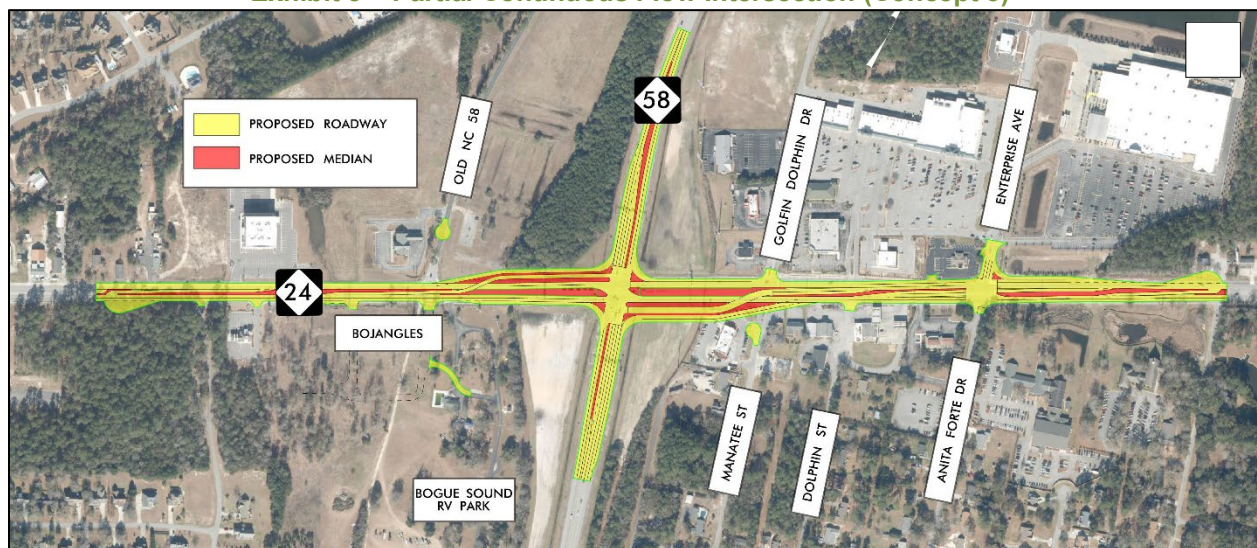
Continuous flow intersections have been proposed in several locations in North Carolina. The first in the state was opened in October 2019 in Charlotte, at the intersection of NC 16 and Mount Holly-Huntersville Road. For a visual representation on how a CFI operates, see the video below:

<https://www.youtube.com/watch?v=IJEa615aH5g>

Under this option the following changes would occur:

- The addition of a median would convert NC 24 intersections with Golfin Dolphin Drive and Dolphin Street to right-in/right-out access.
- The Old NC 58 and Manatee Street intersections on NC 24 would be converted to cul-de-sacs.
- The intersection of Enterprise Avenue/Anita Forte Drive and NC 24 would remain as a full movement intersection.
- All driveways would be converted to right-in/right-out access with the exception of Bogue Sound RV Park, which would be relocated with a proposed connection to NC 24 at the Old NC 58 intersection adjacent to Bojangles.

Exhibit 3 – Partial Continuous Flow Intersection (Concept 3)



3.2 Other Options Considered

A second typical section for NC 24 was evaluated that included curb and gutter for the length of the corridor. There are drainage concerns over this option due to the topography of the land. Due to the relative flatness of the area, there is the potential for water to be held on the roadway surface rather than drain into the gutters. Maintenance of this design may be problematic due to sand and other debris blowing into the inlets, clogging the system.

At the intersection of NC 24 and NC 58, initial concepts were analyzed using CAP-X, a high-level planning tool for traffic analysis. The analysis is included in Appendix D. The following options analyzed were not carried forward as a result of this analysis, potential right-of-way impacts, and constructability

concerns. Options not carried forward may be re-evaluated during the project development phase. All options described below were evaluated in two different scenarios: 1) NC 24 as the primary movement, and 2) NC 58 as the primary movement.

At-Grade Options

- Quadrant Intersection (all four quadrants evaluated)
- Partial CFI (also known as a partial Displaced Left-Turn Intersection)
- Signalized Restricted Crossing U-Turn
- Median U-Turn
- Partial Median U-Turn
- Bowtie Intersection
- Split Intersection

Grade-Separated Options

- Echelon Intersection
- Center Turn Overpass Intersection
- Displaced Left-Turn Intersection
- Contraflow Left Interchange
- Diverging Diamond Interchange
- Single Point Urban Interchange

Concept 2 – Diamond Interchange (NC 24)

Concept 2 (**withdrawn from further consideration due to impacts**), as previously described, proposed the intersection be converted to a diamond interchange aligned to NC 24, shown on **Exhibit 4**. Traffic on NC 24 would be free-flowing, while NC 58 would be grade-separated. The following roads would be converted to cul-de-sacs under this option:

- Royal Oaks Court
- Old NC 58
- Golfin Dolphin Drive
- Manatee Street
- Dolphin Street
- Anita Forte Drive
- Enterprise Avenue

Exhibit 4 – Diamond Interchange (Concept 2)



3.3 Traffic Volumes

A traffic estimate that projects traffic volumes for the 2018 No Build Scenario and the 2045 No Build Scenario was prepared for this project. The *R-5858 Traffic Forecast* (November 2018), which forecasted traffic volumes around the intersection of NC 24 and NC 58, was developed closely with these traffic estimates. Average Annual Daily Traffic (AADT) volumes are included in **Table 5**. It should be noted that the AADT is annualized traffic rather than seasonal peaks, and as such, traffic during summer months may be higher than described below. The traffic estimates and forecast report is located in **Appendix D**.

