Comprehensive Transportation Plan

Topsail Area

February 2011

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In Cooperation with: Onslow County
Pender County
Town of Surf City
Town of North Topsail Beach
Town of Holly Ridge
Town of Topsail Beach
Cape Fear Rural Planning Organization
Down East Rural Planning Organization

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Executive Summary

In November of 2005, the Transportation Planning Branch of the North Carolina Department of Transportation, Onslow County and Pender County initiated a study to cooperatively develop the Topsail Area Comprehensive Transportation Plan (CTP), which includes the Town of Surf City, the Town of North Topsail Beach, the Town of Topsail Beach and the Town of Holly Ridge. This is a long range multi-modal transportation plan that covers transportation needs through 2030. Modes of transportation evaluated as part of this plan include: highway, public transportation and rail, bicycle, and pedestrian. This plan does not cover standard bridge replacements, routine maintenance, or minor operations issues. Refer to Appendix A for contact information on these types of issues.

Findings of this CTP study were based on an analysis of the transportation system, environmental screening, and public input. Refer to Figure 1 for the CTP maps, which were mutually endorsed/adopted in 2009. Implementation of the plan is the responsibility of Onslow County, Pender County, the municipalities, and NCDOT. Refer to Chapter 1 for information on the implementation process.

This report documents the recommendations for improvements that are included in the Topsail Area CTP. The major recommendations for improvements are listed below. More detailed information about these and other recommendations can be found in Chapter 1.

- **US 17:** Upgrade to freeway standards from Sloop Point Rd (SR 1561) to Shepards Rd (SR 1533). Interchanges are recommended at NC 210 and Shepards Rd (SR 1533). A northwestern bypass of Holly Ridge is recommended from Shepards Rd (SR 1533) to NC 172 with a recommended grade separation at NC 50. Upgrade to freeway standards from NC 172 to the Topsail Area CTP Planning Boundary. An interchange is recommended at NC 172.

- **NC 172:** Widen to a four-lane divided boulevard from US 17 to the Topsail Area CTP Planning Boundary.

- **NC 210:** Widen to a four-lane divided boulevard from US 17 to Little Kinston Rd (SR 1533). Widen to a four-lane divided boulevard from west bridge end, west of North Topsail Beach to the Topsail Area CTP Planning Boundary.

- **Topsail Drive (SR 1547) future NC 210:** Improve existing Topsail Drive (SR 1547) to a two-lane major thoroughfare with bike lanes and sidewalks. Replace traffic signal with a roundabout at the intersection with Roland Ave.

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I. Recommendations

A Comprehensive Transportation Plan (CTP) is developed to ensure that the progressively developed transportation system will meet the needs of the region for the planning period. The CTP serves as an official guide to providing a well-coordinated, efficient, and economical transportation system for the future of the region. This document should be utilized by the local officials to ensure that planned transportation facilities reflect the needs of the public, while minimizing the disruption to local residents, businesses and the environment.

This report documents the development of the 2009 Topsail Area CTP as shown in Figure 1. This chapter presents recommendations for each mode of transportation in the Topsail Area.

Beginning on the next page are problem statements for each recommendation, organized by CTP modal element.

Implementation

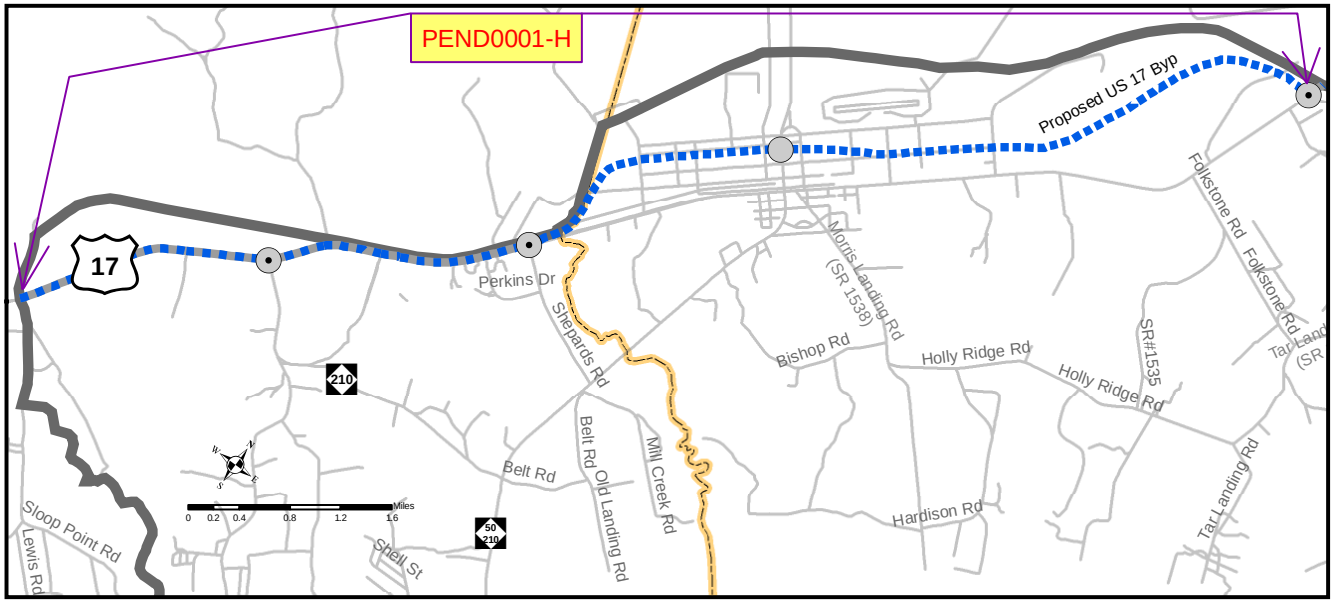
The CTP is based on the projected growth for the planning area. It is possible that actual growth patterns will differ from those logically anticipated. As a result, it may be necessary to accelerate or delay the implementation of some recommendations found within this plan. Some portions of the plan may require revisions in order to accommodate unexpected changes in development. Therefore, any changes made to one element of the Comprehensive Transportation Plan should be consistent with the other elements.

Initiative for implementing the CTP rests predominately with the policy boards and citizens of the Surf City, Topsail Beach, North Topsail Beach, Holly Ridge, Onslow County and Pender County. As transportation needs throughout the State exceed available funding, it is imperative that the local planning area aggressively pursue funding for priority projects. Projects should be prioritized locally and submitted to the Cape Fear and Down East Rural Planning Organizations (RPO) for regional prioritization and submittal to NCDOT. Refer to Appendix A for contact information on funding. Local governments may use the CTP to guide development and protect corridors for the recommended projects. It is critical that NCDOT and local government coordinate on relevant land development reviews and all transportation projects to ensure proper implementation of the CTP. Local governments and the NCDOT share the responsibility for access management and the planning, design and construction of the proposed projects.

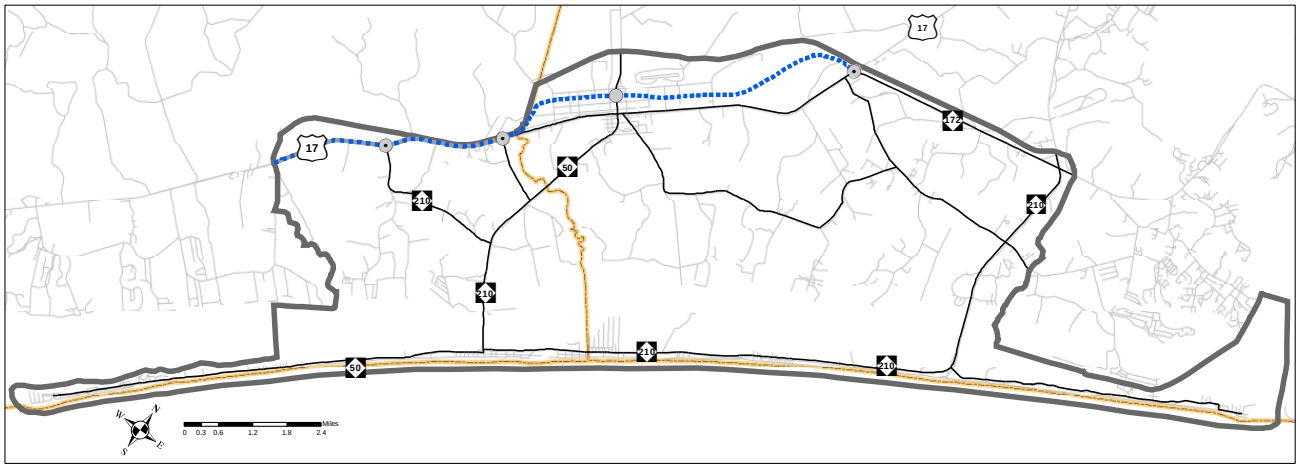
Problem Statements

Highway

US17 Improvements from Sloop Point Road (SR1561) to NC 172 Local ID: PEND0001-H



US17 Project Location Map



US17 Project Map within the Topsail Area CTP

Problem Statement

Improve capacity and mobility of the existing facility consistent with the Strategic Highway Corridor vision. This improvement will provide improvement to the Hurricane Evacuation Route along the corridor.

Justification of Need

US 17 is the only major connection along the east coast between Virginia and South Carolina. The facility is a vital artery in moving people, goods and services north-south through North Carolina with a specific connection from Wilmington to Jacksonville. US 17 is an important military connection from Camp Lejeune located in Jacksonville to southern coastal areas of the state.

Its current cross-section through the planning area is mostly a boulevard. US 17 is designated a freeway facility on NC's Strategic Highway Corridor Map. Along the highway, it is projected that the volume will rise from 20,200 vehicles per day in 2007 to 39,800 vehicles per day in 2030. The facility will be at capacity in the 2030 plan year.

Crash avoidance is extremely important along this section of US 17. Between January 1, 2001 and December 31, 2003 there were four fatal crashes along the corridor. This includes high accident locations at the intersections with NC 50 and Old Folkstone Road (SR 1518). Improvement to a freeway may reduce fatal crashes.

The coastal area of North Carolina is growing rapidly with human and natural environmental impacts being affected immensely. The new location section of the recommended US 17 improvements provide that the town of Holly Ridge will continue to be a thriving town and experience growth to the south and east towards the Intracoastal Waterway.

The recommendation for this corridor will improve mobility through the region and have a positive impact on the economic development in the region.

Community Vision and Problem History

The area west of existing US 17 and north of NC 50 is part owned by Camp Lejeune. The area west of US 17 and south of NC 50 is part of the Holly Shelter Gamelands. This is a substantial barrier to the development in this area. Therefore, the town of Holly Ridge identifies the area to the southeast as the primary place for future development.

The area between the town limits of Holly Ridge and the Intracoastal Waterway is experiencing growth with large residential and commercial developments being constructed in this area. This recommendation would allow for through traffic to move around this developed area while allowing connections for people and goods to access Surf City, Holly Ridge and Topsail Island. It is the goal of this recommendation to keep the through trips moving around the area, but at the same time make a more efficient and faster connection for Topsail Area residents and visitors.

The 1998 Pender County Thoroughfare Plan recommends a 4-lane divided cross-section for US 17 in the rural areas and a 5-lane curb and gutter section in developed

areas due to high turning traffic. These recommendations were part of the Project R-2405 in the 1998-2004 Transportation Improvement Program (TIP).

In the development of the 2009 Topsail Area Comprehensive Transportation Plan (CTP), there has been full support for the US 17 recommended improvements. A bypass was chosen in the vicinity of Holly Ridge because of the substantial impacts to businesses and residents. The town of Holly Ridge's Planning Board and Town Council were involved in the bypass corridor selection and were in favor only of new location freeway alignments to the north and west of the town. Several alternatives of the bypass of Holly Ridge were studied and they are found in Appendix K.

CTP Project Proposal

Project Description and Overview

US 17 will be improved to a 4-lane freeway facility from the northeast portion of the planning area to Sloop Point Road (SR 1561). A new facility is proposed west of the existing facility between Shepards Road (SR 1533) and NC 172. Interchanges are proposed at NC 210, Shepards Road (SR 1533), and NC 172. A grade separation is proposed at NC 50.

The CTP project proposal for US 17 would reduce congestion in Holly Ridge and provide better efficiency for through traffic. The CTP recommendation would provide for a LOS D or better along existing US 17 through Holly Ridge and a LOS C or better on the new location for US 17. It is the goal of this recommendation to allow through trips to move around the area, but at the same time make a more efficient and direct connection for Pender and Onslow County residents and visitors.

Linkages to Other Plans and Proposed Project History

US 17 is an important link to all of the recommendations in the Topsail Area CTP. It directly connects improvements to NC 210, NC 172, and Shepards Road (SR 1531). It is designated as a freeway on the Strategic Highway Corridors Map. There are interchanges proposed at each of these locations that connect each facility to US 17.

NC 210 and NC 172 are recommended to be improved to boulevard cross-section facilities. NC 210 provides connections to Topsail Beach, Surf City and North Topsail Beach which allows direct access to commercial and residential development. Future subdivisions are planned on existing NC 210. NC 210 also provides the only access to Topsail Island at two locations, the northern and southern ends. NC 172 provides a direct connection from Camp Lejeune to US 17 and existing federal land west of the planning area.

A grade separation is recommended at NC 50. The alignment for the bypass portion of US 17 is less than 0.5 miles from the existing NC 50/US 17 intersection and is too close for an interchange at the new location.

Land Use Patterns

There are a large number of commercial and residential developments planned along the southeastern side of the corridor. As discussed previously, development in the northwestern portion of the planning area is limited because of the Holly Shelter Gamelands and Camp Lejeune. There is a need to ensure that the corridor includes full control of access connections in this area.

This recommendation would be consistent for that need. A freeway facility would allow safe access to these new developments and continue to allow Surf City and Holly Ridge to develop in a consistent manner outlined in their respective land use plans.

Natural & Human Environmental Context

As part of the selection for the recommendation, five corridors were studied extensively by the CTP Team, the Holly Ridge Planning Board and Town Council. The CTP Team analyzed preliminary impacts for each proposed corridor studied and presented that information to the planning board and town council. Information regarding these impacts and corridors is located in Appendix I of this report.

This recommendation is located in the coastal portion of North Carolina and can have great impact to the natural and human environment. High quality wetlands, fish nurseries, and endangered species are some of the natural environmental occurrences impacted by corridors studied. The human environment was also affected with between 18 and 51 homes affected as well as up to 24 businesses being impacted.

There was special consideration given to avoiding the Holly Shelter Gamelands, high quality wetlands, and minimizing the impacts to Camp Lejeune.

Multi-modal Considerations

North Carolina Bicycle Route 3 is along US 17 from the southern planning area boundary to NC 210. The recommendation for US 17 is a freeway; full access control facility and bicycles will not be allowed on this type of roadway. The CTP recommends that an off road multi-use path be constructed parallel to existing US 17 to connect the route from the southern planning area boundary to NC 210.

Public/ Stakeholder Involvement

There was little opposition to this project by the public during the CTP development. Concerns with the military were addressed and outlined in Appendix H along with a complete discussion of public involvement.

NC 50, Local ID: PEND0004-H and PEND0005-H

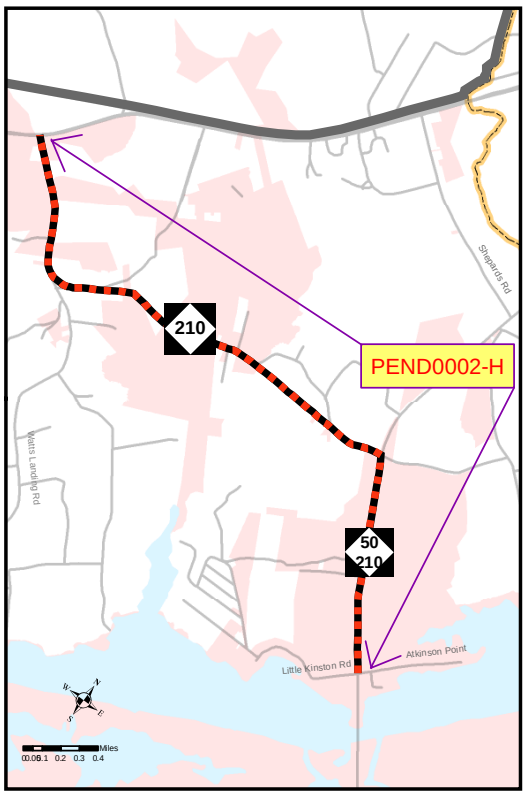
PROBLEM STATEMENT

NC 50 between NC 210 and the end of state maintenance is expected to be about 60% capacity by 2030. Improvements are needed to accommodate projected traffic and to ensure safe travel features to utilize multi-modal improvements. As part of this improvement, bike lanes are recommended along the entire length with sidewalks recommended from NC 210 to South Shore Drive (PEND0004-H).

The section of NC 50 from NC 210 to South Shore Drive currently has a two-lane 30-foot cross section, while the section of this facility from South Shore Drive to the end of state maintenance has a two-lane, 22-foot cross section. The 2007 annual average daily traffic (AADT) is 6,500 vehicles per day (vpd); by 2030, the AADT is expected to be 8,200 vpd compared to a LOS "D" capacity of 14,200 vpd for the existing cross section. Along the facility there are numerous plans for redevelopment in the area. Construction of additional vacation homes is planned for Topsail Island and will impact the volume of traffic along NC 50 on the island.

The project proposal for NC 210 along this facility is to improve the existing corridor to a 2-lane major thoroughfare with bicycle lanes and sidewalks (cross-section 2E) from NC 210 to South Shore Drive (PEND0004-H). The project proposal for NC 210 from South Shore Drive to the end of state maintenance is to improve the existing corridor to a 2-lane major thoroughfare with bicycle lanes (cross-section 2A) (PEND0005-H).

NC 210 Improvements from US 17 to Little Kinston Road (SR 1538) Local ID: PEND0002-H



NC 210 Project Location Map

NC 210 Project Map within the Topsail Area CTP

Problem Statement

Existing NC 210 from US 17 to Little Kinston Road (SR 1538) is projected to be over capacity by 2030 in Surf City. The primary purpose of improving NC 210 is to relieve congestion on the existing facility such that a minimum of LOS D can be achieved.

Justification of Need

NC 210 is a major facility through the Topsail Area connecting US 17 and Topsail Island. It is a vital facility providing access to Surf City, North Topsail Beach and Topsail Beach. NC 210 is currently a major thoroughfare (2-lane and 3-lane cross-section) from US 17 to Little Kinston Road (SR 1538). It is part of the regional tier of North Carolina Multimodal Investment Network.

By 2030 the facility is projected to be over capacity along this segment of NC 210 based on a capacity of LOS D. From US 17 to NC 50, traffic is projected to increase from 8,000 vpd in 2007 to 12,800 vpd in 2030, compared to a capacity of 9,400 vpd. From NC 50 to Little Kinston Road (SR 1538), traffic is projected to increase from 10,600 vpd in 2007 to 17,800 vpd in 2030, compared to a capacity of 10,600 vpd.

Community Vision and Problem History

Due to primary destination nature of Topsail Island, the area will continue to experience seasonal fluctuations in growth and congestion during the coastal vacation times. In the summer months, the population in the area can increase by 500%. In the past, these factors provide for substantial increases in traffic congestion during a small part of the calendar year. However, as the area continues to develop more and more commercial and residential development is growing in the off-island communities. Along this corridor, new subdivisions and commercial developments have been built and are being planned. The facility will continue to experience increases in congestion throughout the year.

This facility provides access to one of only two bridges that cross the Intracoastal Waterway onto Topsail Island. As the area continues to grow and the bridge project is completed, a wider improved facility will be needed to help provide the proper connection to the island. This improved connection will assist in hurricane evacuation as needed during possible damaging tropical weather.

CTP Project Proposal

Project Description and Overview

The CTP proposed project (Local ID PEND0002-H) is to provide a 4-lane boulevard facility on the existing location of NC 210 from US 17 to Little Kinston Road (SR 1538). The CTP project proposal would provide more capacity to assist with growing congestion along the facility. The CTP recommendations would provide for a LOS D or better along existing NC 210. It will improve the connection to one of the two bridges that access Topsail Island.

Linkages to Other Plans and Proposed Project History

This recommendation is vital to the region, but specifically two additional CTP recommendations. US 17 is recommended to be a freeway facility (PEND0001-H) at its connection with NC 210 where an interchange is also recommended. TIP Project B-4929 connects to this recommendation on the far eastern end. This project is the

replacement of the bridge along NC 210 in Surf City that crosses the Intracoastal Waterway. Planning is underway with Right of Way (ROW) scheduled in 2014 and construction scheduled to begin in 2016. The 1998 Pender County Thoroughfare Plan recommends improving the existing facility from NC 50 to Little Kinston Road (SR 1538) to a 3-lane cross-section.

Land Use Patterns

As stated above, there is substantial commercial and residential development planned in inland Pender County. There will be ongoing redevelopment of existing residential and commercial lots on Topsail Island in the Surf City area. The CTP proposal would ensure that driveways are condensed where applicable. The CTP proposed project would allow Surf City to develop in a manner consistent with their plan, the 2005 Land Use Plan.

Natural & Human Environmental Context

In development of the Topsail Area CTP, human and natural environmental impacts were studied for each recommendation. The environmental impacts, mostly wetlands, to the area surrounding NC 210 were minimized as much as possible when reviewing possible recommendations by utilizing existing location. Residential areas cover most of the adjacent land to NC 210. The proposed recommendation will minimize the impact to these residents and provide them with continued access to the facility.