Table 5. Traffic Volumes

Location	2018 No Build (vpd)	2045 No Build (vpd)
NC 24 NC 24 west of NC 172	26,500	41,300
NC 24 NC 24 west of Belgrade-Swansboro Rd	23,600	32,600
NC 24 NC 24 west of Hammock Beach Rd	28,800	42,600
NC 24 NC 24 west of Main St	23,700	35,000
NC 24 NC 24 west of NC 58	28,200	41,700
NC 24 east of NC 58	27,600	46,600
NC 24 NC 24 west of Red Barn Rd	24,200	40,900
NC 24 NC 24 west of Nine Mile Rd	22,400	39,000
NC 24 NC 24 west of Hibbs Rd	20,000	37,000
NC 24 NC 24 west of McCabe Rd	18,800	35,500
NC 24 NC 24 west of US 70	26,000	40,000
NC 58 North of NC 24	8,400	12,400
NC 58 South of NC 24	17,000	25,100

vpd = vehicles per day

3.4 Traffic Capacity Analysis

The *Traffic Capacity Analysis Report* (December 2019) analyzed traffic operations on the corridor under existing conditions, future year conditions, and future year conditions with the proposed project constructed. Six levels of service (LOS), from A to F, are used to describe vehicle delay. LOS A represents free-flowing traffic while LOS F represents excessive delays. **Table 6** summarizes the LOS criteria used to analyze signalized intersections. For unsignalized intersections, it is not uncommon for yielding movements to experience long delays along major through corridors during peak hours.

Table 6. Level of Service Definition for Signalized Intersections

Level of Service	Average Delay per Vehicle (seconds)	Description
A	< 10	Little or no delay
B	10 to 20	Short traffic delays
C	20 to 35	Average traffic delays
D	35 to 55	Longer but acceptable delays
E	55 to 80	Very long traffic delays
F	> 80	Unacceptably long traffic delays

Source: Highway Capacity Manual (6th Edition) Chapter 19 Exhibit 19-8

A summary of traffic operations for major intersections along NC 24 is shown in **Table 7**. Traffic operations at the intersection of NC 24 and NC 58 are included in **Table 8**. The full reports for the corridor and NC 24 at NC 58 intersection are available upon request from the NCDOT Feasibility Studies Unit.

Table 7. Traffic Capacity Analysis along NC 24

Intersection	2018 No Build		2045 No Build		2045 Build	
	AM Peak Hour LOS (delay)	PM Peak Hour LOS (delay)	AM Peak Hour LOS (delay)	PM Peak Hour LOS (delay)	AM Peak Hour LOS (delay)	PM Peak Hour LOS (delay)
NC 172 West U-Turn	-	-	-	-	B (11.5)	B (14.6)
NC 172	D (42.1)	D (39.1)	F (100.4)	F (83.6)	C (30.9)	C (20.0)
NC 172 East-U Turn	-	-	-	-	A (8.9)	B (10.5)
Belgrade-Swansboro Rd West U-Turn	-	-	-	-	B (10.2)	B (14.4)
Belgrade-Swansboro Rd	A (8.0)	A (7.7)	C (25.2)	C (20.1)	B (10.4)	C (20.9)
Swansboro Middle School Exit West U-Turn	-	-	-	-	B (10.3)	B (13.7)
Queens Creek Road/Swansboro Middle School Exit	D (41.1)	D (38.4)	F (102.0)	F (134.0)	EB - C (25.8) WB - B (16.2)	EB - D (49.5) WB - A (7.6)
Queens Creek Road East U-Turn	-	-	-	-	F (107.1)	C (31.2)
West Main Street West U-Turn	-	-	-	-	A (6.7)	A (6.2)
West Main Street	A (9.9)	A (8.8)	B (18.5)	B (13.8)	EB - A (1.2) WB - B (13.7)	EB - A (1.5) WB - B (11.5)
West Main Street East U-Turn	-	-	-	-	A (6.7)	A (4.6)
Taylor Notion Road West U-Turn	-	-	-	-	C (29.2)	B (12.3)
Taylor Notion Road	B (11.2)	B (10.9)	C (27.1)	C (29.5)	C (21.6)* B (18.1) ¹	C (23.1)* C (21.3) ¹
Taylor Notion Road East U-Turn	-	-	-	-	C (19.4)	E (43.8)
Red Barn Road	F (118.8)* ²	F (101.4)* ²	F (>1000)* ²	F (>1000)* ²	C (33.8)	B (17.5)
Red Barn Road East U-Turn	-	-	-	-	B (12.1)	B (14.1)
Bogue Sound Elementary School West U-Turn	-	-	-	-	C (24.7)	A (6.6)
Bogue Sound Elementary School Driveway	A (8.8)	A (8.5)	B (14.4)	B (11.5)	A (7.6)	A (6.1)
Bogue Sound Elementary School East U-Turn	-	-	-	-	A (9.3)	A (8.4)
9 Mile Road West U-Turn Bulb	-	-	-	-	B (17.2)	B (13.3)
9 Mile Road	B (10.9)	B (12.4)	C (22.2)	D (39.8)	B (17.9)	C (21.3)
Hibbs Road West U-Turn	-	-	-	-	B (17.2)	B (13.3)
Hibbs Road	B (15.7)	B (15.1)	C (34.9)	D (46.8)	D (26.0)* B (14.3) ¹	C (15.9)* ² E (37.5) ¹
Hibbs Road East U-Turn*	-	-	-	-	B (14.3)	E (37.5)
Morehead Crossing West U-Turn	-	-	-	-	B (15.4)	B (15.7)
Morehead Crossing/Harbor Drive	B (17.6)	B (19.3)	D (37.6)	E (56.0)	D (24.7)* ² B (16.8) ¹	C (19.5)* ² C (20.7) ¹
Harbor Drive East U-Turn*	-	-	-	-	B (13.0)	C (18.3)