Multi-modal Considerations

The CTP includes recommendations for bicycle, pedestrian and public transportation facilities around the Topsail Area. The recommendation for this facility includes wide outside lanes for bicycles and an adjacent sidewalk for pedestrians. This facility is also part of the North Carolina Bicycle Route 3 – Ports of Call.

Public/ Stakeholder Involvement

As part of developing the CTP, recommendations for NC 210 were considered by the steering committee. For a review of the public involvement process, see Appendix H of the CTP Report.

NC 50/210, TIP No. B-4929

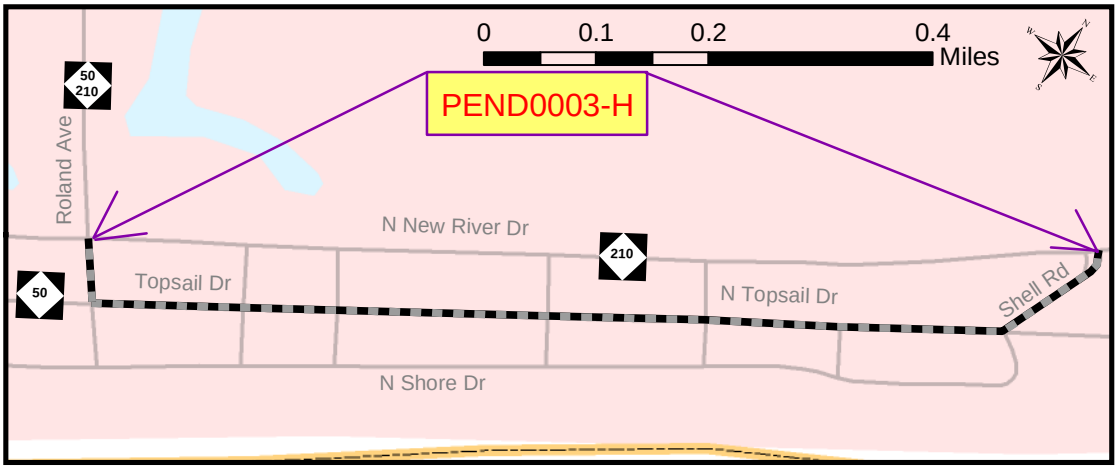
NC 50/210 from Little Kinston Road (SR 1538) to Topsail Drive is projected to be over capacity by 2030. The bridge is currently structurally deficient and functionally obsolete. The 2009-2015 TIP includes project B-4929 that is intended to address these problems. The project is currently in the project development process for environmental analysis. For additional information about this project, including the Purpose and Need, contact NCDOT's Project Development and Environmental Analysis Branch.

NC 210, Local ID: PEND006-H

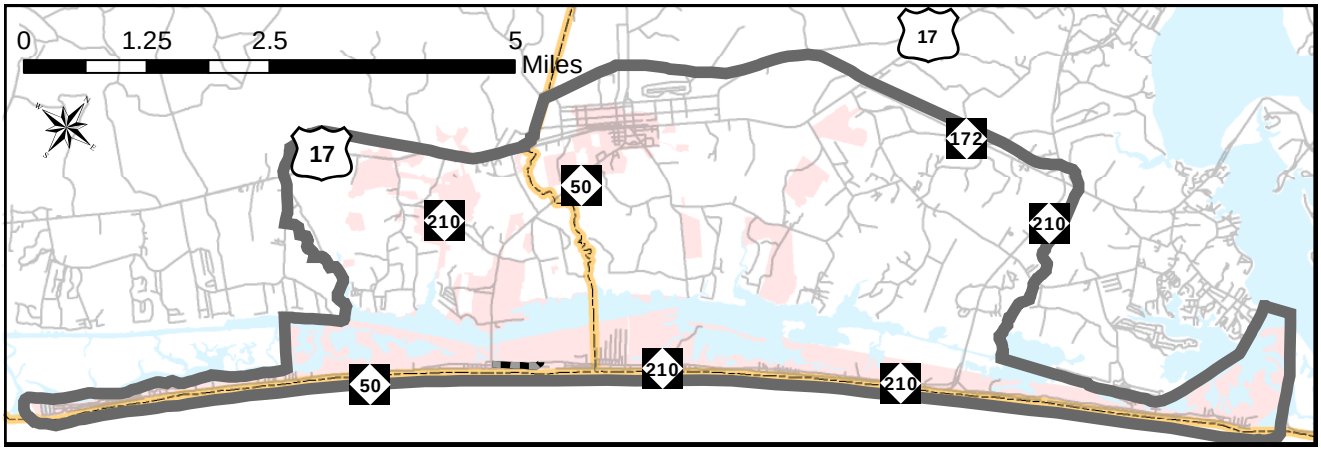
NC 210 between the east-side of the bridge over the Intracoastal Waterway in Surf City and North New River Drive is expected to be over capacity by 2030. Improvements are needed to accommodate projected traffic in order to maintain a LOS D. As part of this improvement, curb and gutter and sidewalks are recommended for the entire length.

This section of NC 210 currently has a 3-lane, 32-foot cross section. The 2007 annual average daily traffic (AADT) is 11,700 vpd; by 2030, the AADT is expected to be 19,000 vpd compared to a LOS D capacity of 15,200 vpd for the existing cross section. It should be noted that during the vacation season traffic can increase to as much as 40,000 vpd. There is a high volume of commercial development adjacent to the corridor with room for additional development in the future.

The project proposal for NC 210 along this facility is to improve the existing corridor to a 3-lane minor thoroughfare with curb and gutter and wide shoulders for bicycles (cross-section 3B) from the east bridge end to North New River Drive.



NC 210 relocation Project Location Map



NC 210 relocation Project Map within the Topsail Area CTP

Problem Statement

Existing NC 210 (North New River Drive) is projected to be near capacity by 2030 in Surf City from Shell Road to Roland Avenue (NC 50). There is a connectivity issue in this area between NC 50 and NC 210 for which a relocation of NC 210 would improve. The primary purpose of relocating NC 210 and improving the cross-section is to improve the linkage through Surf City providing a consistent movement through the town limits.

Justification of Need

NC 210 is a major connection between Onslow and Pender Counties, connecting Surf City and North Topsail Beach. The facility is an important North Carolina route moving people, goods and services along Topsail Island including yearly vacation traffic. NC 210 is currently a major thoroughfare (2-lane cross-section) from Shell Drive to Roland Avenue (NC 50). It is part of the regional tier of the NCMIN.

By 2030 the facility is projected to be near capacity through Surf City based on the capacity of providing a LOS D. Along NC 210, traffic is projected to increase from 5,400 vpd in 2007 to 12,300 vpd in 2030, compared to a capacity of 15,200 vpd.

Community Vision and Problem History

Due to Surf City's vacation destination nature it is expected to continue steady growth and traffic increase over the next twenty years. Surf City is located in a prime location between the metropolitan centers of Wilmington and Jacksonville. Population is expected to increase on and off Topsail Island as the town continues to grow. With the completion of TIP Project B-4929 access to the island and NC 210 will become easier in the future.

For these reasons it is important that Surf City ensures that their multi-modal transportation infrastructure is adequate to handle the future needs. This will include rerouting NC 210 along Topsail and Shell drive while adding the additional lane width and multi-modal improvements. This will provide the communities of North Topsail Beach and Topsail Beach a direct connection using NC 50, NC 210, and North New River Inlet Drive.

CTP Project Proposal

Project Description and Overview

The CTP proposed project (Local ID PEND0003-H) is to reroute existing NC 210 on existing Shell Drive, Topsail Drive, and Roland Avenue (NC 50) in Surf City, connecting existing NC 210 from Shell Road to North New River Drive. Roundabouts are proposed at the intersection of existing Topsail Drive and Roland Avenue/NC 50 as well as the intersection of existing Shell Drive and NC 210. The proposed project will have a 3-lane cross-section with bike lanes and sidewalks from North New River Drive to NC 50 and a 2-lane cross-section with bike lanes and sidewalks from NC 50 to existing NC 210. During the development of this proposal, additional improvements would include the improvement of the North New River Drive (existing NC 210) to a minor thoroughfare with bike lanes and sidewalks.

The CTP project proposal for NC 210 would provide the necessary improvement to the connection between North Carolina routes in Surf City. Currently, the transition between NC 210 and NC 50 in town can provide additional congestion and gridlock during high traffic months. Improving this connection will allow through traffic to move through the town with more efficiency and provide the locals with better access to both business and residential areas in the heart of Surf City.

Linkages to Other Plans and Proposed Project History

The relocation proposal for NC 210 is a vital link to the transportation infrastructure throughout the Topsail Area. It is a primary connection along Topsail Island and a direct link between Topsail Beach, Surf City and North Topsail Beach. It connects three separate project proposals: NC 50 (PEND0004-H), NC 210 (ONSL0002-H), and NC

50/210 (B-4929). Currently TIP Project B-4929 is studying alternatives for the bridge replacement. If the project recommends a new location for the bridge, PEND0003-H would need to be revisited to ensure that the recommendation is consistent with this project. The 1999 Pender County Thoroughfare Plan includes no recommendations for NC 210 in this area.

Land Use Patterns

Surf City's future land use goals in the area along the proposed relocation of NC 210 include land use compatibility and infrastructure carrying capacity in the 2005 Surf City Coastal Area Management Act (CAMA) Land Use Plan. Under Land Use Compatibility, they would like "to ensure that development and use of resources or preservation of land minimizes direct and secondary environmental impact". In the Infrastructure Carrying Capacity, the town will "ensure that public infrastructure systems are properly sized, located and managed so the qualities…of fragile areas are protected."

The CTP proposal would accomplish both of these goals by maximizing the existing infrastructure and allowing for growth and redevelopment to continue along the existing and relocated corridors.

Natural & Human Environmental Context

In the development of the 2010 Topsail Area CTP, natural and human environmental sensitivity was a primary concern. Most of the area is covered by potential coastal environmental impacts on and off Topsail Island. The CTP project proposal primarily impacts the human environment in Surf City. There are various homes and businesses along the corridor that are vital to the economy and way of life for the town. The project proposal would only provide a positive impact to the area by providing for better movement of people and goods through Surf City. There could be minimal impacts to existing buildings at the locations for the two proposed roundabouts.

The CTP proposal would ensure that more safe multi-modal options were available for all residents and visitors to the area. Ensuring that bicyclists and pedestrians have ample opportunities to explore Topsail Island was a primary focus for the entire plan and is evident with this project as well. Having these additional types of transportation options would allow the infrastructure to serve a large majority of people without the need for additional vehicular travel lanes to accommodate traffic and impact the human and natural environment.

Multi-modal Considerations

The CTP project proposal includes recommendations for bicycle and pedestrian accommodations along the entire relocation. It also includes bicycle and pedestrian recommendations for existing NC 210 location along North New River Drive. All of these multi-modal recommendations would be to provide bike lanes on both sides of the road and sidewalks to accommodate pedestrian traffic. These options are vital to the infrastructure and land use vision in Surf City. This facility is also part of the North Carolina Bicycle Route 3 – Ports of Call.

Public/ Stakeholder Involvement

As part of developing the CTP, recommendations for NC 210 were considered by the steering committee. For a review of the public involvement process, see Appendix H of the CTP Report.

NC 210, Local ID: ONSL0002-H

NC 210 between North New River Drive (NC 210) and New River Inlet Road (SR 1568) is expected to be near capacity by 2030. Improvements are needed to accommodate projected traffic in order to maintain a LOS D. As part of this improvement, bike lanes are recommended along the entire length.

This section of NC 210 currently has a 2-lane, 30-foot cross section. The 2007 AADT is 5,100 vehicles per day (vpd); by 2030, the AADT is expected to be 11,600 vpd compared to a LOS D capacity of 14,200 vpd for the existing cross section. Along the facility there are numerous plans for redevelopment in the area. Substantial construction of additional vacation homes is planned for Topsail Island and will greatly impact the volume of traffic along NC 210 on the island.

The project proposal for NC 210 along this facility is to improve the existing corridor to a 3-lane major thoroughfare with bicycle lanes (cross-section 3A) from North New River Drive (NC 210) to New River Inlet Road (SR 1568). This facility is also part of the North Carolina Bicycle Route 3 – Ports of Call.

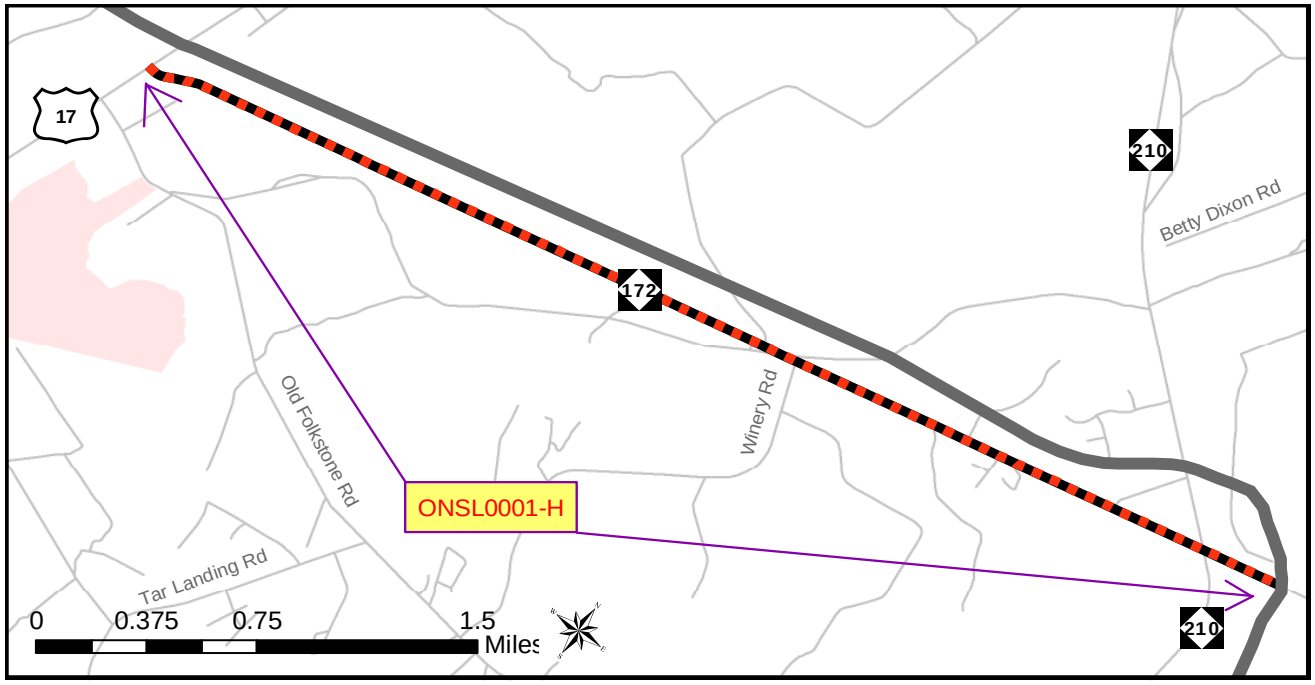
NC 210, Local ID: ONSL0003-H

NC 210 between the west bridge end of North Topsail Beach and the planning area boundary north of NC 172 is expected to be over capacity by 2030. Improvements are needed to accommodate projected traffic in order to maintain a LOS D. As part of this improvement, bike lanes and grass median are recommended along the entire length.

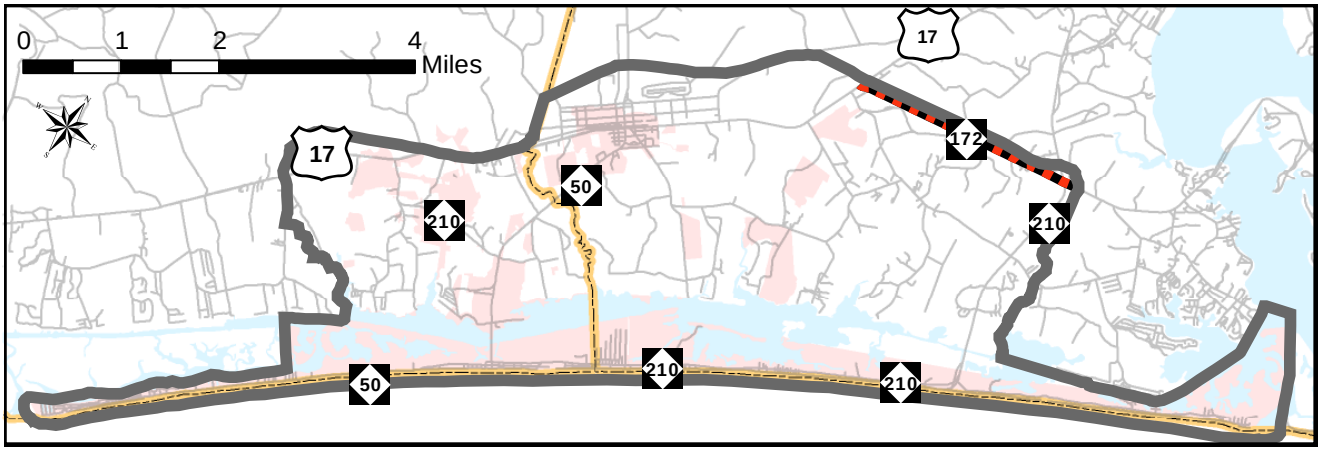
This section of NC 210 currently has a 2-lane, 12-foot cross section. The 2007 AADT is 11,700 vpd; by 2030, the AADT is expected to be 23,300 vpd compared to a LOS D capacity of 9,200 vpd for the existing cross section. This facility provides one of the two accesses to Topsail Island as well as being one of the primary access facilities for the military base.

The project proposal for NC 210 along this facility is to improve the existing corridor to a 4-lane boulevard with bicycle lanes (cross-section 4B) from the west bridge end west of North Topsail Beach and the planning area boundary north of NC 172. This facility is also part of the North Carolina Bicycle Route 3 – Ports of Call.

NC 172 Improvements from planning area boundary to US 17 Local ID: ONSL0001-H



NC 172 Project Location Map



NC 172 Project Map within the Topsail Area CTP

Problem Statement

Existing NC 172 is projected to be over capacity by 2030 in the Topsail study area, from US 17 to the Camp Lejeune Military Base. The primary purpose of improving NC 172 is to relieve congestion on the existing facility such that a minimum of LOS D can be achieved.

Justification of Need

NC 172 is a vital connection in southern Onslow County connecting Camp Lejeune with NC 210 and US 17. The facility is vital to the bases ability to move goods and services to major centers throughout North Carolina and the southeast. NC 172 is one of the few access points to the military base. NC 172 is currently a major thoroughfare (2-lane cross-section) from US 17 to the Topsail Area CTP study area. It is part of the regional tier of the North Carolina Multimodal Investment Network (NCMIN).

By 2030 the facility is projected to be over capacity throughout the study area based on the capacity of providing a LOS D. From the study area boundary to NC 210 near the military base the traffic is projected to increase from 17,000 vpd in 2007 to 33,500 vpd in 2030, compared with a capacity of 9,400 vpd. From NC 210 to US 17 the traffic is projected to increase from 7,000 vpd in 2007 to 12,500.

Community Vision and Problem History

Due to the facility's close proximity to Camp Lejeune, NC 172 is expected to continue experiencing rapid growth related to the Department of Defense's Base Realignment and Closure (BRAC) implementation over the next few years. Population is also expected to continue increasing through the 2030 planning period, in part due to new residents migrating from the Jacksonville and Wilmington areas including new retirees and vacationers.

NC 172 is a vital and direct route from US 17 to the military base. It will continue to serve as an important outlet for traffic to utilize when leaving the island in weather related emergency situations. The North Topsail Beach community will continue to utilize this corridor in the future for exiting the island and as primary access to US 17 heading south towards Wilmington.

CTP Project Proposal

Project Description and Overview

The CTP proposed project (Local ID ONSL0001-H) is to widen the existing facility to a 4-lane divided, boulevard from Camp Lejeune/planning area boundary to US 17.

The CTP project proposal for NC 172 would reduce congestion along the corridor and provide better access to US 17, NC 210 and military base. The CTP recommendation would alleviate congestion along existing NC 172.

Linkages to Other Plans and Proposed Project History

The project proposal for NC 172 is an important link to two of the recommendations in the Topsail Area CTP. It directly connects to proposed improvements of NC 210 and US 17; interchange is recommended at US 17.

Land Use Patterns

The future land use along the NC 172 corridor is planned to be used as medium residential and identified as a community growth area. While no significant development is currently planned along NC 172 the area is primed for residential growth on the southern side. The majority of land north of NC 172 is identified as a Conservation District.

The CTP proposal for a boulevard facility would ensure the new facility has partial control of access, ideal for this type of growth. This recommendation would allow Onslow County to develop in a manner consistent with their plan, the Onslow County Land Use Plan.

Natural & Human Environmental Context

In the development of the 2009 Topsail Area CTP, the human and natural environment plays a vital role. Along NC 172 there are managed lands (conservation areas) to the north, high quality water resources, groundwater intakes, storage tanks, wetlands and significant natural heritage occurrences. There are a few homes and businesses located adjacent to the corridor, but the impacts to these properties would be minimal with the current CTP proposal.

Multi-modal Considerations

The CTP proposal includes recommendations for bicycle improvements along the facility. These multi-modal features do not significantly impact the traffic demand along this corridor; however they are vital to the character and nature of the area.

Public/ Stakeholder Involvement

Significant public comment and interaction was received from military personnel and the Topsail Area CTP Steering Committee throughout the CTP proposal development. Camp Lejeune officials expressed concern about needing additional lanes to move goods and people in and out of the base more efficiently.