*Unsignalized intersection; ¹Only the westbound left-turn is proposed to be signalized; ²LOS shown is for side-street approach; Delay is measured in seconds; EB = eastbound traffic; WB = westbound traffic

Table 8. Traffic Capacity Analysis NC 24 at NC 58

Scenario	AM Peak Hour LOS (delay)	PM Peak Hour LOS (delay)
2018 No Build	C (31.9)	C (32.7)
2045 No Build	E (63.1)	D (52.7)
2045 Diamond (NC 58)	D (36.0)	D (31.0)
2045 Diamond (NC 24)	C (21.5)	C (20.8)
2045 CFI	D (43.7)	D (47.8)

Delay is measured in seconds

3.5 Maintenance of Traffic

A narrative maintenance of traffic plan is described below. This is not an exhaustive or final plan, but an outline of how the design could be constructed. Final maintenance of traffic plans require approval by NCDOT.

Maintenance of Traffic determines how and in what order a project will be constructed. This includes potential lane closures and what hours construction may occur.

3.5.1 NC 24 Corridor

NC 24 Corridor

- Road widening to the outside of existing travel lanes and U-turn bulb construction would be performed first. Existing travel lanes would be maintained except when practicable – required lane closures would be temporary.
- Upon completion of the outside widening, traffic would be shifted to new travel lanes on the outside. Left-turn access would be restricted in the work zone and directed to the new U-turn bulbs. Median, monolithic concrete islands, left-turn lanes, and traffic signals would then be constructed.
 - Temporary traffic patterns could be implemented in stages along the corridor so as to not restrict left-turn access throughout the entire project limits at once.
 - Channelizing islands should not be constructed at signalized intersections until U-turn bulbs, associated signals, and lanes have been completed east and west of the intersection to be converted.
- Channelizing islands and associated signals would be constructed at all signalized intersections using right-in/right-out access at side streets for the duration of construction and required concrete cure time. Left-turning traffic would be directed to U-turn bulbs adjacent to the intersection.

Intersection Relocations

- The new location of the side street would be constructed while maintaining existing traffic patterns. The new road would be connected to the existing roadway utilizing temporary lane closures as required.
- Traffic would shift to the completed new location road. The existing road would be removed, and all driveway tie ins would be constructed.

3.5.2 NC 24 at NC 58 Intersection

Concept 1 – Diamond Interchange (NC 58)

- Maintain existing traffic patterns and construct NC 58 on new location, including ramps and loop, away from traffic using temporary shoring and portable concrete barriers as necessary. Perform all required widening, U-turn bulb construction, and tie-ins using temporary lane closures on NC 24.
- Upon completion of U-turn bulb construction and at-grade widening on NC 24, implement a right-in/right-out traffic pattern for all non-signalized side streets and driveways, restricting left-turn access on NC 24. Traffic wishing to make left-turns would utilize the newly constructed U-turn bulbs. Construct proposed median, monolithic islands, and signals not associated with new ramps along NC 24.
- Using night time rolling road blocks in accordance with NCDOT Roadway Standard Drawing 1101.03 and flaggers as required, hang girders for proposed NC 58 bridge over NC 24.
- Complete bridge construction.
- Install new traffic signals at ramp termini on NC 24 at open interchange to traffic.
- Away from traffic, remove existing at-grade intersection and complete grading as necessary.

Concept 2 – Diamond Interchange (NC 24) (**withdrawn from further consideration due to impacts**)

- Maintain existing traffic patterns and construct NC 58 on new location, including ramps, away from traffic using temporary shoring and portable concrete barriers as necessary. Perform all required widening and tie-ins using temporary lane closures.
- Upon completion of outside widening on NC 24, shift traffic to newly constructed outside travel lanes in each direction and construct proposed median.
- Using night time rolling road blocks in accordance with NCDOT Roadway Standard Drawing 1101.03 and flaggers as required, hang girders for proposed NC 58 bridge over NC 24.
- Complete bridge construction.
- Install new traffic signals at ramp termini on NC 58 and open interchange to traffic.
- Away from traffic, remove existing at-grade intersection and complete grading as necessary.

Concept 3 – Continuous Flow Intersection

- Perform outside widening and U-turn bulb construction using temporary lane closures while maintaining existing travel lanes.
- Upon completion of outside widening, shift traffic out to newly constructed edge of travel in each direction and restrict left-turn access onto unsignalized side streets. Direct all left-turning traffic to newly constructed U-turn bulbs. Construct proposed median and all associated monolithic islands, left-turn lanes, and traffic signals as required.
- Full-movement access in all directions at the intersection of NC 24 at NC 58 should be maintained until islands and medians required for left-turn crossover have been constructed in both directions on NC 24.
- Install new signal at the intersection of NC 24 at NC 58. Open signalized left-turn crossovers to traffic on NC 24 at complete remaining median construction on NC 24 at NC 58.

4. Design Option Impacts and Costs

4.1 Impacts

Because this Project Scoping Report is not the product of an exhaustive environmental or design effort, but rather an initial step to this process, the environmental impacts are based on a screening of readily available geographic information system (GIS) data. It is assumed that a more detailed impacts analysis would be performed during the NEPA/SEPA phase of the project. A comparison of impacts is included in Table 9 and Table 10. These numbers are initial estimates based on conceptual designs. Avoidance and minimization measures such as retaining walls or tighter fill slopes should be evaluated during the design process.

Table 9. Project Impacts NC 24

Impact	Segment 1	Segment 2	Segment 3	Segment 5	Segment 6	Segment 7	Segment 8	Segment 9
Wetland Impacts (acres)	<0.1	-	<0.1	1.1	0.6	-	<0.1	<0.1
Stream Impacts (linear feet)	195	-	-	350	165	-	85	-
Total Relocations*	2	25	8	16	4	8	8	2
Residential	2	9	5	9	2	5	6	2
Business	-	16	3	6	2	3	2	-
Non-Profit	-	-	-	1	-	-	-	-
Cemeteries	-	-	-	1	-	-	2	-

**Relocations are based on conceptual designs and subject to change. Parcels with multiple businesses were counted based on individual business relocations*

Table 10. Project Impacts NC 24 at NC 58

Impact	Concept 1 Diamond (NC 58)	Concept 2 Diamond (NC 24)**	Concept 3 CFI
Wetland Impacts (acres)	-	-	-
Stream Impacts (linear feet)	-	-	-
Total Relocations*	-	44	4
Residential	-	1	-
Business	-	41	4
Non-Profit	-	2	-

**Relocations are based on conceptual designs and subject to change. Parcels with multiple businesses were counted based on individual business relocations*

***Concept 2 was withdrawn from further consideration due to impacts*

4.2 Costs

Cost estimates have been developed for the proposed project design options based upon the conceptual designs. Table 11 shows cost estimates for the build alternative for construction, utility relocations, and right of way.

Table 11. Cost Estimates

Design Option	Construction	Utility Relocation	Right-of-Way	Total Cost
NC 24 Corridor	X	X	X	X
Concept 1 – Diamond (NC 58)	X	X	X	X
Concept 2 – Diamond (NC 24)*	X	X	X	X
Concept 3 - CFI	X	X	X	X

*Concept 2 was withdrawn from further consideration due to impacts

5. Existing Conditions

5.1 Coastal Area Management Act

Onslow and Carteret Counties are considered coastal counties, and thus fall under the jurisdiction of the North Carolina Coastal Area Management Act of 1974 (CAMA). CAMA has the following goals:

- To provide a management system capable of preserving and managing the natural and ecological conditions of the coastal estuarine system, the barrier dune system, and the beaches, so as to safeguard and perpetuate their natural productivity and their biological, economic, and aesthetic values;
- To ensure that the development or preservation of the land and water resources of the coastal area proceeds in a manner consistent with the capability of the land and water for development, use, or preservation based on ecological considerations;
- To ensure the orderly and balanced use and preservation of our coastal resources on behalf of the people of North Carolina and the nation;
- And to establish policies, guidelines, and standards for the coastal area.

Projects within coastal zones or other areas of concern under CAMA, such as the proposed NC 24 improvement project, are subject to CAMA regulations. The North Carolina Division of Coastal Management (NCDQM) oversees the implementation and enforcement of CAMA. More information about CAMA and North Carolina's coastal management strategies is available online at the following link: <https://deq.nc.gov/about/divisions/coastal-management>.

5.2 Croatan National Forest

The Croatan National Forest is parallel to NC 24 in segments 3 through 8. The Congressional Boundary stretches from the north side of NC 24 once it crosses the White Oak River to McCabe Road. Land owned by the US Forest Service is concentrated in segment 6, though there is land present in segments 7 and 8 as well. The Croatan Game Land is adjacent to NC 24 in segment 8. Extensive coordination with the US Forest Service (USFS) will be required regarding any potential direct or indirect impacts and subsequent mitigation. The potential requirement to conduct protected, endangered, threatened, and sensitive (PETS) species surveys should be taken into consideration when developing future project schedules. The Patsy Pond Limesink Complex Registered Heritage Area is adjacent to NC 24 in the project area and part of the Croatan National Forest. The USFS noted their concern over any impacts near Patsy Pond. Record of coordination with the USFS is included in Appendix C.

5.3 Bogue Field

The US Marine Corps Auxiliary Landing Field Bogue, otherwise known as Bogue Field, is accessed via NC 24. The field is used as a training ground for pilots from US Marine Corps Air Station Cherry Point (Cherry Point). The property's perimeter is fenced. Coordination with Cherry Point should occur regarding any potential direct or indirect impacts to Bogue Field. The Marine Corps noted that any impact to the perimeter fence could result in the entire fence needing to be replaced.

5.4 Land Use

Land use in the project area varies by segment, described below.

Segment 1: NC 172 to Belgrade-Swansboro Road

NC 24 is a four-lane median divided roadway in this segment. The unincorporated community of Hubert is located north of the corridor and accessed via Old Highway 172. Camp Lejeune is located south of NC 24 via NC 172. Land use in this segment is primarily residential and undeveloped land. Agricultural operations are present along and adjacent to the corridor. Small businesses are scattered throughout with some larger operations including two concrete facilities.