Minor Widening Recommendations

The following routes do not have capacity issues, but are recommended to be upgraded to 12-foot lanes with 2-foot paved shoulders to improve safety.

- Old Folkstone Road (SR 1518); ONSL0004-H: It is recommended that Old Folkstone Road be widened from two 10-foot lanes to two 12-foot lanes with 2-foot paved shoulders from US 17 to Marigold Drive.

- Tar Landing Road (SR 1531); ONSL0005-H: It is recommended that Tar Landing Road be widened from two 10-foot lanes to two 12-foot lanes with 2-foot paved shoulders from Holly Ridge Road (SR 1534) to Old Folkstone Road (SR 1518).

- North New River Inlet Road (SR 1568); ONSL0006-H: It is recommended that North New River Inlet Road be widened from two 11-foot lanes to two 12-foot lanes with 2-foot paved shoulders from NC 210 to the end of state maintenance.

- Holly Ridge Road (SR 1534); ONSL0007-H: It is recommended that Holly Ridge Road be widened from two 10-foot lanes to two 12-foot lanes with 2-foot paved shoulders from Morris Landing Road (SR 1538) to Tar Landing Road (SR 1531).

- Morris Landing Road (SR 1538); ONSL0008-H: It is recommended that Morris Landing Road be widened from two 10-foot lanes to two 12-foot lanes with 2-foot paved shoulders from Sound Road (SR 1538) to Holly Ridge Road (SR 1534).

- Shepards Road (SR 1533); PEND0007-H: It is recommended that Shepards Road be widened from two 10-foot lanes to two 12-foot lanes with 2-foot paved shoulders from US 17 to NC 50.

Public Transportation and Rail

There are no recommendations for Public Transportation and Rail in the Topsail Area CTP.

Bicycle and Pedestrian

On-Road Bicycle Recommendations

The entire on-road bicycle routes are identified in the CTP Bicycle map legend and are shown as “Needs Improvement” or “Existing”. Due to this shared, or multi-modal, use of these facilities, it is recommended that sub-standard roadway sections be widened to a standard 24-foot cross section with 2-foot paved shoulders. These improvements should enhance safety and the functional design of the facility. The Topsail Area CTP Steering Committee also recommends that bicycle accommodations be considered during the planning and funding for all future pavement rehabilitation or re-surfacing projects.

The facilities that are part of the designated bicycle routes in the Topsail Area with substandard pavement/shoulder widths are listed in the CTP Inventory and Recommendations spreadsheet and are illustrated in the Bicycle Maps with brown dotted lines, including a recommendation for Ocean Drive in Topsail Beach (PEND0002-B). For more information, please see the Town of North Topsail Beach Comprehensive Bicycle Plan 2006, the CTP Inventory and Recommendations spreadsheet Appendix C and Typical Cross-sections Appendix D.

Off-Road Bicycle Recommendations

The off-road bicycle routes evolved from extensive work through the Topsail Area CTP Steering Committee including community involvement. Through the survey conducted throughout the area one primary area of discussion was the inclusion of new greenway recommendations in the area. For detailed information please see Figure 1 – Sheet 4. The Off-road Greenway recommendations include:

- PEND0001-B (Topsail Area Greenway recommendation): North-south route following NC Bicycle Route #3 parallel to US 17 from the southwest planning area boundary to proposed US 17 and NC 210 interchange.
- PEND0003-B (Topsail Area Greenway recommendation): Powerline Trail Greenway from the southwest planning area boundary to US 17 north of Holly Ridge.
- ONSL0001-B (Town of North Topsail Beach Comprehensive Bicycle Plan 2006): Northern route from existing off-road bicycle facility on NC 210 to boat ramp at Intercoastal waterway in North Topsail Beach.
- ONSL0002-B (Town of North Topsail Beach Comprehensive Bicycle Plan 2006): North-east route paralleling North New River Inlet Road (SR 1568) from existing off-road bicycle facility to the end of the island at North Topsail Beach.

Pedestrian Recommendations

Please see the Town of Surf City Sidewalk Infrastructure Expansion 2008 for further information on pedestrian recommendations.

Adopted by:

Onslow County
Date: August 17, 2009

Pender County
Date: August 17, 2009

Holly Ridge
Date: August 11, 2009

Surf City
Date: August 4, 2009

North Topsail Beach
Date: August 8, 2009

Topsail Beach
Date: August 12, 2009

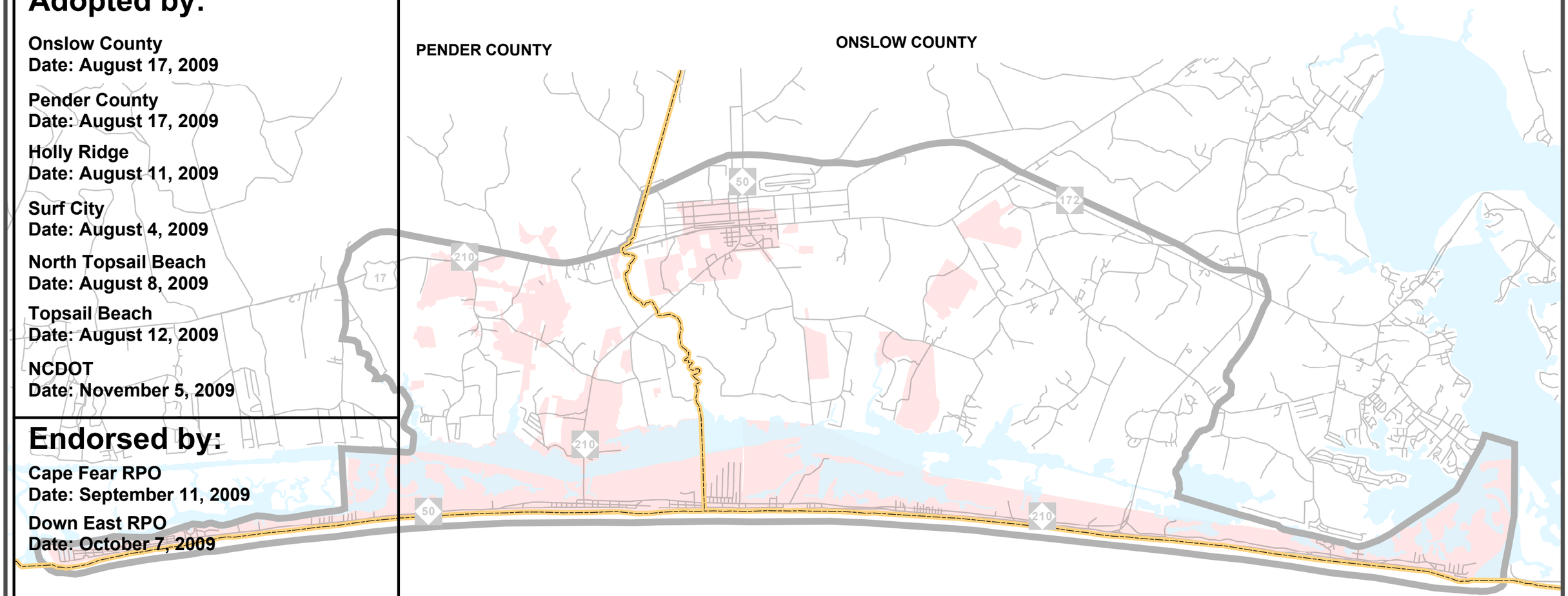
NCDOT
Date: November 5, 2009

Endorsed by:

Cape Fear RPO
Date: September 11, 2009

Down East RPO
Date: October 7, 2009

NOTES: Sheet 3: There are no existing or recommended public transportation and rail routes in the planning area.



Plan date: 6/27/09

Sheet 1 of 5

Base map date: September 2008

0 0.5 1 2 3 Miles

Refer to CTP document for more details

Legend

- Roads
- Water
- County Boundary
- Study Area
- Municipal Boundary

Adoption Sheet
Topsail Area
North Carolina
Comprehensive Transportation Plan

Figure 1 - Sheet 1

PENDER COUNTY

ONSLOW COUNTY

HOLLY RIDGE

SURF CITY

See Inset 1

TOPSAIL BEACH

NORTH TOPSAIL BEACH

Shepards Rd (SR 1533)

Holly Ridge Rd (SR 1534)

Old Folkstone Rd (SR 1518)

New River Inlet Rd (SR1568)

17

50

210

172

INSET 1

Topsail Dr. (SR 1547)

ATLANTIC OCEAN

Plan date: 6/27/09

Sheet 2 of 5

Base map date: September 2008

Miles

0 0.5 1 2 3

Refer to CTP document for more details

Freeways
- Existing
- Needs Improvement
- Recommended

Expressways
- Existing
- Needs Improvement
- Recommended

Boulevards
- Existing
- Needs Improvement
- Recommended

Other Major Thoroughfares
- Existing
- Needs Improvement
- Recommended

Minor Thoroughfares
- Existing
- Needs Improvement
- Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation

Highway Map
Topsail Area
North Carolina
Comprehensive Transportation Plan

Figure 1 - Sheet 2

PENDER COUNTY

ONSLOW COUNTY

HOLLY RIDGE

SURF CITY

TOPSAIL BEACH

NORTH TOPSAIL BEACH

ATLANTIC OCEAN

17

172

210

50

Shepards Rd (SR 1533)

Morris Landing Rd (SR 1538)

Holly Ridge Rd (SR 1534)

Tar Landing Rd (SR 1531)

Old Folkstone Rd (SR 1518)

New River Inlet Rd (SR1568)

See Inset 1

See Inset 2

See Inset 3

INSET 1

Ocean Ave

INSET 2

Topsail Dr (SR 1547)

INSET 3

Plan date: 6/27/09

Sheet 4 of 5

Base map date: September 2008

0 0.5 1 2 3 Miles

Refer to CTP document for more details

On Road
- Existing
- Needs Improvement
- Recommended

Off Road
- Existing
- Needs Improvement
- Recommended

- Existing Grade Separation
- Proposed Grade Separation

Bicycle Map

Topsail Area

North Carolina

Comprehensive Transportation Plan

Figure 1 - Sheet 4

PENDER COUNTY

ONSLOW COUNTY

HOLLY RIDGE

SURF CITY

TOPSAIL BEACH

NORTH TOPSAIL BEACH

See Inset 1

See Inset 2

17

172

210

50

Shepards Rd (SR 1533)

Morris Landing Rd (SR 1538)

Holly Ridge Rd (SR 1534)

Tar Landing Rd (SR 1531)

Old Folkstone Rd (SR 1518)

New River Inlet Rd (SR1568)

Plan date: 6/27/09

Sheet 5 of 5

Base map date: September 2008

Miles

0 0.5 1 2 3

Refer to CTP document for more details

Sidewalks
- Existing
- Needs Improvement
- Recommended

Off Road
- Existing
- Needs Improvement
- Recommended

Multi-Use Paths
- Existing
- Needs Improvement
- Recommended

- Existing Grade Separation
- Proposed Grade Separation

Pedestrian Map

Topsail Area

Comprehensive Transportation Plan

Figure 1 - Sheet 5

INSET 1

INSET 2

Plan date: 6/27/09

Sheet 5A of 5

Base map date: September 2008

0 0.05 0.1 0.2 0.3 Miles

Refer to CTP document for more details

Sidewalks
- Existing
- Needs Improvement
- Recommended

Off Road
- Existing
- Needs Improvement
- Recommended

Multi-Use Paths
- Existing
- Needs Improvement
- Recommended

- Existing Grade Separation
- Proposed Grade Separation

Pedestrian Map
Insets 1 and 2
Topsail Area
Comprehensive Transportation Plan

Figure 1 - Sheet 5A

II. Analysis of the Existing and Future Transportation System

In order to develop a Comprehensive Transportation Plan (CTP), the following are considered:

- Analysis of the transportation system, including any local and statewide initiatives;
- Impacts to the natural and human environment, including natural resources, historic resources, homes, and businesses;
- Public input, including community vision and goals and objectives.

Analysis Methodology and Data Requirements

Reliable forecasts of future travel patterns must be estimated in order to analyze the ability of the transportation system to meet future travel demand. These forecasts depend on careful analysis of the character and intensity of existing and future land use and travel patterns.

An analysis of the transportation system looks at both current and future travel patterns and identifies existing and anticipated deficiencies. This is usually accomplished through a capacity deficiency analysis, a traffic crash analysis, and a system deficiency analysis. This information, along with population growth, economic development potential, and land use trends, is used to determine the potential impacts on the future transportation system.

Roadway System Analysis

An important stage in the development of a CTP is the analysis of the existing transportation system and its ability to serve the area's travel desires. Emphasis is placed not only on detecting the existing deficiencies, but also on understanding the causes of these deficiencies. Roadway deficiencies may result from inadequacies such as pavement widths, intersection geometry, and intersection controls; or system problems, such as the need to construct missing travel links, bypass routes, loop facilities, or additional radial routes.

In the development of this plan, travel demand was projected from 2005 to 2030 using a hand allocation model. Hand allocation models are developed to replicate travel patterns on the existing transportation system as well as to estimate travel patterns for 2030. In addition, local land use plans and growth expectations were used to develop future growth rates and patterns. For more information on the hand allocation model, see Appendix J.

Existing and future travel demand is compared to existing roadway capacities. Capacity deficiencies occur when the traffic volume of a roadway exceeds the roadway's capacity. Roadways are considered near capacity when the traffic volume is at least

eighty percent of the capacity. Refer to Figures 2 and 3 for existing and future capacity deficiencies.

Capacity is the maximum number of vehicles which have a "reasonable expectation" of passing over a given section of roadway during a given time period under prevailing roadway and traffic conditions. Many factors contribute to the capacity of a roadway including the following:

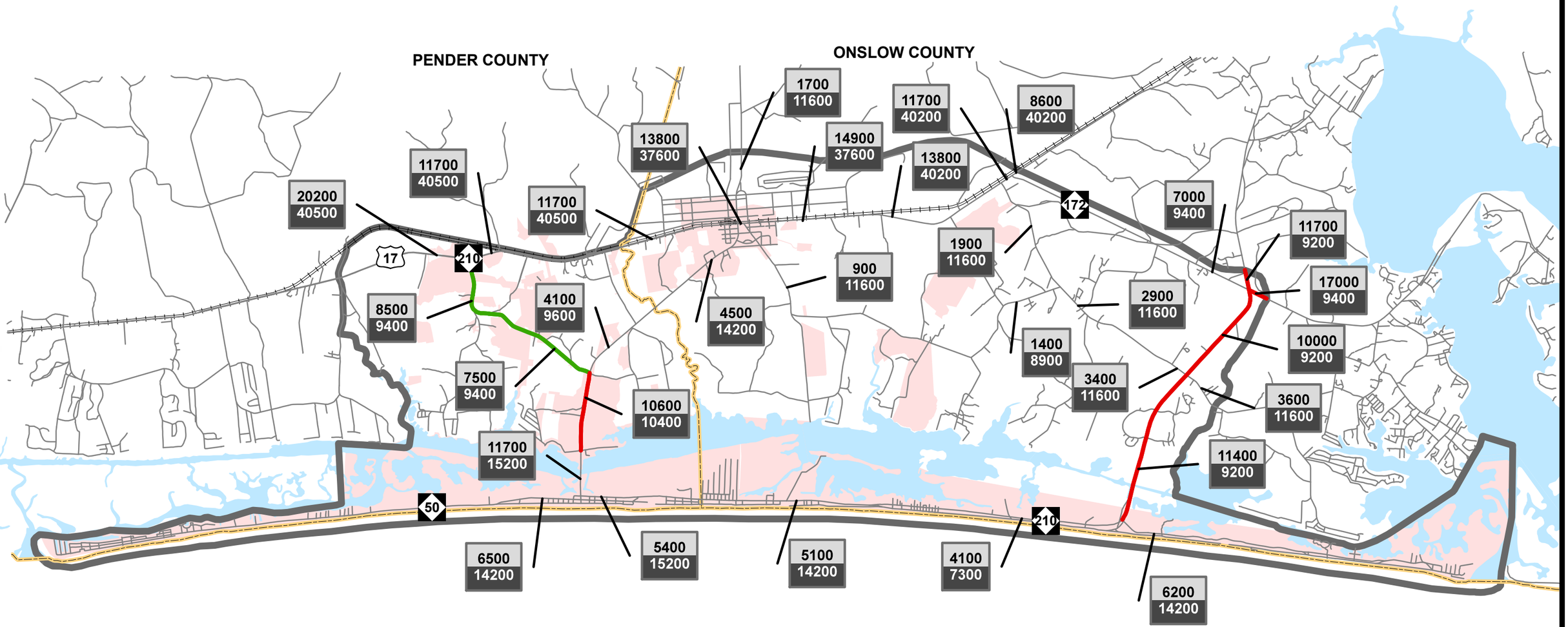
- Geometry of the road (including number of lanes), horizontal and vertical alignment, and proximity of perceived obstructions to safe travel along the road;
- Typical users of the road, such as commuters, recreational travelers, and truck traffic;
- Access control, including streets and driveways, or lack thereof, along the roadway;
- Development along the road, including residential, commercial, agricultural, and industrial developments;
- Number of traffic signals along the route;
- Peaking characteristics of the traffic on the road;
- Characteristics of side-roads feeding into the road; and
- Directional split of traffic or the percentages of vehicles traveling in each direction along a road at any given time.

The relationship of travel demand compared to the roadway capacity determines the level of service (LOS) of a roadway. Six levels of service identify the range of possible conditions. Designations range from LOS A, which represents the best operating conditions, to LOS F, which represents the worst operating conditions.

LOS D indicates "practical capacity" of a roadway, or the capacity at which the public begins to express dissatisfaction. The practical capacity for each roadway was developed based on the 2000 Highway Capacity Manual using the NCLOS Program. Recommended improvements and overall design of the transportation plan were based upon achieving a minimum LOS D on existing facilities and a LOS C for new facilities. Refer to Appendix E for detailed information on LOS.

Traffic Crash Analysis

Traffic crashes are often used as an indicator for locating congestion and roadway problems. Crash patterns obtained from an analysis of crash data can lead to the identification of improvements that will reduce the number of crashes. A crash analysis was performed for the Topsail Area CTP for crashes occurring in the planning area between January 1, 2001 and December 31, 2003. During this period, a total of 5 intersections were identified as high crash locations as illustrated in Figure 4. Refer to Appendix F for a detailed crash analysis.



2007 VOLUME AND CAPACITY DEFICIENCIES

0 0.5 1 2 3 Miles

LEGEND

- Near Capacity
- Over Capacity
- **2007 Volumes (AADT)**
- **2005 Capacity**
- **ROADS**
- **COUNTY BOUNDARY**
- **RAILROADS**
- **PLANNING AREA**
- MUNICIPAL BOUNDARIES

AREA OF

TOPSAIL ISLAND

PENDER AND ONSLOW COUNTIES
NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING BRANCH

IN COOPERATION WITH THE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

BASE MAP DATE: DECEMBER 1, 2005

Figure 2

PENDER COUNTY

ONSLOW COUNTY

39800
40500

29300
40500

32100
40500

37700
37600

2600
11600

34700
37600

27200
40200

32600
40200

17000
40200

12500
9400

23000
9200

33500
9400

17600
9200

5700
11600

19800
9200

7100
11600

3000
11600

9400
11600

3000
8900

9100
11600

10600
14200

8600
9600

13000
9400

12500
9400

17800
10400

19000
15200

8200
14200

12300
15200

11600
14200

10900
7300

10200
14200

17

210

50

172

210

2030 VOLUME AND CAPACITY DEFICIENCIES

0 0.5 1 2 3 Miles

LEGEND

Near Capacity

Over Capacity

2030 Volumes (AADT)
2005 Capacity

ROADS

COUNTY BOUNDARY

RAILROADS

PLANNING AREA

MUNICIPAL BOUNDARIES

AREA OF

TOPSAIL ISLAND

PENDER AND ONSLOW COUNTIES
NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING BRANCH

IN COOPERATION WITH THE

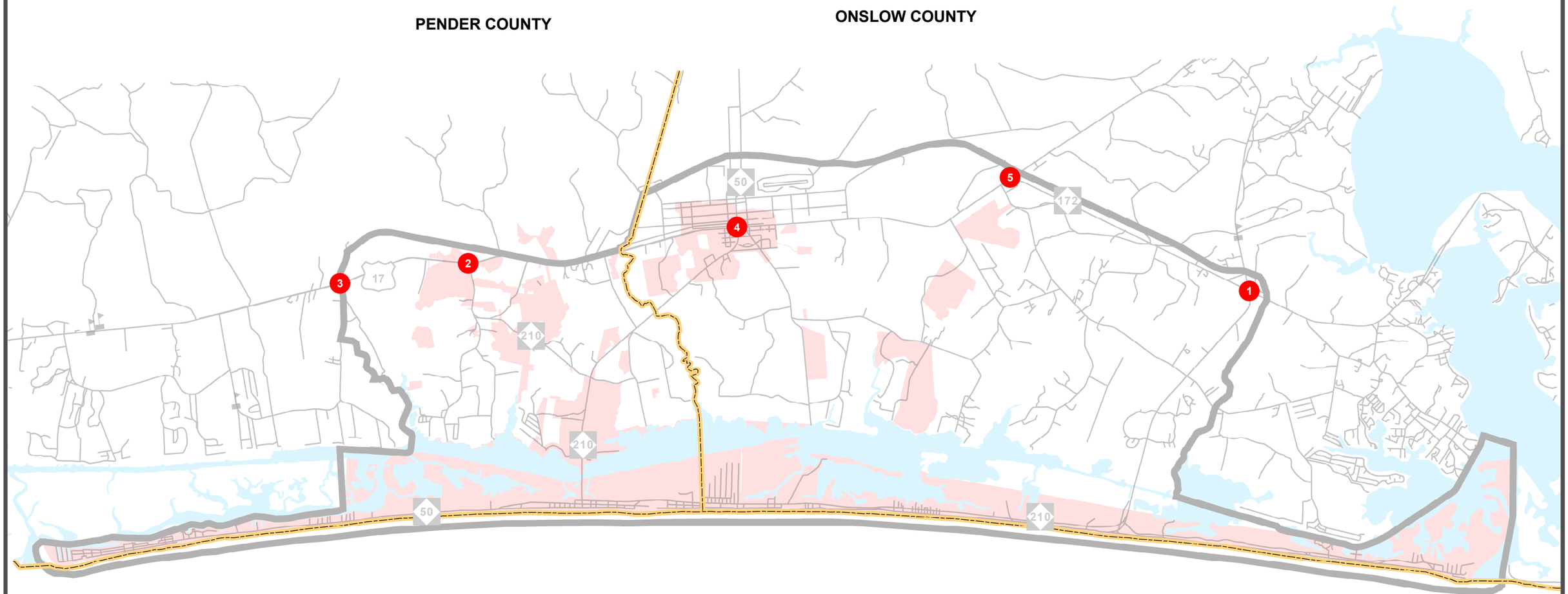
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

BASE MAP DATE: DECEMBER 1, 2005

Figure 3

PENDER COUNTY

ONSLOW COUNTY



ATLANTIC OCEAN

W N S E

0 0.5 1 2 3 Miles

Base map date: September 2008

Refer to CTP document for more details

Legend

- High Accident Locations
- School Locations
- County Boundary
- Study Area
- Roads
- Water
- Municipal Boundary

Crash Locations
January 1, 2001 - December 31, 2003
Topsail Area
North Carolina
Comprehensive Transportation Plan

Figure 4

Bridge Deficiency Assessment

Bridges are a vital and unique element of a highway system. First, they represent the highest unit investment of all elements of the system. Second, any inadequacy or deficiency in a bridge reduces the value of the total investment. Third, a bridge presents the greatest opportunity of all potential highway failures for disruption of community welfare. Finally, and most importantly, a bridge represents the greatest opportunity of all highway failures for loss of life. For these reasons, it is imperative that bridges be constructed to the same design standards as the system of which they are a part.