Segment 2: Belgrade-Swansboro Road to Front Street

NC 24 transitions to a five-lane undivided roadway with a two-way center left-turn lane through this section and the remainder of the corridor. The majority of this segment travels through the Town of Swansboro. Land use is primarily commercial, with residential areas located off of side streets. Businesses vary between large retail centers such as Walmart to small local businesses. Historic Swansboro is adjacent to the corridor, accessed primarily via West Church Street and Front Street.

Segment 3: Front Street to NC 24 west of NC 58

Segment 3 crosses the White Oak River and is populated by businesses related to the water and residential areas. Many residences along this section have either direct access to the water or a community access point. Waterway RV Resort is an annual RV campground on the corridor with 336 sites. Non-water focused businesses primarily serve the local community. Winberry Farm is a family-owned farm accessed via NC 24 that grows the Bogue Sound watermelons and cantaloupes, seasonal vegetables, and operates a farm market. The Carteret County Magistrate is accessed off of NC 24 in this segment.

Segment 4: NC 24 at NC 58 Intersection

Land use around the intersection is primarily commercial along NC 24, with cross-street access to neighborhoods and vacation properties. The Carteret Crossing shopping center is adjacent to the intersection of NC 24 and NC 58, containing destination retail as well as fast-food restaurants, anchored by Lowe's Foods and Lowe's Home Improvement. Sidewalks are present on NC 24 on both sides of the intersection but do not connect through the intersection. Within the project area, NC 24 is a five-lane undivided facility with a speed limit of 35 miles per hour. Center left-turn lanes and sidewalks are provided to allow access to the residences and businesses bordering the roadway.

Due to previous right-of-way acquisition in the 1960s in anticipation of a diamond interchange, NC 58 is full control of access in the project area. No bicycle or pedestrian facilities are present along NC 58, though share the road signs are present heading south towards Emerald Isle. NC 58 is generally a two-lane undivided road that widens for turn lanes at the intersection with NC 24. The posted speed limit is 45 miles per hour. Cedar Point noted that the vacant parcel accessed via Old NC 58 (SR 1113) has the potential to be developed.

The *Cedar Point Comprehensive Plan* (2012) noted that one of the significant deterrents to rapid growth in the area is the lack of a centralized sewer system, though the town is not opposed to the construction of one. The future land use map called out areas directly adjacent to the intersection as candidates for community growth areas and existing core areas. The potential for new commercial, mixed-use, and

residential development was noted in the plan but emphasized that it be consistent with the existing community character. Pedestrian connectivity throughout the town limits is a stated goal.

The draft *Cape Carteret Strategic Plan* (2014) noted a goal to create a sense of place and identity that is “Cape Carteret.” The plan stated this could be accomplished through adopting design standards for commercial structures, development of a “Town Center,” and other methods.

Segment 5: East of NC 58 to Red Barn Road

NC 24 crosses Deer Creek and Goose Creek in this segment. Land use is primarily residential, with small businesses throughout. The Marine Corps operates Bogue Field, an auxiliary landing site used for training purposes, which is located on the south side of NC 24 in this segment. Guthrie Farm is an active agricultural operation and produce stand adjacent to NC 24, accessed via Guthrie Farm Road.

Segment 6: Red Barn Road to Broad Creek

The north side of NC 24 is dominated by the Croatan National Forest. The south side of the corridor is residential and open land. Small businesses are scattered along NC 24 in this segment.

Segment 7: Broad Creek to Gales Creek

Land use is a mixture of residential and wooded parcels. Small businesses are present along the corridor, and the Croatan National Forest is located on the north side of NC 24. The segment is bound by Broad Creek, Gales Creek, and the Intracoastal Waterway, limiting the available area for potential development or changes in land use.

Segment 8: Gales Creek to McCabe Road

Segment 8 is primarily residential in use. Small businesses are scattered along this segment. The Croatan Game Land is adjacent to NC 24 in this segment. Carteret-Craven Electric Cooperative and SPX Dehydration & Process operate large facilities accessed off of Hankinson Drive. A conservation easement owned by the North Carolina Division of Mitigation Services is located on the north side of NC 24 west of Hankinson Drive.

Segment 9: McCabe Road to US 70

Land use in segment 9 is residential around McCabe Road, transitioning to commercial as NC 24 approaches US 70. Large wooded parcels are present on both the north and south sides of NC 24 in this segment. Large box stores including Walmart, Belk, and Lowes Home Improvement are accessed via NC 24, in addition to small businesses in the vicinity of the intersection with US 70.

5.5 Community Resources

Community resources include places such as schools, places of worship, parks and other publicly owned recreational facilities. A detailed community resource study was not conducted for this Project Scoping Report. GIS-level research and a preliminary site review were completed. **Figure 2** shows the location of documented community resources within and near the project study area.

Community resources in the project vicinity are summarized below:

Segment 1: NC 172 to Belgrade-Swansboro Road

An Onslow Water and Sewer Authority water treatment plant is adjacent to the intersection of NC 24 and NC 172. It is not anticipated to be impacted by this project. Swansboro Church of God is accessed from NC 24 in this segment.

Segment 2: Belgrade-Swansboro Road to Front Street

Swansboro Branch Public Library, Queen's Creek Elementary School, Swansboro High School, Swansboro Middle School, Swansboro Elementary School, Swansboro United Methodist Church, Swansboro Church of Christ, First Baptist Church of Swansboro, Swansboro Fire Department, Swansboro Police Department, and the Swansboro Town Hall are located on or accessed from NC 24 in this segment.