The NCDOT Bridge Maintenance Unit inspects all bridges in North Carolina at least once every two years. Bridges having the highest priority are replaced as Federal and State funds become available. Seven deficient bridges were identified within the planning area and are illustrated in Figure 5. Refer to Appendix G for more detailed information.

Public Transportation and Rail

Public transportation and rail are vital modes of transportation that give alternative options for transporting people and goods from one place to another.

Public Transportation

North Carolina's public transportation systems serve more than 50 million passengers each year. Five categories define North Carolina's public transportation: community, regional community, urban, regional urban and intercity.

- Community Transportation - Local transportation efforts formerly centered on assisting clients of human service agencies. Today, the vast majority of rural systems serve the general public as well as those clients.
- Regional Community Transportation - Regional community transportation systems are composed of two or more contiguous counties providing coordinated / consolidated service. Although such systems are not new, the NCDOT Board of Transportation is encouraging single-county systems to consider mergers to form more regional systems.
- Urban Transportation - There are currently nineteen urban transit systems operating in North Carolina, from locations such as Asheville and Hendersonville in the west to Jacksonville and Wilmington in the east. In addition, small urban systems are at work in three areas of the state. Consolidated urban-community transportation exists in five areas of the state. In those systems, one transportation system provides both urban and rural transportation within the county.
- Regional Urban Transportation - Regional urban transit systems currently operate in three areas of the state. These systems connect multiple municipalities and counties.
- Intercity Transportation - Intercity bus service is one of a few remaining examples of privately owned and operated public transportation in North Carolina. Intercity

buses serve many cities and towns throughout the state and provide connections to locations in neighboring states and throughout the United States and Canada. Greyhound/Carolina Trailways operates in North Carolina. However, community, urban and regional transportation systems are providing increasing intercity service in North Carolina.

There are no existing or planned fixed public transportation routes for the planning area.

Rail

Today North Carolina has 3,684 miles of railroad tracks throughout the state. There are two types of trains that operate in the state, passenger trains and freight trains.

The NCDOT sponsors two passenger trains, the Carolinian and Piedmont. The Carolinian runs between Charlotte and New York City, while the Piedmont train carries passengers from Raleigh to Charlotte and back everyday. Combined, the Carolinian and Piedmont carry more than 200,000 passengers each year.

There are two major freight railroad companies that operate in North Carolina, CSX Transportation and Norfolk Southern Corporation. Also, there are more than 20 smaller freight railroads, known as shortlines.

There are no existing or planned rail facilities for the planning area.

Bicycles & Pedestrians

Bicyclists and pedestrians are a growing part of the transportation equation in North Carolina. Many communities are working to improve mobility for both cyclists and pedestrians.

NCDOT's Bicycle Policy, updated in 1991, clarifies responsibilities regarding the provision of bicycle facilities upon and along the 77,000-mile state-maintained highway system. The policy details guidelines for planning, design, construction, maintenance, and operations pertaining to bicycle facilities and accommodations. All bicycle improvements undertaken by the NCDOT are based upon this policy.

The 2000 NCDOT Pedestrian Policy Guidelines specifies that NCDOT will participate with localities in the construction of sidewalks as incidental features of highway improvement projects. At the request of a locality, state funds for a sidewalk are made available if matched by the requesting locality, using a sliding scale based on population.

NCDOT's administrative guidelines, adopted in 1994, ensure that greenways and greenway crossings are considered during the highway planning process. This policy was incorporated so that critical corridors which have been adopted by localities for future greenways will not be severed by highway construction.

Inventories of existing and planned bicycle and pedestrian facilities for the planning area are presented on Sheets 4 and 5 of Figure 1. The North Topsail Beach Comprehensive Bicycle Plan 2006 and the Surf City Sidewalk Infrastructure were utilized in the development of these elements of the CTP. Bike Route 3 – Ports of Call travels through the entire planning area following NC 210. All recommendations for bicycle and pedestrian facilities were coordinated with the local governments and the NCDOT Division of Bicycle and Pedestrian Transportation. Refer to Appendix A for contact information.

Land Use

G.S. §136-66.2 requires that local areas have a current (less than five years old) land development plan prior to adoption of the CTP. For this CTP, the Topsail Beach Land Use Plan, Surf City Land Use Plan, North Topsail Beach Land Use Plan, Onslow and Pender County Land Use Plans were used to meet this requirement. Each of these plans can be found on the town and county websites.

Land use refers to the physical patterns of activities and functions within an area. Traffic demand in a given area is, in part, attributed to adjacent land use. For example, a large shopping center typically generates higher traffic volumes than a residential area. The spatial distribution of different types of land uses is a predominant determinant of when, where, and to what extent traffic congestion occurs. The travel demand between different land uses and the resulting impact on traffic conditions varies depending on the size, type, intensity, and spatial separation of development. Additionally, traffic volumes have different peaks based on the time of day and the day of the week. For transportation planning purposes, land use is divided into the following categories:

- Residential: Land devoted to the housing of people, with the exception of hotels and motels which are considered commercial.
- Commercial: Land devoted to retail trade including consumer and business services and their offices; this may be further stratified into retail and special retail classifications. Special retail would include high-traffic establishments, such as fast food restaurants and service stations; all other commercial establishments would be considered retail.
- Industrial: Land devoted to the manufacturing, storage, warehousing, and transportation of products.
- Public: Land devoted to social, religious, educational, cultural, and political activities; this would include the office and service employment establishments.
- Agricultural: Land devoted to the use of buildings or structures for the raising of non-domestic animals and/or growing of plants for food and other production.
- Mixed Use: Land devoted to a combination of any of the categories above.

Anticipated future land development is, in general, a logical extension of the present spatial land use distribution. Locations and types of expected growth within the planning area help to determine the location and type of proposed transportation improvements.

The Topsail Area is a destination area for beach vacations, but also houses significant opportunities for environmental work and future annual economic vitality. The vision for the area in the future is to provide multi-modal opportunities on the island while enhancing the commercial and residential development on the mainland. Surf City, Holly Ridge, and Onslow and Pender counties have identified areas on the mainland for commercial and residential expansion.

On Topsail Island, the vision for the area is to keep the land use similar to the existing uses for the future. While improving the existing transportation infrastructure to include additional multi-modal opportunities for local citizens and vacationers, local leaders will work to preserve the nature of the area.

PENDER COUNTY

ONSLOW COUNTY

ATLANTIC OCEAN

0 0.5 1 2 3 Miles

Base map date: September 2008

Refer to CTP document for more details

Legend

- Bridge Locations
- School Locations
- County Boundary
- Study Area
- Roads
- Water
- Municipal Boundary

Deficient Bridges

Topsail Area

North Carolina

Comprehensive Transportation Plan

Figure 5

Consideration of Natural and Human Environment

In recent years, the environmental considerations have come to the forefront of the transportation planning process. Section 102 of the National Environmental Policy Act (NEPA) requires consideration of impacts on wetlands, wildlife, water quality, historic properties, and public lands. While a full NEPA evaluation was not conducted as part of the CTP, potential impacts to these resources were identified as a part of the project recommendations in Chapter 1 of this report. Prior to implementing transportation recommendations of the CTP, a more detailed environmental study would need to be completed in cooperation with the appropriate environmental resource agencies.

A full listing of environmental features that were examined as a part of this study is shown in the following table utilizing the best available data. Environmental features occurring within Topsail Area are shown in Figure 7 – Sheets 1-5.

Table 1 – Environmental Features

- Cemeteries
- Churches
- Conservation Tax Credit Properties
- Federal Land Ownership
- Fisheries Nursery Areas
- Game Lands – Wildlife Resources Commission
- Groundwater Incidents, unverified
- High Quality Water and Outstanding Resource Water Management Zones
- National Wetlands Inventory
- Recreation Projects – Land and Water
- Sanitary Sewer Discharges
- Solid Waste Facilities
- Water Distribution Systems – Water Treatment Plants
- Well Ground Water Intakes
- Water Storage Tanks

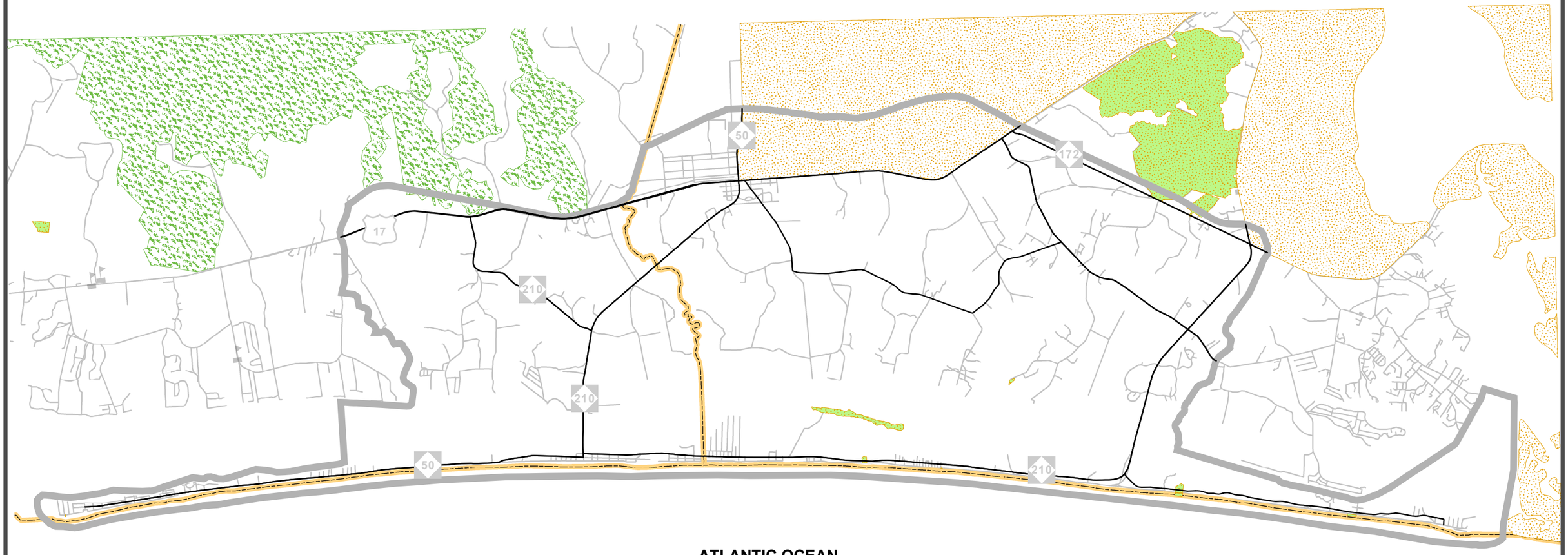
Additionally, the following environmental features were considered but are not mapped due to restrictions associated with the sensitivity of the data.

Table 2 – Restricted Environmental Features

- Historic National Register Structures
- Historic Study List Districts Historic Study List Structures
- Managed Areas National Heritage Element Occurrences
- Significant Natural Heritage Areas

PENDER COUNTY

ONSLOW COUNTY



ATLANTIC OCEAN

0 0.5 1 2 3 Miles

Base map date: September 2008

Refer to CTP document for more details

Legend

- Network Roads
- Federal Land
- Gamelands
- Managed Lands

Environmental Features

Topsail Area

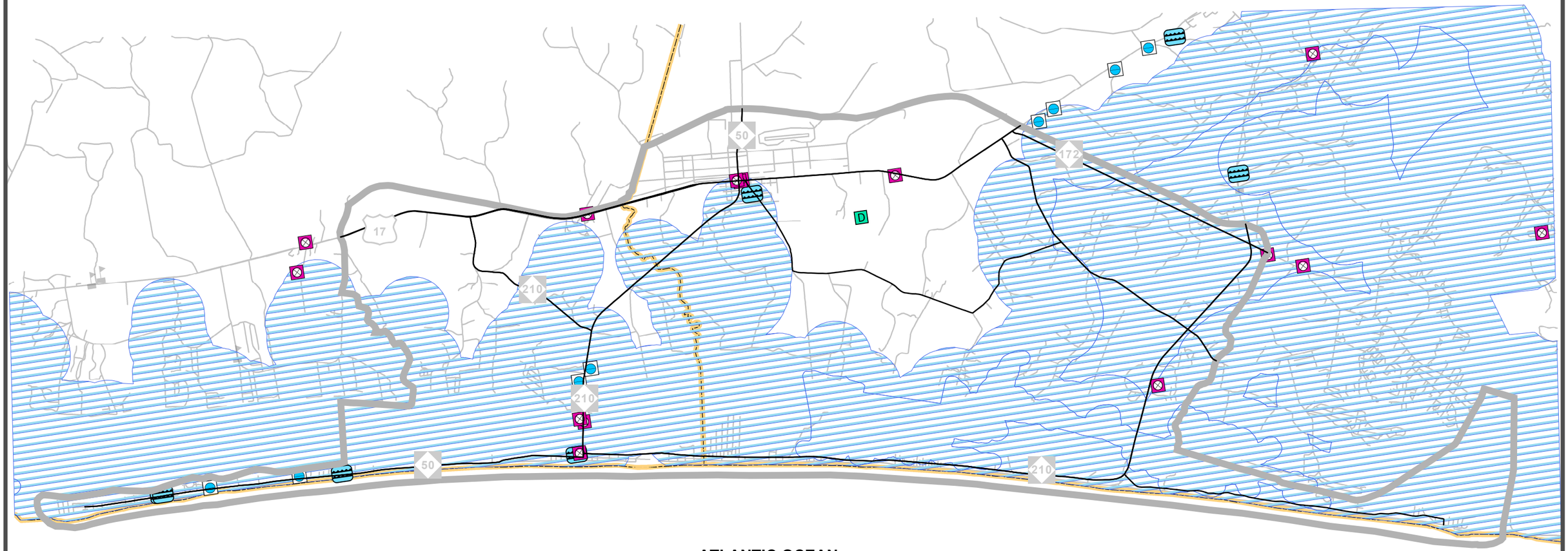
North Carolina

Comprehensive Transportation Plan

Figure 6

PENDER COUNTY

ONSLOW COUNTY



ATLANTIC OCEAN

N
W
E
S

0 0.5 1 2 3 Miles

Base map date: September 2008

Refer to CTP document for more details

Legend

- Network Roads
- Groundwater Incidents
- Sanitary Sewer Discharges
- Water Storage Tanks
- Wells Groundwater Intakes
- High Quality Water Resource

Environmental Features

Topsail Area

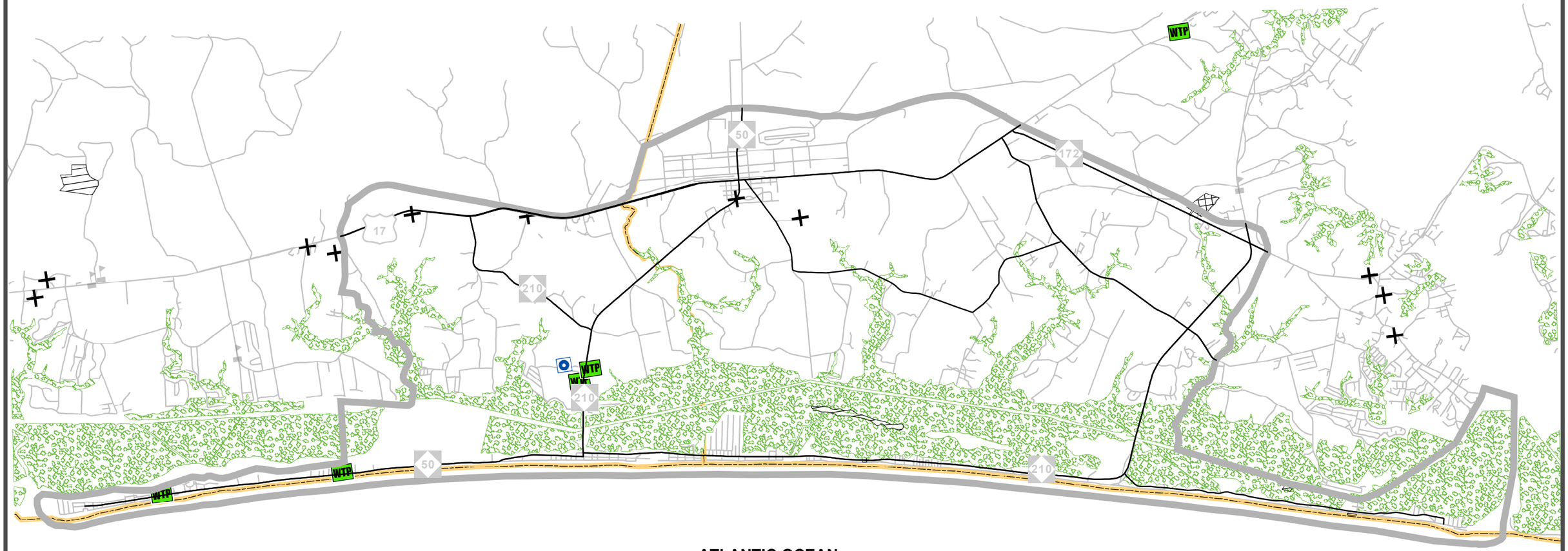
North Carolina

Comprehensive Transportation Plan

Figure 7

PENDER COUNTY

ONSLOW COUNTY



ATLANTIC OCEAN

W N S E

0 0.5 1 2 3 Miles

Base map date: September 2008

Refer to CTP document for more details

Legend

- Network Roads
- Churches
- Solid Waste Facilities
- Water Treatment Plants
- Conservation Tax Credits
- Fish Nursery
- Recreation Projects

Environmental Features

Topsail Area

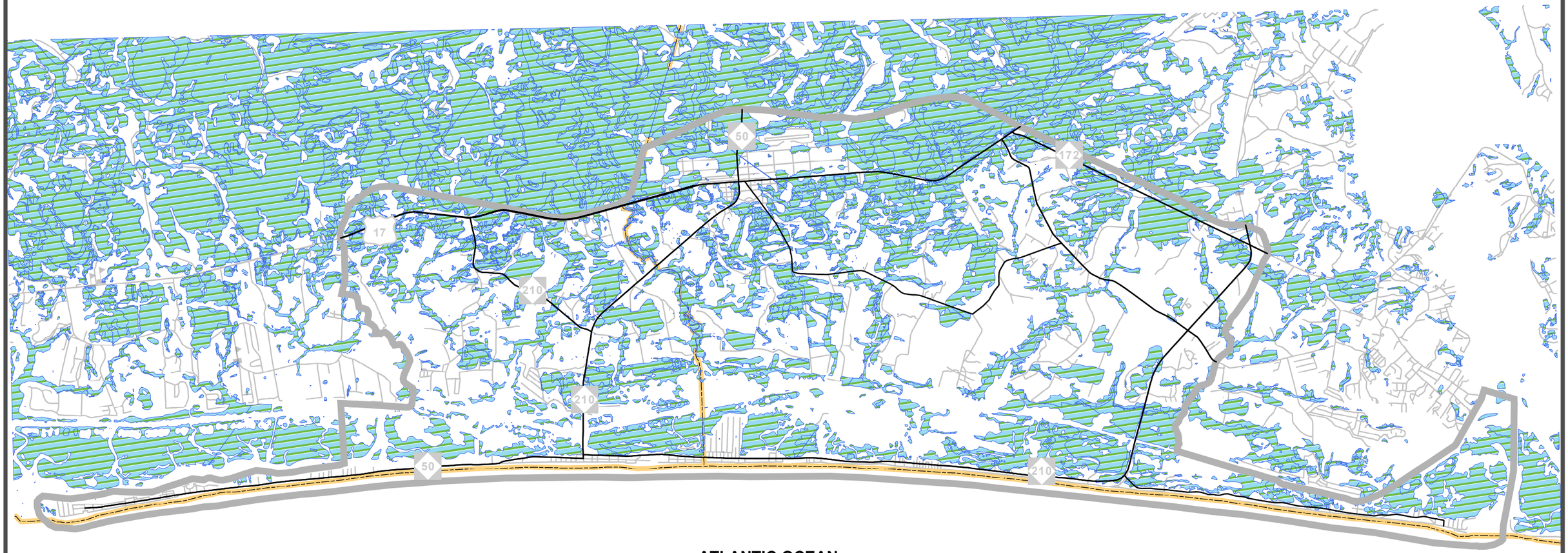
North Carolina

Comprehensive Transportation Plan

Figure 8

PENDER COUNTY

ONSLOW COUNTY



ATLANTIC OCEAN

0 0.5 1 2 3 Miles

Base map date: September 2008

Refer to CTP document for more details

Legend

Network Roads

Wetlands

Environmental Features

Topsail Area

North Carolina

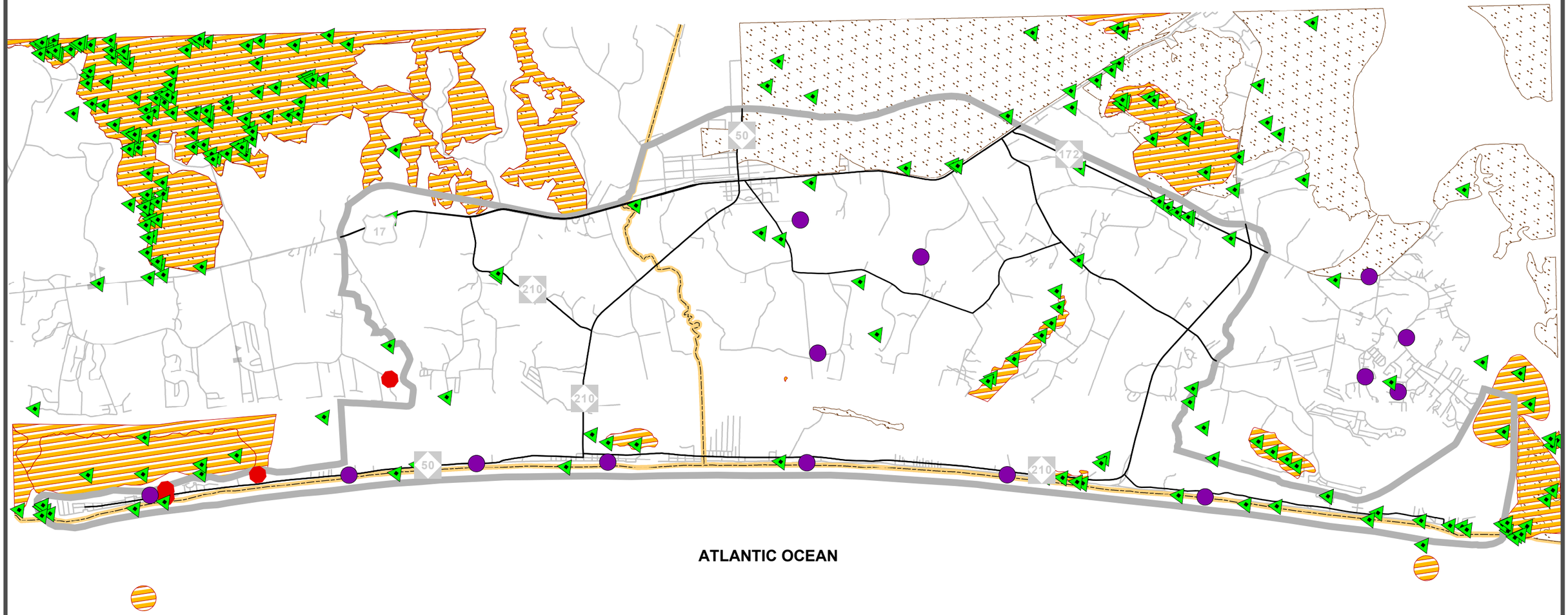
Comprehensive Transportation Plan

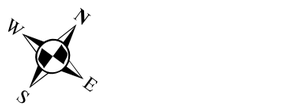
Figure 9

PENDER COUNTY

ONSLOW COUNTY

ATLANTIC OCEAN





0 0.5 1 2 3 Miles

Base map date: September 2008

Refer to CTP document for more details

Legend

- Natural Heritage Occurence
- Historic Study Lists
- Historic National Registers
- Network_Roads_Final
- Significant Heritage Areas
- Managed Areas

Environmental Features - Resticted

Topsail Area

North Carolina

Comprehensive Transportation Plan

Figure 10

Public Involvement

Public involvement is a key element in the transportation planning process. Adequate documentation of this process is essential for a seamless transfer of information from systems planning to project planning and design.

The Cape Fear RPO requested the development of a CTP for the Topsail Area through a prioritized list of regional needs. A meeting was held with the local officials and transportation staff in November 2005 to formally initiate the study, provide an overview of the transportation planning process, and to gather input on area transportation needs.

Throughout the course of the study, the Transportation Planning Branch cooperatively worked with the Topsail Area CTP Steering Committee, which included a representative from each municipality, county staffs, the RPOs and others, to provide information on current local plans, to develop transportation vision and goals, to discuss population and employment projections, and to develop proposed CTP recommendations. Refer to Appendix H for detailed information on the vision statement, the goals and objectives survey and a listing of committee members.

The public involvement process included holding four public drop-in sessions in the Topsail Area to present the proposed Comprehensive Transportation Plan to the public and solicit comments.

- June 10, 2009 at the North Topsail Beach Town Hall, 1-4pm
- June 10, 2009 at the Holly Ridge Town Hall, 5-8pm
- June 11, 2009 at the North Topsail Beach Town Hall, 1-4pm
- June 11, 2009 at the Surf City Town Hall, 5-8pm

Each session was publicized in the local newspaper and five comment forms were submitted during the two days of sessions.

Public hearings were held in late summer/early fall of 2009 for Surf City, Topsail Beach, North Topsail Beach, Holly Ridge, Onslow and Pender counties. The purpose of these meetings was to discuss the plan recommendations and to solicit further input from the public. The CTP was adopted during each these meetings.

The Cape Fear RPO endorsed the CTP on September 11, 2009 and the Down East RPO endorsed the CTP on October 10, 2009. The North Carolina Board of Transportation adopted the Topsail Area CTP on November 5, 2009.

Appendix A

Resources and Contacts

North Carolina Department of Transportation

Customer Service Office

Contact information for other units within the NCDOT that are not listed in this appendix is available by calling the Customer Service Office or by visiting the NCDOT homepage:

1-877-DOT-4YOU
(1-877-368-4968)
https://apps.dot.state.nc.us/dot/directory/authenticated/ToC.aspx

Secretary of Transportation

Eugene A. Conti, Jr., Ph.D.
1501 Mail Service Center
Raleigh, NC 27699-1501
(919) 733-2520
http://www.ncdot.org/about/leadership/secretary.html

Board of Transportation Member

Mr. Mike Alford
1408 Western Blvd.
Jacksonville, NC 28546
(910) 455-2121
malford@ncdot.gov
http://www.ncdot.gov/about/board/default.html

Highway Division Engineer

Contact the Division Engineer with general questions concerning NCDOT activities within each Division and for information on Small Urban Funds.

Mr. Allen Pope, PE
124 Division Dr.
Wilmington, NC 28401
(910) 251-5724
apope@ncdot.gov
http://www.ncdot.gov/doh/operations/division3/

Division Project Manager

Contact the Division Project Manager with questions concerning transportation projects within each Division.

Mr. Patrick Riddle
124 Division Dr.
Wilmington, NC 28401
910) 251-5724
priddle@ncdot.gov

Division Construction Engineer

Contact the Division Construction Engineer for information concerning major roadway improvements under construction.

Mr. Jackson Provost, PE
124 Division Dr.
Raleigh, NC 27699-1535
(910) 251-5724
jjprovost@ncdot.gov

Division Traffic Engineer

Contact the Division Traffic Engineer for information concerning traffic signals, highway signs, pavement markings and crash history.

Mr. Katie Hite
124 Division Dr.
Wilmington, NC 28401
(910) 251-2693
kehite@ncdot.gov

Division Operations Engineer

Contact the Division Operations Engineer for information concerning facility operations.

Mr. D. Chad Kimes, PE
124 Division Dr.
Wilmington, NC 28401
(910) 251-5724
ckimes@ncdot.gov

Division Maintenance Engineer

Contact the Division Maintenance Engineer information regarding maintenance of all state roadways, improvement of secondary roads and other small improvement projects. The Division Maintenance Engineer also oversees the District Offices, the Bridge Maintenance Unit and the Equipment Unit.

Mr. David L. Thomas, PE
124 Division Dr.
Wilmington, NC 28401
(910) 251-5724
dlthomas@ncdot.gov

District Engineer

Contact the District Engineer for information on outdoor advertising, junkyard control, driveway permits, road additions, subdivision review and approval, Adopt A Highway program, encroachments on highway right of way, issuance of oversize/overwidth permits, paving priorities, secondary road construction program and road maintenance.

Mr. Robert Vause, PE
295-A Wilmington Highway
Jacksonville, NC 28540
(910) 346-8030
rvause@ncdot.gov

Transportation Planning Branch (TPB)

Contact the Transportation Planning Branch for information on long-range multi-modal planning services.

1554 Mail Service Center
Raleigh, NC 27699-1554
(919) 733-4705
http://www.ncdot.gov/doh/preconstruct/tpb/

Cape Fear Rural Planning Organization (RPO)

Contact the RPO for information on long-range multi-modal planning services.

Mr. Don Eggert
1480 Harbour Drive
Wilmington, NC 28401
(910) 395-4553 Ext. 203
deggert@capefearcog.org
http://www.capefearcog.org/

Down East Rural Planning Organization (RPO)

Contact the RPO for information on long-range multi-modal planning services.

Mr. Rob Will
PO Box 1717
New Bern, NC 28563
(252) 638-3185
rwill@eccog.org
http://www.eccog.org/

Strategic Planning Office

Contact the Strategic Planning Office for information concerning prioritization of transportation projects.

Mr. Don Voelker
1501 Mail Service Center
Raleigh, NC 27699-1501
(919) 715-0951
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=11054

Project Development & Environmental Branch (PDEA)

Contact PDEA for information on environmental studies for projects that are included in the TIP.

1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 733-3141
http://www.ncdot.gov/doh/preconstruct/pe/

Secondary Roads Office

Contact the Secondary Roads Office for information regarding the status for unpaved roads to be paved, additions and deletions of roads to the State maintained system and the Industrial Access Funds program.

1535 Mail Service Center
Raleigh, NC 27699-1535
(919) 733-3250
http://www.ncdot.gov/doh/operations/secondaryroads/

Program Development Branch

Contact the Program Development Branch for information concerning Roadway Official Corridor Maps, Feasibility Studies and the Transportation Improvement Program (TIP).

1534 Mail Service Center
Raleigh, NC 27699-1534
(919) 733-2039
http://www.ncdot.org/planning/development/

Public Transportation Division

Contact the Public Transportation Division for information public transit systems.

1550 Mail Service Center
Raleigh, NC 27699-1550
(919) 733-4713
http://www.ncdot.org/transit/nctransit/

Rail Division

Contact the Rail Division for rail information throughout the state.

1553 Mail Service Center
Raleigh, NC 27699-1553
(919) 733-7245
http://www.bytrain.org/

Division of Bicycle and Pedestrian Transportation

Contact this Division for bicycle and pedestrian transportation information throughout the state.

1552 Mail Service Center
Raleigh, NC 27699-1552
(919) 807-0777
http://www.ncdot.gov/transit/bicycle/

Bridge Maintenance Unit

Contact the Bridge Maintenance Unit for information on bridge management throughout the state.

1565 Mail Service Center
Raleigh, NC 27699-1565
(919) 733-4362
http://www.ncdot.gov/doh/operations/dp_chief_eng/maintenance/bridge/

Highway Design Branch

The Highway Design Branch consists of the Roadway Design, Structure Design, Photogrammetry, Location & Surveys, Geotechnical, and Hydraulics Units. Contact the Highway Design Branch for information regarding design plans and proposals for road and bridge projects throughout the state.

1584 Mail Service Center
Raleigh, NC 27699-1584
(919) 250-4001
http://www.ncdot.gov/doh/preconstruct/highway/

Other State Government Offices

Department of Commerce – Division of Community Assistance

Contact the Department of Commerce for resources and services to help realize economic prosperity, plan for new growth and address community needs.

http://www.nccommerce.com/en/CommunityServices/

Appendix B

Comprehensive Transportation Plan Definitions

Highway Map

For visual depiction of facility types for the following CTP classification, visit http://www.ncdot.gov/doh/preconstruct/tpb/SHC/facility/.

Facility Type Definitions

- **Freeways**

- Functional purpose – high mobility, high volume, high speed
- Posted speed – 55 mph or greater
- Cross section – minimum four lanes with continuous median
- Multi-modal elements – High Occupancy Vehicles (HOV)/High Occupancy Transit (HOT) lanes, busways, truck lanes, park-and-ride facilities at/near interchanges, adjacent shared use paths (separate from roadway and outside ROW)
- Type of access control – full control of access
- Access management – interchange spacing (urban – one mile; non-urban – three miles); at interchanges on the intersecting roadway, full control of access for 1,000ft or for 350ft plus 650ft island or median; use of frontage roads, rear service roads
- Intersecting facilities – interchange or grade separation (no signals or at-grade intersections)
- Driveways – not allowed

- **Expressways**
  - Functional purpose – high mobility, high volume, medium-high speed
  - Posted speed – 45 to 60 mph
  - Cross section – minimum four lanes with median
  - Multi-modal elements – HOV lanes, busways, very wide paved shoulders (rural), shared use paths (separate from roadway but within ROW)
  - Type of access control – limited or partial control of access;
  - Access management – minimum interchange/intersection spacing 2,000ft; median breaks only at intersections with minor roadways or to permit U-turns; use of frontage roads, rear service roads; driveways limited in location and number; use of acceleration/deceleration or right turning lanes
  - Intersecting facilities – interchange; at-grade intersection for minor roadways; right-in/right-out and/or left-over or grade separation (no signalization for through traffic)
  - Driveways – right-in/right-out only; direct driveway access via service roads or other alternate connections

- **Boulevards**
  - Functional purpose – moderate mobility; moderate access, moderate volume, medium speed
  - Posted speed – 30 to 55 mph
  - Cross section – two or more lanes with median (median breaks allowed for U-turns per current NCDOT *Driveway Manual*
  - Multi-modal elements – bus stops, bike lanes (urban) or wide paved shoulders (rural), sidewalks (urban - local government option)
  - Type of access control – limited control of access, partial control of access, or no control of access
  - Access management – two lane facilities may have medians with crossovers, medians with turning pockets or turning lanes; use of acceleration/deceleration or right turning lanes is optional; for abutting properties, use of shared driveways, internal out parcel access and cross-connectivity between adjacent properties is strongly encouraged
  - Intersecting facilities – at grade intersections and driveways; interchanges at special locations with high volumes
  - Driveways – primarily right-in/right-out, some right-in/right-out in combination with median leftovers; major driveways may be full movement when access is not possible using an alternate roadway

- **Other Major Thoroughfares**
  - Functional purpose – balanced mobility and access, moderate volume, low to medium speed
  - Posted speed – 25 to 55 mph
  - Cross section – four or more lanes without median *(US and NC routes may have less than four lanes)*
  - Multi-modal elements – bus stops, bike lanes/wide outer lane (urban) or wide paved shoulder (rural), sidewalks (urban)
  - Type of access control – no control of access
  - Access management – continuous left turn lanes; for abutting properties, use of shared driveways, internal out parcel access and cross-connectivity between adjacent properties is strongly encouraged
  - Intersecting facilities – intersections and driveways
  - Driveways – full movement on two lane roadway with center turn lane as permitted by the current NCDOT *Driveway Manual*

- **Minor Thoroughfares**
  - Functional purpose – balanced mobility and access, moderate volume, low to medium speed
  - Posted speed – 25 to 45 mph
  - Cross section – ultimately three lanes (no more than one lane per direction) or less without median
  - Multi-modal elements – bus stops, bike lanes/wide outer lane (urban) or wide paved shoulder (rural), sidewalks (urban)

- ROW – no control of access
- Access management – continuous left turn lanes; for abutting properties, use of shared driveways, internal out parcel access and cross-connectivity between adjacent properties is strongly encouraged
- Intersecting facilities – intersections and driveways
- Driveways – full movement on two lane with center turn lane as permitted by the current NCDOT *Driveway Manual*

Other Highway Map Definitions

- **Existing** – Roadway facilities that are not recommended to be improved.
- **Needs Improvement** – Roadway facilities that need to be improved for capacity, safety, or system continuity. The improvement to the facility may be widening, other operational strategies, increasing the level of access control along the facility, or a combination of improvements and strategies. *"Needs improvement" does not refer to the maintenance needs of existing facilities.*
- **Recommended** – Roadway facilities on new location that are needed in the future.
- **Interchange** – Through movement on intersecting roads is separated by a structure. Turning movement area accommodated by on/off ramps and loops.
- **Grade Separation** – Through movement on intersecting roads is separated by a structure. There is no direct access between the facilities.
- **Full Control of Access** – Connections to a facility provided only via ramps at interchanges. No private driveway connections allowed.
- **Limited Control of Access** – Connections to a facility provided only via ramps at interchanges (major crossings) and at-grade intersections (minor crossings and service roads). No private driveway connections allowed.
- **Partial Control of Access** – Connections to a facility provided via ramps at interchanges, at-grade intersections, and private driveways. Private driveway connections shall be defined as a maximum of one connection per parcel. One connection is defined as one ingress and one egress point. These may be combined to form a two-way driveway (most common) or separated to allow for better traffic flow through the parcel. The use of shared or consolidated connections is highly encouraged.
- **No Control of Access** – Connections to a facility provided via ramps at interchanges, at-grade intersections, and private driveways.

Public Transportation and Rail Map

- **Bus Routes** – The primary fixed route bus system for the area. Does not include demand response systems.
- **Fixed Guideway** – Any transit service that uses exclusive or controlled rights-of-way or rails, entirely or in part. The term includes heavy rail, commuter rail, light rail,

monorail, trolleybus, aerial tramway, included plane, cable car, automated guideway transit, and ferryboats.

- **Operational Strategies** – Plans geared toward the non-single occupant vehicle. This includes but is not limited to HOV lanes or express bus service.
- **Rail Corridor** – Locations of railroad tracks that are either active or inactive tracks. These tracks were used for either freight or passenger service.
  - Active – rail service is currently provided in the corridor; may include freight and/or passenger service
  - Inactive – right of way exists; however, there is no service currently provided; tracks may or may not exist
  - Recommended – It is desirable for future rail to be considered to serve an area.
- **High Speed Rail Corridor** – Corridor designated by the U.S. Department of Transportation as a potential high speed rail corridor.
  - Existing – Corridor where high speed rail service is provided (there are currently no existing high speed corridor in North Carolina).
  - Recommended – Proposed corridor for high speed rail service.
- **Rail Stop** – A railroad station or stop along the railroad tracks.
- **Intermodal Connector** – A location where more than one mode of transportation meet such as where light rail and a bus route come together in one location or a bus station.
- **Park and Ride Lot** – A strategically located parking lot that is free of charge to anyone who parks a vehicle and commutes by transit or in a carpool.

Bicycle Map

- **On Road-Existing** – Conditions for bicycling on the highway facility are adequate to safely accommodate cyclists.
- **On Road-Needs Improvement** – At the systems level, it is desirable for **an existing** highway facility to accommodate bicycle transportation; however, highway improvements are necessary to create safe travel conditions for the cyclists.
- **On Road-Recommended** – At the systems level, it is desirable for **a recommended** highway facility to accommodate bicycle transportation. The highway should be designed and built to safely accommodate cyclists.
- **Off Road-Existing** – A facility that accommodates only bicycle transportation and is physically separated from a highway facility either within the right-of-way or within an independent right-of-way.
- **Off Road-Needs Improvement** – A facility that accommodates only bicycle transportation and is physically separated from a highway facility either within the

right-of-way or within an independent right-of-way that will not adequately serve future bicycle needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), and improved horizontal or vertical alignment.

- **Off Road-Recommended** – A facility needed to accommodate only bicycle transportation and is physically separated from a highway facility either within the right-of-way or within an independent right-of-way.
- **Multi-use Path-Existing** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Needs Improvement** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic that will not adequately serve future needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), and improved horizontal or vertical alignment. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Recommended** – A facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that is needed to serve bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Existing Grade Separation** – Locations where existing “Off Road” facilities and “Multi-use Paths” are physically separated from existing highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.
- **Proposed Grade Separation** – Locations where “Off Road” facilities and “Multi-use Paths” are recommended to be physically separated from existing or recommended highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.

Pedestrian Map

- **Sidewalk-Existing** – Paved paths (including but not limited to concrete, asphalt, brick, stone, or wood) on both sides of a highway facility and within the highway right-of-way that are adequate to safely accommodate pedestrian traffic.
- **Sidewalk-Needs Improvement** – Improvements are needed to provide paved paths on both sides of a highway facility. The highway facility may or may not need improvements. Improvements do not include re-paving or other maintenance activities but may include: filling in gaps, widening sidewalks, or meeting ADA (Americans with Disabilities Act) requirements.