Several parks are in this segment, including Swansboro Municipal Park, Pirates Den Park, Riverview Park, and Bicentennial Park. These properties are protected by Section 4(f) of the US Department of Transportation (USDOT) Act. If impacts to Section 4(f) resources are anticipated, coordination should occur with the Federal Highway Administration (FHWA).

Additionally, Swansboro Municipal Park is protected under Section 6(f) of the Land and Water Conservation Fund Act, and the North Carolina Parks and Recreation Trust Fund. It is not anticipated to be impacted by this project. If during project development impacts are anticipated, coordination should occur with FHWA and the North Carolina Division of Parks and Recreation.

Segment 3: Front Street to NC 24 west of NC 58

The North Carolina Wildlife Resource Commission (NCWRC) operates a boat ramp in this segment. It is protected by Section 4(f) of the USDOT Act and under CAMA. Coordination with the NCWRC and NCDOT should occur during project development regarding any impacts or change in access to this property.

Emmanuel Baptist Church and cemetery are accessed via Bell Street. Cedar Point Pentecostal Church is in the project vicinity off of Bluff Road. The Salty Air Open Market, a space for local artists, collectors, and farmers to share their wares, is adjacent to NC 24. During project discussions, Cedar Point noted they are planning to construct a park off of Masonic Avenue.

Segment 4: NC 24 at NC 58 Intersection

The following community resources are located on NC 24 or in the project vicinity in segment 4: Cape Carteret Town Hall, Cape Carteret Police Department, Western Carteret Fire & EMS Station 1, Cedar Point Town Hall, Cape Carteret Baptist Church, and East Coast Square medical offices.

Western Park is in the project vicinity, accessed via Old NC 58. It is a community resource protected by Section 4(f) of the USDOT Act, Section 6(f) of the Land and Water Conservation Fund Act, and the North Carolina Parks and Recreation Trust Fund. It is not anticipated to be impacted by this project. If during project development impacts are anticipated, coordination should occur with the FHWA and the North Carolina Division of Parks and Recreation.

Segment 5: East of NC 58 to Red Barn Road

Cape Carteret Presbyterian Church, Church of God of Prophecy, Bethlehem United Methodist Church, and White Oak Church of God are located in this segment. Bethlehem United Methodist Cemetery is accessed via Bogue Loop Road. White Oak Elementary School is located on the eastern edge of the segment, with two driveways onto NC 24. The Bogue Town Hall is also present in this segment.

Segment 6: Red Barn Road to Broad Creek

NC 24 west Carteret Water Corporation, which provides water to the area, is accessed via Page Lane in this segment. Bogue Sound Elementary School and Croatan High School are located off of NC 24 near Broad Creek.

The Croatan National Forest is located on the north side of NC 24 in the project area. Patsy Pond Natural Trail runs parallel to NC 24 and is part of the Croatan National Forest. Recreational trails such as this are protected by Section 4(f) of the USDOT Act. Coordination should occur with FHWA, USFS, the NCDOT.

Segment 7: Broad Creek to Gales Creek

Broad Creek Middle School is located on NC 24 in this segment. Broad Creek United Methodist Church and Broad Creek Church of the God Parsonage are community resources accessed via side streets.

Segment 8: Gales Creek to McCabe Road

Soundview Church, Kingdom Hall of Jehovah's Witness, All Saints Anglican Church, the Croatan Game Land, and Gethsemane Memorial Park are located on or accessed from NC 24 in segment 8.

Segment 9: McCabe Road to US 70

Gethsemane Memorial Park is adjacent to the segment and has a driveway off of McCabe Road. St. Peter's United Methodist Church is accessed off of Hodges Street near the intersection with US 70.

5.6 Cultural Resources

5.6.1 Historic Resources

Records and maps published by the North Carolina State Historic Preservation Office (NC SHPO) were reviewed using the NC HPOWeb GIS database for historic architectural resources that had been identified in previous surveys or that were listed in or had been determined eligible for listing in the National Register of Historic Places. **Table 12** provides a list of previously identified historic resources found within 1,000 feet of the project area that are properties designated as study list, determined eligible, or listed on the National Register of Historic Places. More detailed evaluations of these properties and the potential effects of the project on these resources would be conducted during the project development phase of the project.

Table 12. Historic Resources

Name	ID	Status	Location
Sampson A. Starling House	ON0511	SL	9 Starling Road
Isaac Newton Henderson House	ON0192	SLDOE	138 Barbour Road
Swansboro Local Historic District	ON0992	LHD	-
Swansboro Historic District	ON0812	NR	-
William Edward Mattocks House	ON0891	NR	109 Front Street
Peter Ringware's House	ON0973	SL	209 Main Street
Octagon House	CR0604	SL	301 Masonic Avenue
Gales Creek Cemetery	CR1287	SL	Across from 227 Gales Shore Circle

Source: North Carolina State Historic Preservation Office (2019)

LHD = Local Historic District; NR = National Register; SL = Study List; SLDOE = Study List & Determined Eligible

5.6.2 Archaeological Resources

Because this Project Scoping Report is not the product of an exhaustive environmental or design effort, but rather an initial step to this process, the environmental impacts are based on a screening of readily available GIS data. At this stage, archaeological resources were not evaluated. It is assumed that a more detailed impacts analysis would be performed during the NEPA/SEPA phase.