- **Sidewalk-Recommended** – At the systems level, it is desirable for **a recommended** highway facility to accommodate pedestrian transportation. The highway should be designed and built to safely accommodate pedestrian traffic.
- **Off Road-Existing** – A facility that accommodates only pedestrian traffic and is physically separated from a highway facility usually within an independent right-of-way.
- **Off Road-Needs Improvement** – A facility that accommodates only pedestrian traffic and is physically separated from a highway facility usually within an independent right-of-way that will not adequately serve future pedestrian needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), improved horizontal or vertical alignment, and meeting ADA requirements.
- **Off Road-Recommended** – A facility needed to accommodate only pedestrian traffic and is physically separated from a highway facility usually within an independent right-of-way.
- **Multi-use Path-Existing** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Needs Improvement** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic that will not adequately serve future needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), and improved horizontal or vertical alignment. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Recommended** – A facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that is needed to serve bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Existing Grade Separation** – Locations where existing “Off Road” facilities and “Multi-use Paths” are physically separated from existing highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.
- **Proposed Grade Separation** – Locations where “Off Road” facilities and “Multi-use Paths” are recommended to be physically separated from existing or recommended highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.

Appendix C

CTP Inventory and Recommendations

Assumptions/ Notes:

- **ID:** If a TIP project number exists it is listed as the ID. Otherwise, the following system is used to create a code for each recommended improvement (this code is the same as the one used as the SPOT prioritization tool ID): the first 4 letters of the county name is combined with a 4 digit unique numerical code followed by '-H' for highway, '-T' for public transportation, '-R' for rail, '-B' for bicycle, or '-P' for pedestrian modes. If a different code is used along a route it indicates separate projects will probably be requested. Also, upper case alphabetic characters (i.e. 'A', 'B', or 'C') are included after the numeric portion of the code if it is anticipated that project segmentation or phasing will be recommended.
- **Jurisdiction:** Jurisdictions listed are based on municipal limits, county boundaries, and MPO Metropolitan Planning Area Boundaries (MAB), as applicable.
- **Cross-Section:** Listed under '(ft)' is the approximate width of the roadway from edge of pavement to edge of pavement. Listed under 'lanes' is the total number of lanes, with the letter 'D' if the facility is divided.
- **ROW:** The estimated existing right-of-way is based on the Road Conditions shapefile provided by the North Carolina GIS Unit. These right-of-way amounts are approximate and may vary.
- **Existing and Proposed Capacity:** The estimated capacities are given in vehicles per day (vpd) based on LOS D for existing facilities and LOS C for new facilities. These capacity estimates were developed using NCLOS, as documented in Chapter II. The Proposed Capacity is shown in bold if it does not meet or exceed the 2030 AADT with CTP.
- **Existing and Proposed AADT** (Annual Average Daily Traffic) volumes, given in vehicles per day (vpd), are estimates only based on a systems-level analysis. The '2030 No Build AADT' is an estimate of the volume in 2030 with no additional facilities/ improvements assumed to be in place that were not open to traffic in the base year (2007). The '2030 AADT with CTP' is an estimate of the volume in 2030 with all proposed CTP improvements assumed to be in place. For additional information about the assumptions and techniques used to develop the AADT volume estimates, refer to Chapter II.
- **Rec. (Recommended) Cross-section:** The CTP recommended cross-sections are listed by code; for depiction of the cross-section, refer to Appendix D. An entry of 'ADQ' indicates the existing facility is adequate and there are no improvements recommended as part of the CTP.
- **CTP Classification:** The CTP classification is listed, as shown on the adopted CTP Maps (see Figure 1). Abbreviations are F= freeway, E= expressway, B= boulevard, Maj= other major thoroughfare, Min= minor thoroughfare.
- **Tier:** Tiers are defined as part of the North Carolina Mulitmodal Investment Network (NCMIN). Abbreviations are Sta= statewide tier, Reg= regional tier, Sub= subregional tier.
- **Other Modes:** If there is an improvement recommended for another mode of transportation that relates to the given recommendation, it is indicated by an alphabetic code (H=highway, T= public transportation, R= rail, B= bicycle, and P= pedestrian)

CTP INVENTORY AND RECOMMENDATIONS

HIGHWAY																		
					2007 Existing System						2030 Proposed System							
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 AADT	2030 AADT No Build	2030 AADT with CTP	Proposed Capacity (vpd)	Rec. Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
PEND0001-H	**US 17**	Sloop Point Rd. (SR 1561) - Shepards Rd. (SR 1533)	Pender Co.	4.1	48	4	90	55	40500	16000	34600	34600	42500	4A	280	F	Sta	-
	US 17	Shepards Rd. (SR 1533) - Holly Ridge Town Limits	Pender Co.	1.2	48	4	90	55	40500	11700	32100	9600	40500	ADQ	90	B	Reg	-
	US 17	Holly Ridge Town Limits - Crawford St.	Holly Ridge	1.4	60	5	90	45	37600	13800	37700	15200	37600	ADQ	90	Maj	Reg	-
	US 17	Crawford St. - Graham Ln.	Onslow Co.	1.5	60	5	90	55	37600	14900	34700	12200	37600	ADQ	90	Maj	Reg	-
	US 17	Graham Ln. - NC 172	Onslow Co.	2.2	48	4	100	55	40200	12800	29900	7400	40200	ADQ	100	B	Reg	-
PEND0001-H	**US 17**	NC 172 - Planning Area Boundary	Onslow Co.	0.1	48	4	100	55	40200	8600	17000	17000	42500	4A	280	F	Sta	-
PEND0005-H	**NC 50**	Florida Ave. - Crews Ave.	Topsail Beach	1.1	22	2	100	45	14200	6500	8200	8200	14200	2A	60	Maj	Reg	B
PEND0005-H	**NC 50**	Crews Ave. - Davis Ave.	Topsail Beach	0.2	24	2	100	25	14200	6500	8200	8200	14200	2A	60	Maj	Reg	B
PEND0005-H	**NC 50**	Davis Ave. - Empie Ave.	Topsail Beach	0.3	22	2	100	35	14200	6500	8200	8200	14200	2A	60	Maj	Reg	B
PEND0005-H	**NC 50**	Empie Ave. - S. Shore Dr.	Topsail Beach	4.4	22	2	100	45	14200	6500	8200	8200	14200	2A	60	Maj	Reg	B
PEND0004-H	**NC 50**	S. Shore Dr. - NC 210	Surf City	1.2	30	2	100	35	14200	6500	8200	8200	14200	2E	60	Maj	Reg	B P
	NC 50	NC 210 - Holly Ridge Town Limits	Pender Co.	2.1	24	2	100	55	9600	4100	8600	8600	9600	ADQ	100	Maj	Reg	-
	NC 50	Holly Ridge Town Limits - Trout St.	Holly Ridge	0.6	24	2	100	45	14200	4500	10600	10600	14200	ADQ	100	Maj	Reg	-
	NC 50	Trout St. - Dyson St.	Holly Ridge	0.4	24	2	100	35	14200	4500	10600	10600	14200	ADQ	100	Maj	Reg	-
	NC 50	Dyson St. - US 17	Holly Ridge	0.1	62	3	100	35	15900	4500	10600	10600	14200	ADQ	100	Maj	Reg	-
	NC 50	US 17 - Lloyd St.	Holly Ridge	0.1	24	2	100	35	14200	1700	2600	2600	14200	ADQ	100	Maj	Reg	-
	NC 50	Lloyd St. - Holly Ridge Town Limits	Holly Ridge	0.2	24	2	100	35	14200	1700	2600	2600	14200	ADQ	100	Maj	Reg	-
	NC 50	Holly Ridge Town Limits - Planning Area Boundary	Onslow Co.	0.7	24	2	100	55	11600	1700	2600	2600	14200	ADQ	100	Maj	Reg	-
PEND0002-H	**NC 210**	US 17 - NC 50	Pender Co.	2.7	24	2	60	55	9400	8000	12800	12800	35200	4D	110	B	Reg	B P
PEND0002-H	**NC 210**	NC 50 - Little Kinston Rd. (SR 1538)	Surf City	1.2	36	3	100	55	10400	10600	17800	17800	35200	4D	110	B	Reg	B P
B-4929	**NC 210**	Little Kinston Rd. (SR 1538) - East bridge end	Surf City	0.6	24	2	100	35	14200	11700	19000	19000	35200	4D	110	B	Reg	B P
PEND0006-H	**NC 210**	East bridge end - S. New River Dr.	Surf City	0.3	32	3	100	35	15200	11700	19000	19000	15200	3B	80	Maj	Reg	B P

HIGHWAY																			
					2007 Existing System						2030 Proposed System								
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 AADT	2030 AADT No Build	2030 AADT with CTP	Proposed Capacity (vpd)	Rec. Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
PEND0003-H	**NC 210**	S. New River Dr. - New Bern Ave.	Surf City	0.4	42	3	60	35	15200	5400	12300	2000	14200	2E	60	Min	Reg	B
PEND0003-H	**NC 210**	New Bern Ave. - Shell Dr. (SR 1549)	Surf City	0.4	30	2	60	35	14200	5400	12300	2000	14200	2E	60	Min	Reg	B
ONSL0002-H	**NC 210**	Shell Dr. (SR 1549)- Surf City City Limits	Surf City	1.5	30	2	60	45	14200	5100	11600	11600	15200	3A	100	Maj	Reg	B
ONSL0002-H	**NC 210**	Surf City City Limits - Topsail Rd. (SR 1583)	North Topsail Beach	2.0	24	2	60	45	14200	5100	11600	11600	15200	3A	100	Maj	Reg	B
ONSL0002-H	**NC 210**	Topsail Rd. (SR 1583) - Change in speed limit	North Topsail Beach	2.6	30	2	100	45	14200	5100	10900	10900	15200	3A	100	Maj	Reg	B
ONSL0002-H	**NC 210**	Change in speed limit - N. River Inlet Rd. (SR 1568)	North Topsail Beach	1.1	30	2	100	55	7300	4100	10900	10900	15200	3A	100	Maj	Reg	B
	NC 210	N. River Inlet Rd. (SR 1568) - East bridge end	North Topsail Beach	0.2	30	2	100	55	9200	11400	19800	19800	9200	ADQ	250	Maj	Reg	-
	NC 210	East bridge end - West bridge end	Onslow Co.	0.6	24	2	250	55	9200	11400	19800	19800	9200	ADQ	250	Maj	Reg	-
ONSL0003-H	**NC 210**	West bridge end - NC 172	Onslow Co.	3.3	24	2	150	55	9200	10000	18700	18700	40500	4B	150	B	Reg	B
ONSL0003-H	**NC 210**	NC 172 - Planning Area Boundary	Onslow Co.	0.3	24	2	100	55	9200	11700	23000	23000	40500	4B	150	B	Reg	B
ONSL0001-H	**NC 172**	US 17 - NC 210	Onslow Co.	3.9	24	2	100	55	9400	7000	12500	14000	40500	4B	150	B	Reg	B
ONSL0001-H	**NC 172**	NC 210 - Planning Area Boundary	Onslow Co.	0.3	24	2	100	55	9400	17000	33500	35000	40500	4B	150	B	Reg	B
ONSL0004-H	**Old Folkstone Rd. (SR 1518)**	US 17 - Crosswood Dr.	Onslow Co.	0.6	18	2	60	35	11600	1900	7100	5600	13700	2B	70	Min	Sub	-
ONSL0004-H	**Old Folkstone Rd. (SR 1518)**	Crosswood Dr. - Marigold Dr.	Onslow Co.	3.9	20	2	60	45	11600	3300	8100	6600	13700	2B	70	Min	Sub	-
ONSL0005-H	**Tar Landing Rd. (SR 1531)**	Holly Ridge Rd. (SR 1534) - Old Folkstone Rd. (SR 1518)	Onslow Co.	1.8	20	2	60	55	8900	1400	3000	3000	13700	2B	70	Min	Sub	-
PEND0007-H	**Shepards Rd. (SR 1533)**	US 17 - NC 50	Pender Co.	1.2	20	2	60	55	8900	1000	1600	1600	13700	2B	70	Min	Sub	-
ONSL0007-H	**Holly Ridge Rd. (SR 1534)**	Morris Landing Rd. (SR 1538) - Tar Landing Rd. (SR 1531)	Onslow Co.	2.8	20	2	60	55	8900	1400	3000	3000	13700	2B	70	Min	Sub	-

HIGHWAY																			
					2007 Existing System						2030 Proposed System								
ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 AADT	2030 AADT No Build	2030 AADT with CTP	Proposed Capacity (vpd)	Rec. Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
ONSL0008-H	**Morris Landing Rd. (SR 1538)**	US 17 - N. Smith St.	Holly Ridge	0.4	36	2	60	35	14500	900	3000	3000	13700	2B	70	Min	Sub	-
ONSL0008-H	**Morris Landing Rd. (SR 1538)**	N. Smith St. - Holly Ridge Rd. (SR 1534)	Holly Ridge	1.1	20	2	60	35	11600	900	3000	3000	13700	2B	70	Min	Sub	-
PEND0003-H	**Topsail Dr. (SR 1547) (future NC 210)**	Roland Ave. (SR 1598) - Shell Dr.	Surf City	0.8	22	2	100	35	14200	1000	1600	12000	15200	3B	80	Maj	Reg	B P
PEND0003-H	**Shell Rd. (SR 1549) (future NC 210)**	Topsail Dr. (SR 1547) - NC 210	Surf City	0.1	24	2	100	35	14200	1000	1600	12000	15200	3B	80	Maj	Reg	B P
ONSL0006-H	**N. New River Inlet Rd. (SR 1568)**	NC 210 - Barton Bay Rd.	North Topsail Beach	3.7	22	2	60	45	14200	6200	10200	10200	13700	2B	70	Min	Sub	-
ONSL0006-H	**N. New River Inlet Rd. (SR 1568)**	Barton Bay Rd. - River Rd.	North Topsail Beach	1.5	22	2	60	35	14200	6200	10200	10200	13700	2B	70	Min	Sub	-
PEND0003-H	**Roland Ave. (SR 1598)**	NC 210 - Topsail Dr. (SR 1547)	Surf City	0.1	32	3	100	35	15200	6000	9800	17000	15200	3B	80	Maj	Reg	B P
PEND0001-H	**US 17 new location**	Shepards Road (SR 1533) - NC 172	Pender Co./Onslow Co.	6.7	-	-	-	-	-	-	-	22500	42500	4A	280	F	Sta	-

BICYCLE AND PEDESTRIAN

BICYCLE[1]								
				Existing System		Proposed System		
				Cross-Section				Other
ID	Facility/ Route	Section (From - To)	Distance (mi)	(ft)	lanes	Type	Cross-Section	Modes
	Bike Route NC 3 - Ports of Call							
PEND0001-B	US 17	Sloop Point Road (SR 1561) - NC 210	2.0	--	--	Off Road	MA	--
PEND0002-H	NC 210	US 17 - Little Kinston Road (SR 1533)	4.0	Concurrent with NC 210 - see Highway Table				H
B-4929	NC 210	Little Kinston Road (SR 1533) - East bridge end in Surf City	0.6	Concurrent with NC 210 - see Highway Table				HP
PEND0007-H	NC 210	East bridge end in Surf City - Topsail Drive (SR 1547)	0.4	Concurrent with NC 210 - see Highway Table				HP
PEND0003-H	Future NC 210	Roland Avenue (SR 1598) - NC 210	0.9	Concurrent with future NC 210 - see Highway Table				HP
ONSL0002-H	NC 210	Shell Drive (SR 1569) - North River Inlet Road (SR 1568)	7.2	Concurrent with NC 210 - see Highway Table				H
ONSL0003-H	NC 210	North River Inlet Road (SR 1568) - Planning Area Boundary	4.4	Concurrent with NC 210 - see Highway Table				H
PEND0004-H	**North New River Drive (existing NC 210)**	Topsail Drive (SR 1547) - Roland Avenue (SR 1598)	0.9	Concurrent with North New River Drive - see Highway Table				HP
PEND0005-H	**NC 50**	Roland Avenue (SR 1598) - South Shore Drive	1.2	Concurrent with NC 50 - see Highway Table				HP
PEND0006-H	**NC 50**	South Shore Drive - End of state maintenance	6.0	Concurrent with NC 50 - see Highway Table				H
PEND0002-B	**Ocean Drive**	NC 50 - end of island	2.1	--	--	On Road	MB	--
PEND0003-B	**Powerline Greenway Trail**	US 17 - Southwest Planning Area Boundary	9.6	--	--	Off Road	MA	--

[1]See Town of North Topsail Beach Comprehensive Bicycle Plan 2006 for further information on additional recommendations

PEDESTRIAN[2]								
				Existing System		Proposed System		Other
ID	Facility/ Route	Section (From - To)	Distance (mi)	Type	Side of Street	Type	Side of Street	Modes
B-4929	**NC 210**	Little Kinston Road (SR 1533) - East bridge end in Surf City	0.6	--	--	Sidewalks	Both	H B

[2]See Town of Surf City Sidewalk Infrastructure Expansion 2008 for further information on additional recommendations

Appendix D

Typical Cross Sections

Cross section requirements for roadways vary according to the capacity and level of service to be provided. Universal standards in the design of roadways are not practical. Each roadway section must be individually analyzed and its cross section determined based on the volume and type of projected traffic, existing capacity, desired level of service, and available right-of-way. These cross sections are typical for facilities on new location and where right-of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross sections should be developed that meet the needs of the project.

The typical cross sections were updated on December 7, 2010 to support the Department's "Complete Streets" policy that was adopted in July 2009. This guidance established design elements that emphasize safety, mobility, and accessibility for multiple modes of travel. These "typical" cross sections should be used as preliminary guidelines for comprehensive transportation planning, project planning and project design activities. The specific and final cross section details and right of way limits for projects will be established through the preparation of the National Environmental Policy Act (NEPA) documentation and through final plan preparation.

On all existing and proposed roadways delineated on the CTP, adequate right-of-way should be protected or acquired for the recommended cross sections. In addition to cross section and right-of-way recommendations for improvements, Appendix C may recommend ultimate needed right-of-way for the following situations:

- roadways which may require widening after the current planning period,
- roadways which are borderline adequate and accelerated traffic growth could render them deficient, and
- roadways where an urban curb and gutter cross section may be locally desirable because of urban development or redevelopment.
- roadways which may need to accommodate an additional transportation mode

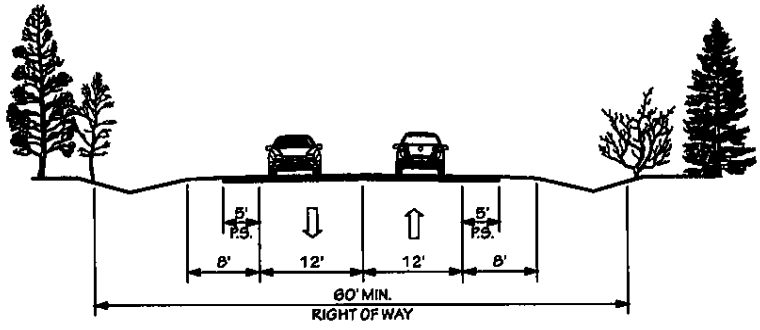
Cross Sections used for the Topsail Area CTP (Figure 8 on next page)