5.7 Natural Environment

A detailed environmental study was not conducted for this Project Scoping Report. GIS level research and a preliminary site review were completed. **Figure 2** shows the preliminary conceptual design and location of environmental features within the project area.

5.7.1 Water Quality Resources

Water resources in the project area are described in **Table 13**. The project is located in the White Oak River Basin (hydrologic unit code 03020301).

Water resources in the project area have multiple classifications, which consist of:

- High Quality Waters (HQW) – Supplemental classification intended to protect waters which are rated excellent based on biological and physical or chemical characteristics through Division of Water Resources monitoring or special studies, primary nursery areas designated by the Marine Fisheries Commission, and other functional nursery areas designated by the Marine Fisheries Commission.
- Outstanding Resource Waters (ORW) – All outstanding resource waters are a subset of High Quality Waters. This supplemental classification is intended to protect unique and special waters having excellent water quality and being of exceptional state or national ecological or recreational significance. To qualify, waters must be rated Excellent by the Division of Water Resources.
- Class SC – All tidal salt waters protected for secondary recreation such as fishing, boating, and other activities involving minimal skin contact; fish and non-commercial shellfish consumption; aquatic life propagation and survival; and wildlife.
- Class SB – Tidal salt waters protected for all SC uses in addition to primary recreation. Primary recreational activities include swimming, skin diving, water skiing, and similar uses involving human body contact with water where such activities take place in an organized manner or on a frequent basis.
- Class SA – Tidal salt waters that are used for commercial shellfishing or marketing purposes and are also protected for all class SC and Class SB uses. All SA waters are also HQW by supplemental classification.

Table 13. Surface Water Classifications

Surface Water Name	Classification	303(d)
Queen Creek	SA; HQW	No
Pasture Branch	SA; HQW	No
Halls Creek	SA; HQW	No
Ward Creek	SC	No
White Oak River	SA; HQW	No
White Oak River Restricted Area	SC	No
Bogue Sound (including Intracoastal Waterway)	SA; ORW	Yes
Deer Creek	SA; ORW	Yes
Hunting Island Creek	SA; HQW	Yes
Goose Creek	SA; HQW	Yes
Sanders Creek	SA; HQW	Yes
Sikes Branch	SA; HQW	Yes
East Prong Sanders Creek	SA; HQW	Yes
Broad Creek	SA; HQW	Yes
Gales Creek	SA; HQW	Yes
Jumping Run	SA; HQW	Yes
Spooner Creek	SA; HQW	Yes

HQW = High Quality Water; ORW = Outstanding Resource Water

Section 303(d) of the Clean Water Act requires states to develop a list of waters not meeting water quality standards or which have impaired uses. All streams in the project area included in the 2018 Final 303(d) list are listed for exceeding criteria related to shellfish growing area status, including fecal coliform.

5.7.2 Jurisdictional Features

Jurisdictional “Waters of the United States”, including wetlands, are protected under Section 404 of the Clean Water Act (CWA). Any action that proposes impacts to waters of the United States falls under the jurisdiction of the US Army Corps of Engineers (USACE) through Section 404 of the Clean Water Act (33 U.S.C. 1344) and under the jurisdiction of the NC Department of Environmental Quality (NCDEQ) through the Section 401 Water Quality Certification Process (NC General Statutes Chapter 143 Article 21, Part 1). Encroachments into areas determined as subject under CWA must be reviewed and approved by the USACE through the Section 404 program.

A Natural Resource Technical Report will be prepared during project development to fully identify and evaluate impacts to these resources. For the purposes of this report, the US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) data for wetlands and NCDEQ’s online mapping for streams or other water bodies that may be present within 1,000 feet of the project were reviewed. Based on a preliminary review of NWI mapping, NCDEQ’s online mapping for streams, and conceptual slope stake limits. Impacts are considered by section and are included Table 9.

5.7.3 Protected Species

Species with the federal status of endangered and threatened are protected under provisions of the Endangered Species Act (ESA) of 1973 as amended (16 USC 1531 et. seq.). Any action likely to adversely affect a species classified as federally protected will be subject to review by the USFWS for terrestrial species, and the National Marines Fisheries Service (NMFS) for marine species. As of November 15, the USFWS and NMFS lists 18 and 15 federally protected species for Onslow and Carteret Counties respectively. Protected species are shown in Table 14.

Table 14. Federally Protected Species listed for Onslow and Carteret Counties

County	Agency	Common Name	Scientific Name	Federal Status
Onslow, Carteret	USFWS	American alligator	<i>Alligator mississippiensis</i>	T (S/A)
Onslow	USFWS	Bald eagle	<i>Haliaeetus leucocephalus</i>	BGPA
Onslow, Carteret	USFWS	Green sea turtle	<i>Chelonia mydas</i>	T
Onslow, Carteret	USFWS	Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E
Onslow, Carteret	USFWS	Kemp’s ridley sea turtle	<i>Lepidochelys kempii</i>	E
Onslow, Carteret	USFWS	Leatherback sea turtle	<i>Dermochelys coriacea</i>	E
Onslow, Carteret	USFWS	Loggerhead sea turtle	<i>Caretta caretta</i>	T
Carteret	USFWS	Nothorn long-eared bat	<i>Myotis septentrionalis</i>	E
Onslow, Carteret	USFWS	Piping plover	<i>Charadrius melodus</i>	T
Onslow, Carteret	USFWS	Red-cockaded woodpecker	<i>Picoides borealis</i>	E
Onslow, Carteret	NMFS	Shortnose sturgeon	<i>Acipenser brevirostrum</i>	E
Onslow, Carteret	USFWS	Red knot	<i>Calidris canutus rufa</i>	T
Carteret	USFWS	Roseate tern	<i>Sterna dougallii dougallii</i>	T
Onslow, Carteret	USFWS	NC 24 west Indian manatee	<i>Trichechus manatus</i>	E
Onslow	USFWS	Cooley’s meadowrue	<i>Thalictrum cooleyi</i>	E
Onslow	USFWS	Golden sedge	<i>Carex lutea</i>	E
Onslow	USFWS	Pondberry	<i>Lindera melissifolia</i>	E
Onslow, Carteret	USFWS	Rough-leaved loosestrife	<i>Lysimachia asperulaefolia</i>	E
Onslow, Carteret	USFWS	Seabeach amaranth	<i>Amaranthus pumilus</i>	T
Onslow, Carteret	NMFS	Atlantic sturgeon	<i>Acipenser oxyrinchus oxyrinchus</i>	E

E = endangered; T = threatened; T (S/A) = threatened due to similarity of appearance; BGPA = Bald and Golden Eagle Protection Act; USFWS = US Fish and Wildlife Service; NMFS = National Marines Fisheries Service

5.7.4 Existing NCDOT Mitigation Sites

Two NCDOT Mitigation sites are located within 1,000 feet of the project area. The Cedar Point Site is approximately 0.82 acres and located on the eastern bank of the White Oak River adjacent to NC 24. The Deer Creek Mitigation Site is approximately 4.5 acres in size and located on the north side of NC 24 east of White Oak Elementary School. This site was used as on-site wetland mitigation for TIP Project R-2105, which widened NC 24 to five lanes. The site is no longer monitored and is closed out. NCDOT mitigation sites are shown on **Figure 2**. Impacts to mitigation sites should be avoided to the greatest extent practicable. Coordination with the NC Division of Mitigation Services and the Interagency Review Team will be required if impacts are unavoidable.

5.7.5 Conservation Easements

Three conservation easements are located along NC 24 in the project area. Overlapping easements owned by the North Carolina Coastal Land Trust and North Carolina Department of Agriculture are present in Segment 5, accessed from Guthrie Farm Road. A conservation easement owned by the North Carolina Division of Mitigation Services is located just west of the intersection of NC 24 at Hankinson Drive.

5.7.6 Federal Emergency Management Agency (FEMA) Resources

Protection of floodways and floodplains is required under 23 Code of Federal Regulations (CFR) 650A; Executive Order 11988, Floodplain Management; and USDOT Order 550.2, Floodplain Management and Protection. The intent of these regulations is to avoid or minimize highway encroachments within the 100-year (base) floodplains or regulatory floodway, where practicable, and to avoid supporting land use development that is incompatible with floodplain values.

Based on a preliminary review of data available on the North Carolina Flood Risk Information System, NC 24 crosses multiple floodways, 100-year floodplains, and 500-year floodplains in the project area. The location of these crossings is included in **Figure 2**.

A GIS review of the project area revealed several county owned properties along the corridor. Two of these parcels remain vacant and are potential FEMA Hazard Mitigation Grant Program buyout properties. Coordination with the Carteret County Planning & Inspections Department should occur during project development regarding any potential FEMA buyout properties.

6. Stakeholder Involvement

A project kick-off meeting was held January 16, 2019 at the Cedar Point Town Hall to introduce the subject NC 24 at NC 58 intersection project and the NC 24 Corridor Project and gather initial feedback to be used in preparation of designs. A formal summary of this meeting, including attendees, can be found in **Appendix C**.

A design review meeting was held August 8, 2019 at the Swansboro Town Hall to review designs for the NC 24 at NC 58 intersection and a portion of the NC 24 Corridor Study west of the intersection to US 70 in Morehead City. Additionally, the Down East Rural Planning Organization presented the project to the Carteret County Transportation Board following the design review meeting. The following general concerns were received regarding the designs:

- Loss of left-turn access due to the proposed median would negatively affect businesses.
- Impacts to businesses and property in Concept 2 (**withdrawn from further consideration due to impacts**) are excessive.
- No proposed concept will solve the congestion issues at the intersection of NC 24 at NC 58 until a mid-island bridge is constructed.

Cape Carteret noted they were opposed to any design that would result in the elimination of businesses or government facilities. Cedar Point noted their preference for the CFI in order to keep the small-town feel of the area. A formal meeting summary and copy of comments received can be found in Appendix C.

A project Frequently Asked Questions document was prepared in response to comments received and is included in **Appendix C**.

7. Recommendations

Due to the length of the project, it is anticipated the project will be funded in segments. Coordination with the appropriate federal agencies, such as FHWA and/or USACE, should occur to ensure segments have independent utility and logical termini. Impacts associated with the project are included in Table 10 and cost estimates are included in Table 11, both located in Section 4.1 of this report. Due to the level of potential impacts and protected resources along the corridor, a Federal Categorical Exclusion (CE) is likely to be the most appropriate level of environmental review. Robust public involvement, including but not limited to small group meetings and attending local council meetings is recommended based on feedback and concern received during this process. For the intersection of NC 24 at NC 58, coordination with municipalities outside of the direct impact area of the project but located along the corridor, such as Bogue and Emerald Isle, is recommended. It is assumed that additional concepts may be evaluated for this intersection during the NEPA/SEPA phase of the project.

8. References

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