TYPICAL HIGHWAY CROSS SECTIONS

2 LANES

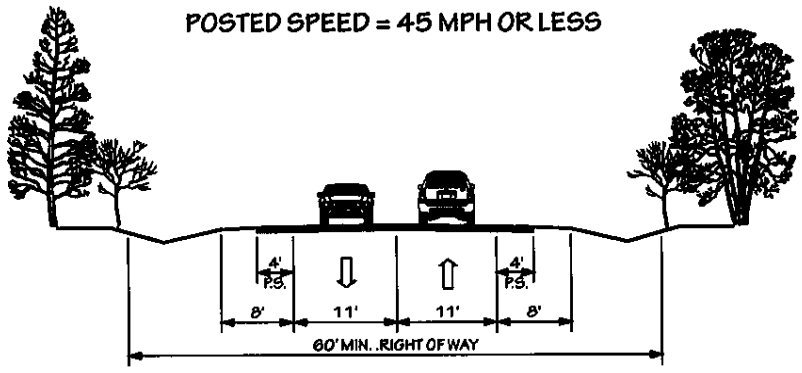
2 A

WIDE PAVED SHOULDERS
POSTED SPEED = 55 MPH



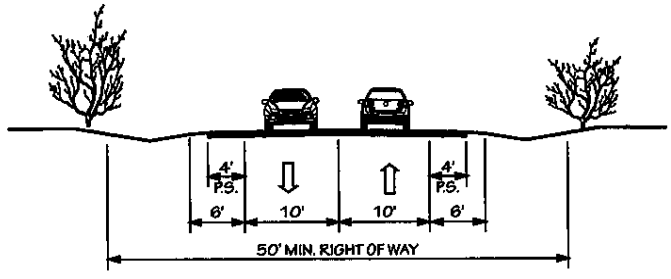
2 B

WIDE PAVED SHOULDERS
POSTED SPEED = 45 MPH OR LESS



2 C

WIDE PAVED SHOULDERS
POSTED SPEED = 35 MPH OR LESS

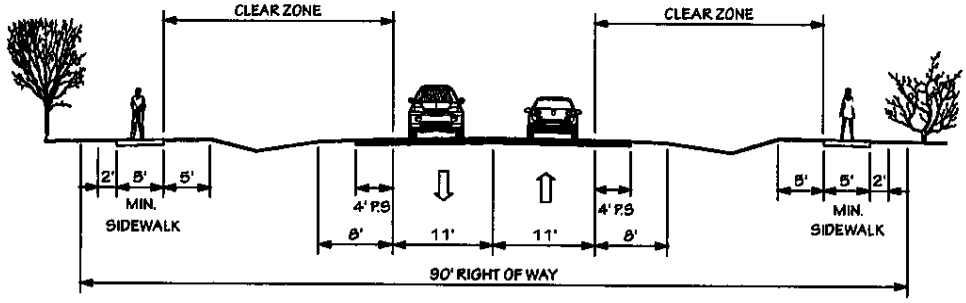


TYPICAL HIGHWAY CROSS SECTIONS

2 LANES

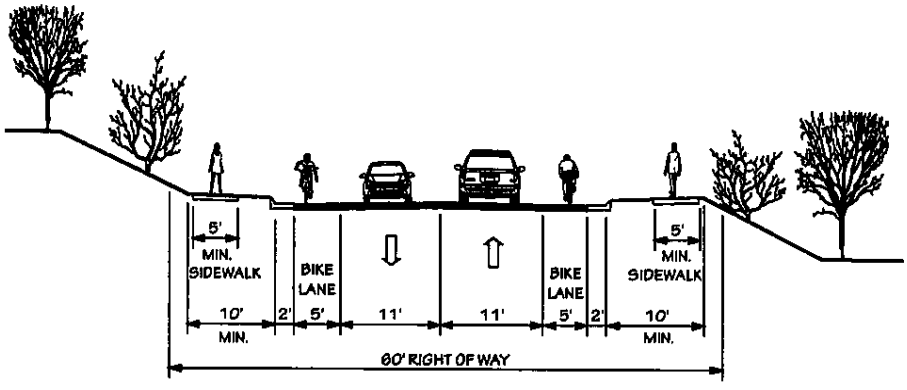
2 D

SIDEWALK PLACEMENT BEHIND A ROADWAY DITCH



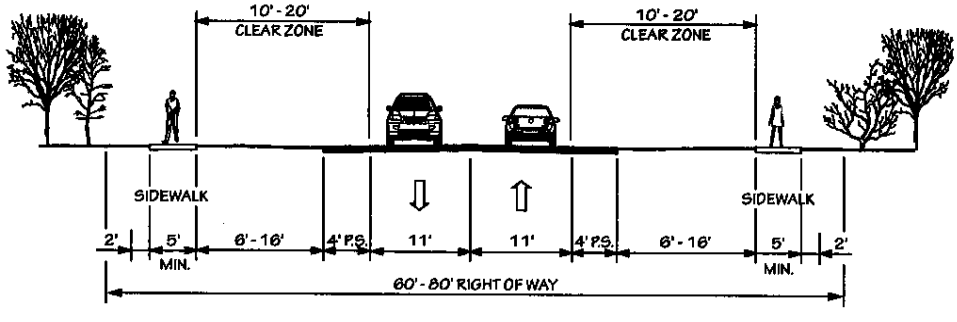
2 E

CURB AND GUTTER
WITH BIKE LANES AND SIDEWALKS



2 F

BUFFERS AND SIDEWALKS WITHOUT A ROADWAY DITCH
(20 MPH TO 45 MPH)
(TYPICALLY COASTAL AREA MANAGEMENT ACT COUNTIES)



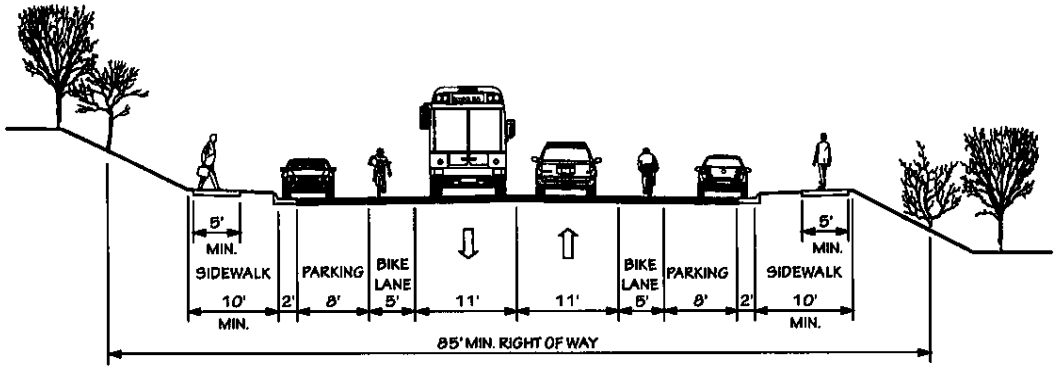
Revised 12/07/2010

TYPICAL HIGHWAY CROSS SECTIONS

2 LANES

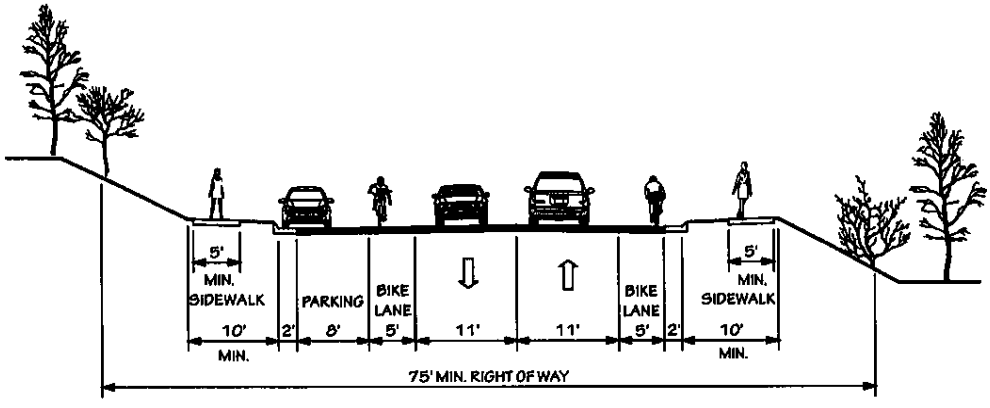
2 G

CURB & GUTTER - PARKING ON EACH SIDE



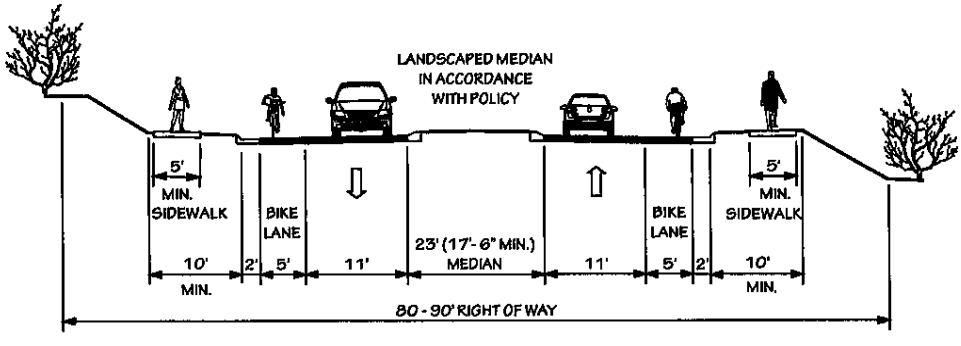
2 H

CURB & GUTTER - PARKING ON ONE SIDE



2 I

RAISED MEDIAN WITH CURB & GUTTER



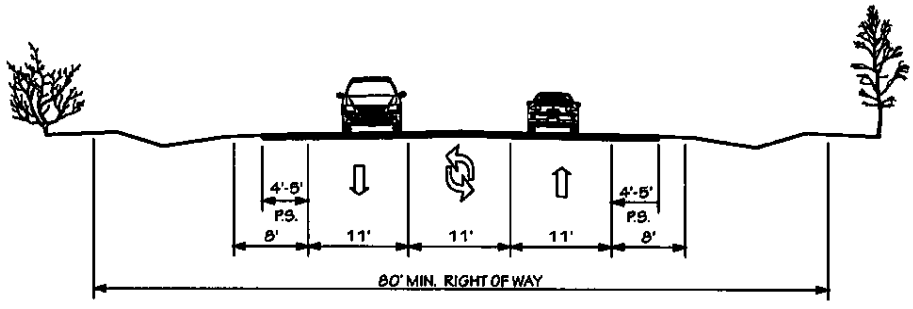
Revised 12/07/2010

TYPICAL HIGHWAY CROSS SECTIONS

3 LANES

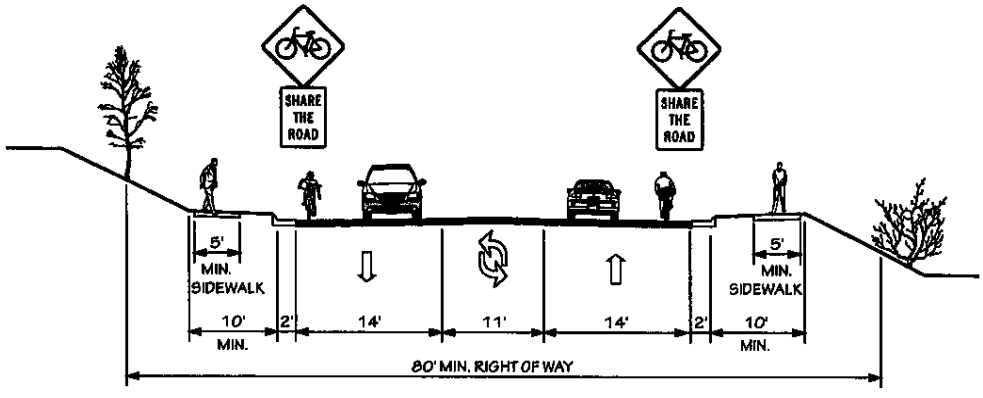
3 A

WIDE PAVED SHOULDERS



3 B

CURB & GUTTER WITH WIDE OUTSIDE LANES AND SIDEWALKS

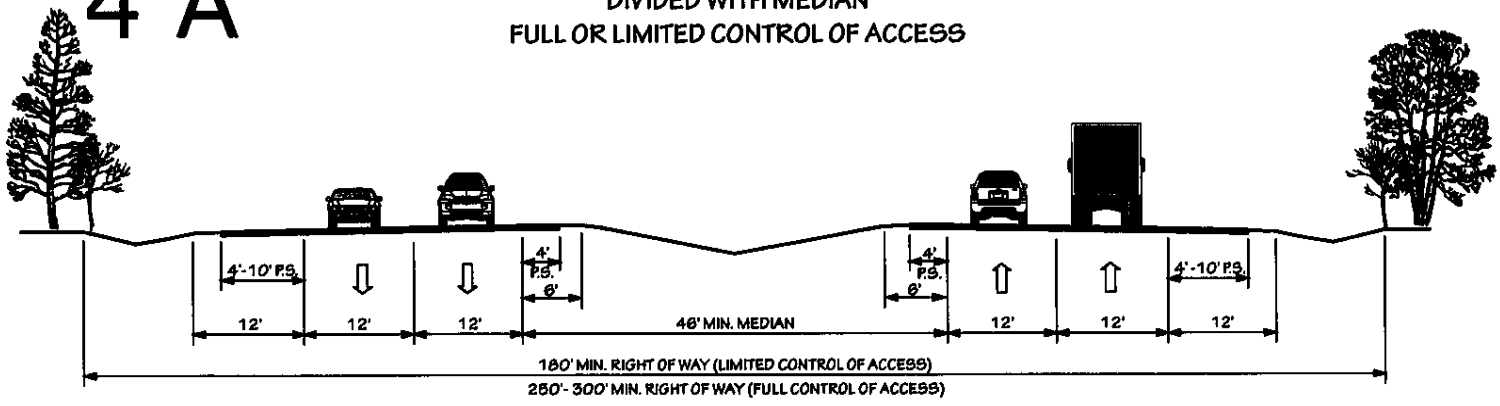


TYPICAL HIGHWAY CROSS SECTIONS

4 LANES

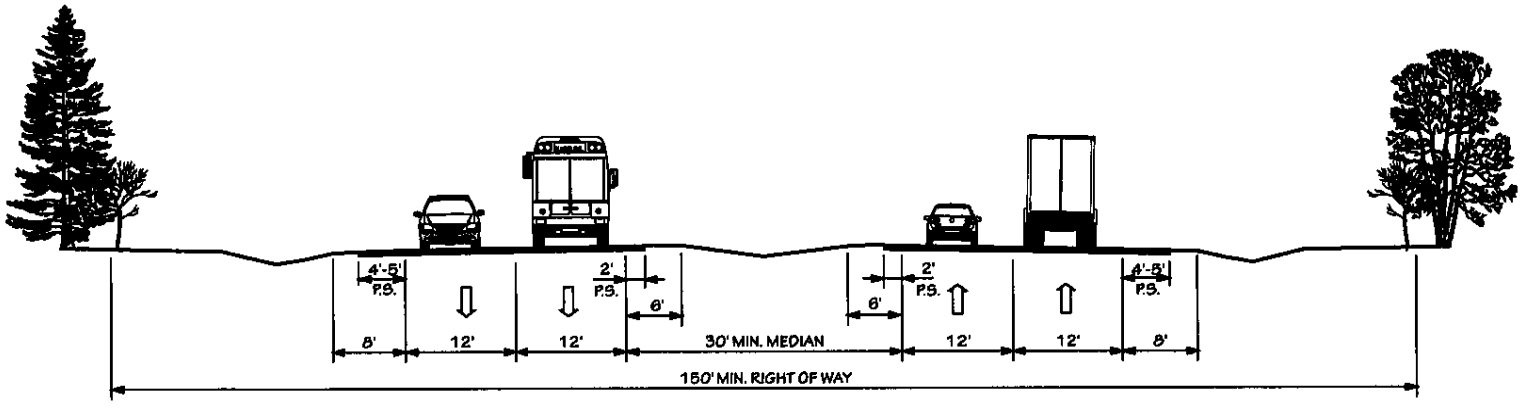
4 A

DIVIDED WITH MEDIAN
FULL OR LIMITED CONTROL OF ACCESS



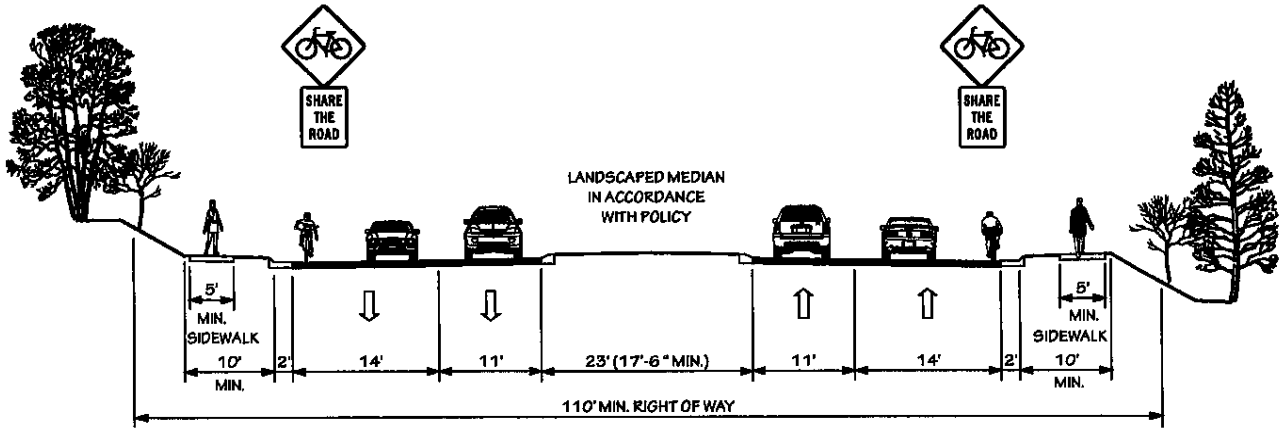
4 B

DIVIDED WITH MEDIAN - NO CURB & GUTTER
PARTIAL CONTROL OF ACCESS



4 C

RAISED MEDIAN WITH WIDE OUTSIDE LANES AND SIDEWALKS



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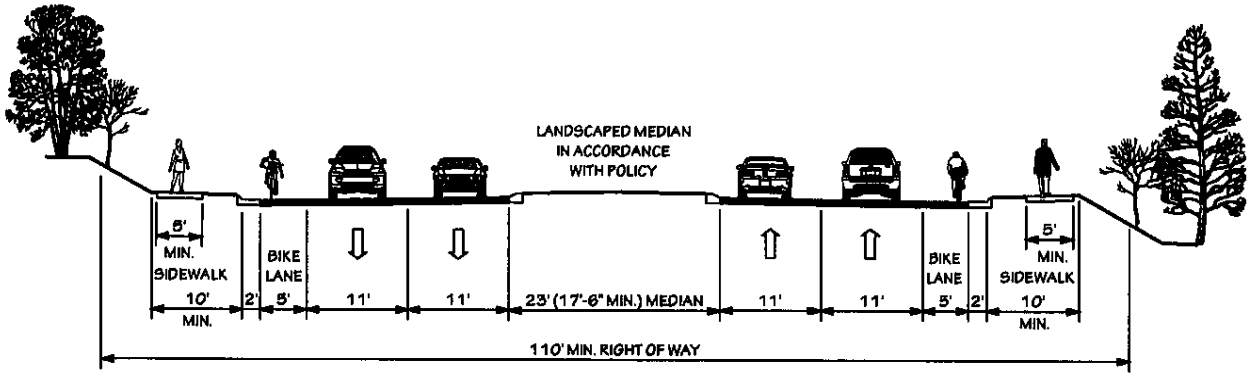
TYPICAL HIGHWAY CROSS SECTIONS

4 LANES

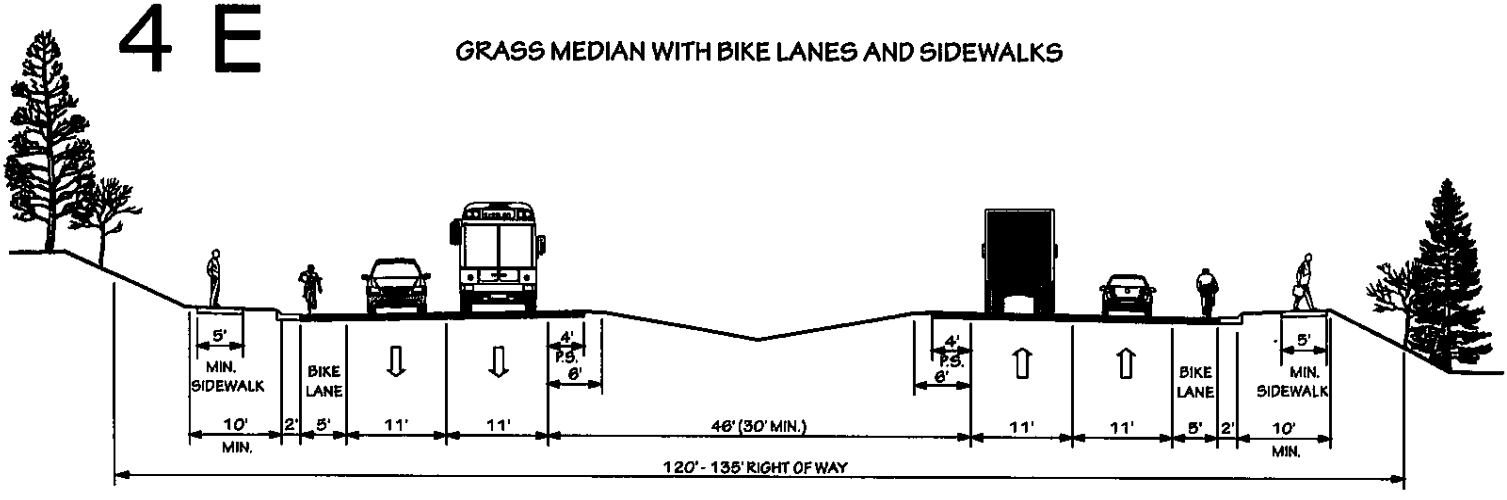
4 D

RAISED MEDIAN - CURB & GUTTER WITH BIKE LANES AND SIDEWALKS



4 E

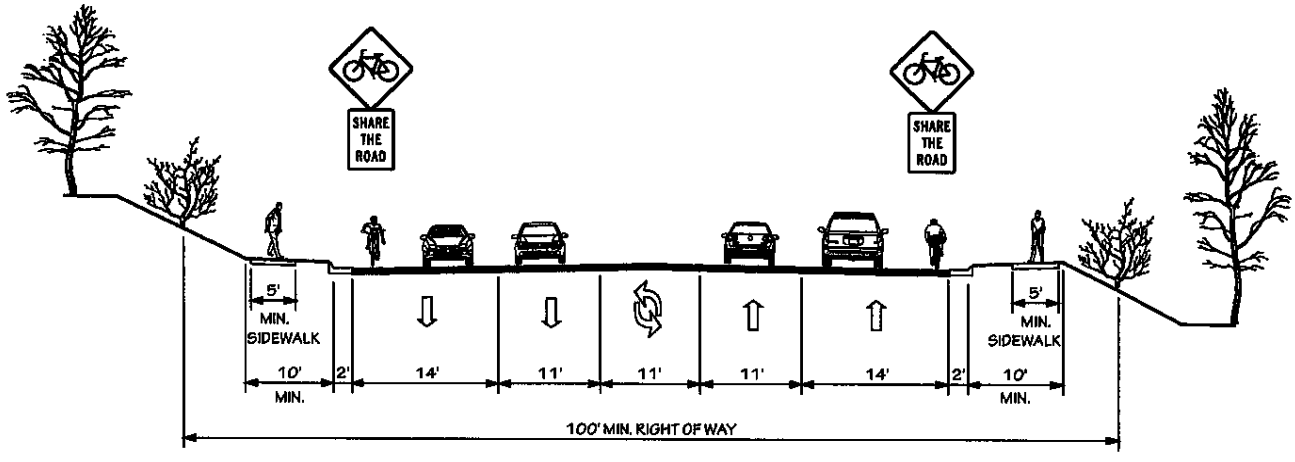
GRASS MEDIAN WITH BIKE LANES AND SIDEWALKS



5 LANES

5 A

WIDE OUTSIDE LANES



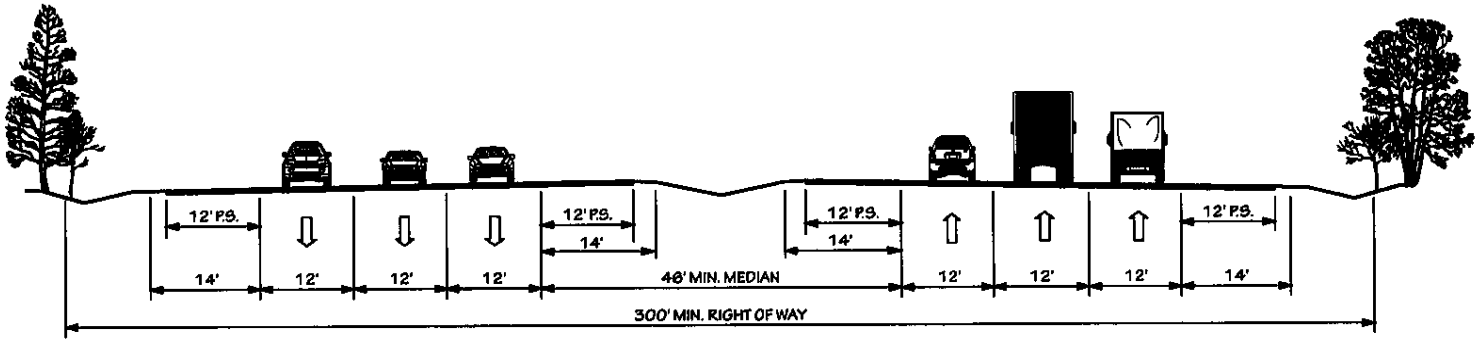
Revised 12/07/2010

TYPICAL HIGHWAY CROSS SECTIONS

6 LANES

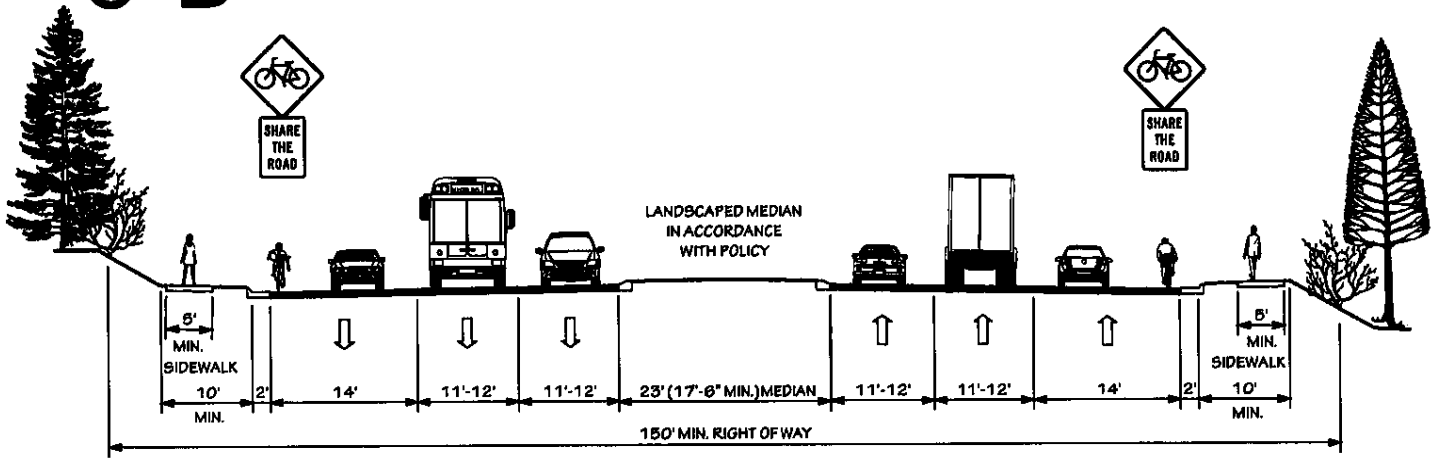
6 A

DIVIDED WITH GRASS MEDIAN



6 B

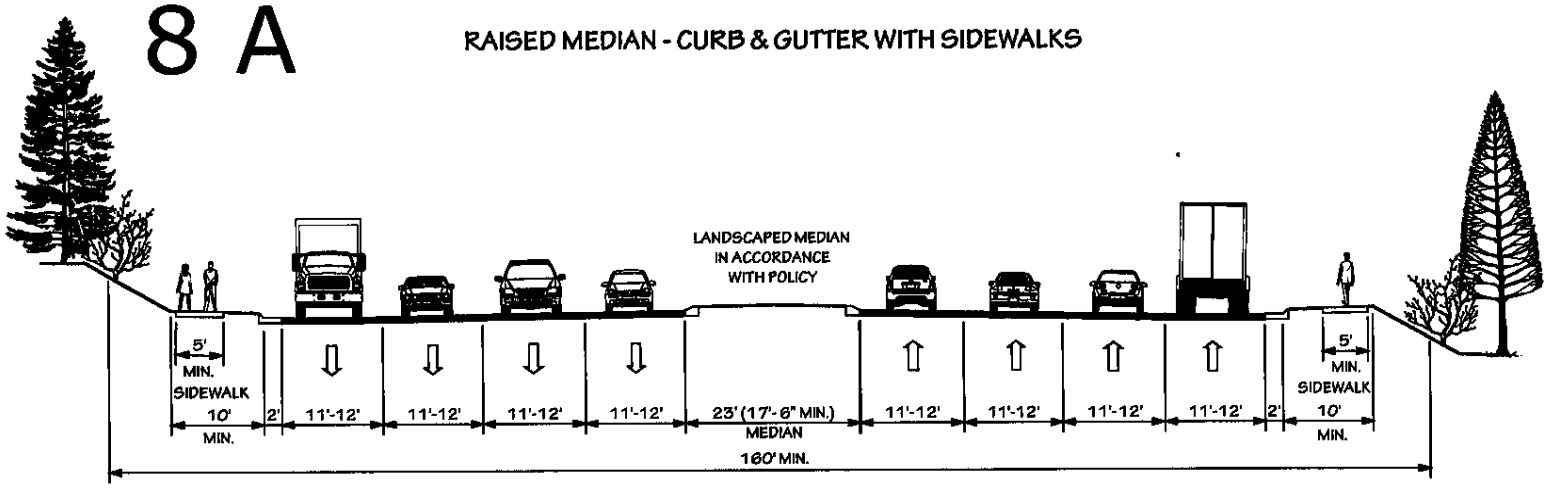
RAISED MEDIAN - CURB & GUTTER WITH WIDE OUTSIDE LANES AND SIDEWALKS



8 LANES

8 A

RAISED MEDIAN - CURB & GUTTER WITH SIDEWALKS

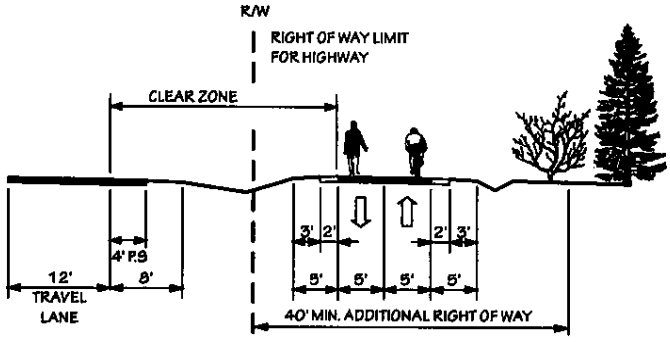


Revised 12/07/2010

TYPICAL MULTI - USE PATH

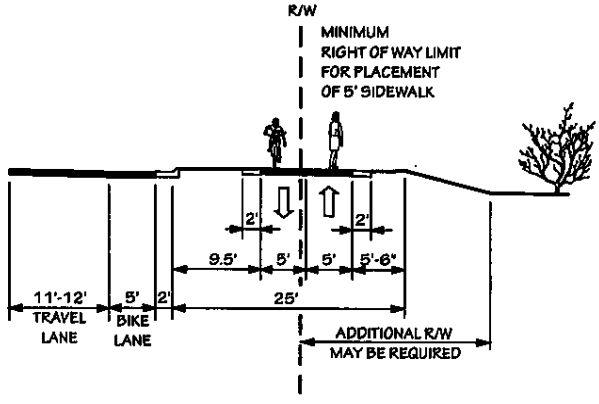
MULTI - USE PATH
ADJACENT TO RIGHT OF WAY OR SEPARATE PATHWAY

M A



MULTI - USE PATH ADJACENT TO CURB AND GUTTER

M B



Appendix E

Level of Service Definitions

The relationship of travel demand compared to the roadway capacity determines the level of service (LOS) of a roadway. Six levels of service identify the range of possible conditions. Designations range from LOS A, which represents the best operating conditions, to LOS F, which represents the worst operating conditions.

Design requirements for roadways vary according to the desired capacity and level of service. LOS D indicates "practical capacity" of a roadway, or the capacity at which the public begins to express dissatisfaction. Recommended improvements and overall design of the transportation plan were based upon achieving a minimum LOS D on existing facilities and a LOS C on new facilities. The six levels of service are described below and illustrated in Figure 10.

- **LOS A**: Describes primarily free flow conditions. The motorist experiences a high level of physical and psychological comfort. The effects of minor incidents of breakdown are easily absorbed. Even at the maximum density, the average spacing between vehicles is about 528 ft, or 26 car lengths.
- **LOS B**: Represents reasonably free flow conditions. The ability to maneuver within the traffic stream is only slightly restricted. The lowest average spacing between vehicles is about 330 ft, or 18 car lengths.
- **LOS C**: Provides for stable operations, but flows approach the range in which small increases will cause substantial deterioration in service. Freedom to maneuver is noticeably restricted. Minor incidents may still be absorbed, but the local decline in service will be great. Queues may be expected to form behind any significant blockage. Minimum average spacing is in the range of 220 ft, or 11 car lengths.
- **LOS D**: Borders on unstable flow. Density begins to deteriorate somewhat more quickly with increasing flow. Small increases in flow can cause substantial deterioration in service. Freedom to maneuver is severely limited, and the driver experiences drastically reduced comfort levels. Minor incidents can be expected to create substantial queuing. At the limit, vehicles are spaced at about 165 ft, or 9 car lengths.
- **LOS E**: Describes operation at capacity. Operations at this level are extremely unstable, because there are virtually no usable gaps in the traffic stream. Any disruption to the traffic stream, such as a vehicle entering from a ramp, or changing lanes, requires the following vehicles to give way to admit the vehicle. This can establish a disruption wave that propagates through the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate any disruption. Any incident can be expected to produce a serious breakdown with extensive queuing. Vehicles are spaced at approximately 6 car lengths, leaving little room to maneuver.

- **LOS F**: Describes forced or breakdown flow. Such conditions generally exist within queues forming behind breakdown points.

Figure 12 - Level Of Service Illustrations

Level of Service A

Driver Comfort: High

Maximum Density:

12 passenger cars per mile per lane

Level of Service B

Driver Comfort: High

Maximum Density:

20 passenger cars per mile per lane

Level of Service C

Driver Comfort: Some Tension

Maximum Density:

30 passenger cars per mile per lane

Level of Service D

Driver Comfort: Poor

Maximum Density:

42 passenger cars per mile per lane

Level of Service E

Driver Comfort: Extremely Poor

Maximum Density:

67 passenger cars per mile per lane

Level of Service F

Driver Comfort: The lowest

Maximum Density:

More than 67 passenger cars per mile per lane

Source: 2000 Highway Capacity Manual

Appendix F

Traffic Crash Analysis

A crash analysis performed for the Topsail Area CTP factored crash frequency, crash type, and crash severity. Crash frequency is the total number of reported collisions and contributes to the ranking of the most problematic intersections. Crash type provides a general description of the crash and allows the identification of any trends that may be correctable through roadway or intersection improvements. Crash severity is the crash rate based upon injuries and property damage incurred.

The severity of every crash is measured with a series of weighting factors developed by the NCDOT Division of Highways (DOH). These factors define a fatal or incapacitating crash as 47.7 times more severe than one involving only property damage and a crash resulting in minor injury is 11.8 times more severe than one with only property damage. In general, a higher severity index indicates more severe accidents. Listed below are levels of severity for various severity index ranges.

Severity	Severity Index
low	< 6.0
average	6.0 to 7.0
moderate	7.0 to 14.0
high	14.0 to 20.0
very high	> 20.0

Table 4 depicts a summary of the crashes occurring in the planning area between January 1, 2001 and December 31, 2003. The data represents locations with 10 or more crashes. The "Total" column indicates the total number of accidents reported within 150-ft of the intersection during the study period. The severity listed is the average crash severity for that location.

Table 4 - Crash Locations

Map Index	Intersection	Average Severity	Total Collisions
1	NC 172 and NC 210	3.77	28
2	US 17 and NC 210	6.03	47
3	US 17 and SR 1561 (Sloop Point Road)	8.52	15
4	US 17 and NC 50	9.78	13
5	US 17 and NC 172	15.45	8

The NCDOT is actively involved with investigating and improving many of these locations. To request a more detailed analysis for any of the locations listed in Table 4, or other intersections of concern, contact the Division Traffic Engineer. Contact information for the Division Traffic Engineer is included in Appendix A.

Appendix G

Bridge Deficiency Assessment

The Transportation Improvement Program (TIP) development process for bridge projects involves consideration of several evaluation methods in order to prioritize needed improvements. A sufficiency index is used to determine whether a bridge is sufficient to remain in service, or to what extent it is deficient. The index is a percentage in which 100 percent represents an entirely sufficient bridge and zero represents an entirely insufficient or deficient bridge. Factors evaluated in calculating the index are listed below.

- structural adequacy and safety
- serviceability and functional obsolescence
- essentiality for public use
- type of structure
- traffic safety features

The NCDOT Bridge Maintenance Unit inspects all bridges in North Carolina at least once every two years. A sufficiency rating for each bridge is calculated and establishes the eligibility and priority for replacement. Bridges having the highest priority are replaced as Federal and State funds become available.

A bridge is considered deficient if it is either structurally deficient or functionally obsolete. Structurally deficient means there are elements of the bridge that need to be monitored and/or repaired. The fact that a bridge is "structurally deficient" does not imply that it is likely to collapse or that it is unsafe. It means the bridge must be monitored, inspected and repaired/replaced at an appropriate time to maintain its structural integrity. A functionally obsolete bridge is one that was built to standards that are not used today. These bridges are not automatically rated as structurally deficient, nor are they inherently unsafe. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand or to meet the current geometric standards, or those that may be occasionally flooded.

A bridge must be classified as deficient in order to quality for Federal replacement funds. Additionally, the sufficiency rating must be less than 50% to qualify for replacement or less than 80% to qualify for rehabilitation under federal funding. Deficient bridges within the planning area are listed in Table 5.

Table 5 - Deficient Bridges

Bridge Number	Facility	Feature	Condition	CTP Project
181	SR 1518	Branch Turkey Creek	Structurally Deficient	
231	SR 1568	Tidal Ditch	Functionally Obsolete	
232	SR 1568	Tidal Ditch	Functionally Obsolete	
234	SR 1568	Tidal Ditch	Functionally Obsolete	
236	SR 1568	Tidal Ditch	Functionally Obsolete	
237	SR 1568	Tidal Ditch	Functionally Obsolete	
16	NC50/NC210	Intracoastal Waterway	Structurally Deficient & Functionally Obsolete	B-4929

Appendix H

Public Involvement

Public Involvement is a vital part of any Comprehensive Transportation Plan (CTP) development process. For the Topsail Area CTP, the first step was to organize a steering committee to help direct the plan through the planning process. This committee consisted of representatives from the area which initially included:

Tyler Bray, PE	NCDOT Transportation Planning Branch
Matthew Stuart	Onslow County
Cindy Williams	Holly Ridge
Robert Vause, PE	District Engineer – Highway Division 3
Todd Rademacher	Surf City
Frank Palmer	Pender County
Jimmy Canady	Topsail Beach
Thomas Best	North Topsail Beach
Don Eggert	Cape Fear RPO
Chris Padgett	Down East RPO

During the CTP process, members changed, but the areas represented remained static. It was imperative that each member be heavily involved in all aspects of the plan so that all member governments, citizens and interested groups were aware of the plan and had an opportunity to comment and be engaged in the development of the CTP. Meetings were scheduled during the life of the plan and held on an as needed basis to gather information, prepare maps, develop recommendations and complete various other tasks. They were held between November 2005 and June 2009.

There were subsequent local meetings that were held to discuss various issues that arose during development of the CTP. For example, representatives from the steering committee met with the military to discuss options for improvements to US 17 (additional information is located in Appendix I) and at another meeting to discuss improvements to the Surf City bridge (TIP# B-4929) over the waterway.

When information was to be taken back to municipalities and counties for their adoption the representative on the committee was charged with this task. In August 2008, the local officials were presented with Capacity/Deficiency Maps for their review and comment. During March, April, and May 2009 the DRAFT Topsail Area Comprehensive Plan was presented to the various local planning boards and municipal and county councils for their review and comment. After all comments had been received, public drop-in sessions were scheduled for the citizens in the area to review the plan and provide additional comments and information.

These public drop-in sessions were held in June 2009 in each of the four municipalities in the study area: Surf City, Topsail Beach, North Topsail Beach, and Holly Ridge. At the sessions, information was provided on the facility types included in the plan, the maps that were developed and the public was allowed opportunities to ask questions and engage the engineers and planners that helped to guide the plan development. Once all comments had been collected, the steering committee finalized the DRAFT plan and presented it to the local councils for adoption.

The plan was adopted by all local governments in August 2009 and then endorsed by both the Cape Fear Rural Planning Organization and the Down East Rural Planning Organization in September and October 2009, respectively. At the November 2009 Board of Transportation meeting, the BOT adopted the plan.

Topsail Area Transportation Survey

Introduction

A critical element of the comprehensive transportation planning process is public participation. Active public involvement will help to ensure that the comprehensive transportation plan that is developed for a particular area meets the objectives of the communities. If the plan is not related to the values held by the community, then it is unlikely that the plan will be implemented and used to its fullest potential.

A Goals and Objectives (G&O) Survey is a means of determining the values of an area. This survey attempts to identify the area's perception of transportation-related issues, and may help to pinpoint concerns that should be addressed in the comprehensive transportation plan.

The survey is also a useful tool for the local government, engineering staff, and the area as a whole. The survey results are used to guide the development of a comprehensive transportation plan that will best meet the needs and values of the area.

Survey Methodology

The goals and objectives survey form that was used was developed by Transportation Planning Branch staff in conjunction with the Topsail Area CTP Steering Committee. The Steering Committee is comprised of representatives from Onslow and Pender Counties, the Cape Fear and Down East RPOs, and the towns of Topsail Beach, North Topsail Beach, Surf City, and Holly Ridge. The survey included yes/no questions, questions that involve ranking the importance of transportation improvements and goals, and several questions requiring a short answer that dealt with specific transportation topics.

The survey was distributed in two formats as determined by the Steering Committee. It was placed on the website Survey Monkey. The survey was available on this website and a link was posted on the homepages of all the towns and counties involved. This was done to allow anyone that visited the town and county websites access to the survey. In addition, one hundred random addresses were gathered from each of the following: Pender County, Onslow County, Topsail Beach, North Topsail Beach, and Surf City. From the 500 addresses submitted, a total of 462 paper surveys were mailed out to the homeowners of the area. This was done to get a sampling of all the persons in the planning area and to engage minority populations and persons without internet access.

Of the original 462 distributed surveys, 17 were returned due to incorrect addresses, 48 surveys were completed and returned by mail to the NCDOT and the various local town halls, and 194 surveys were completed on the Survey Monkey website. The total number of surveys received was 242 (52% of total distribution).

Topsail Area* Transportation Survey

*Includes the municipalities of North Topsail Beach, Topsail Beach, Surf City, and Holly Ridge as well as surrounding areas.

The Transportation Planning Branch of the North Carolina Department of Transportation, in cooperation with Topsail Island, the Cape Fear RPO and the Down East RPO is developing a transportation plan for the area. The transportation plan is a long-range plan that identifies major transportation improvements that will be needed over the next **30 years**. This survey is a means of identifying transportation issues that are important to the citizens, officials, and businesses of the Topsail Island area. This survey can also be completed and submitted at the following website: **http://www.surveymonkey.com/topsailareasurvey**

1. How important are the following goals?
   (Please **check** the box that describes the importance of the following goals.)

GOAL:	**Very Important**	**Important**	**Not Important**
Increased Transportation Choices *Increased, safer opportunities to walk and bike to destinations such as sidewalks and bicycle lanes*			
Increased Public Transportation Options *Bus or rail service to destinations; Park-n-ride lots to facilitate carpooling, vanpooling, and transit service*			
Safer, More Efficient Travel Times *Safer traffic calming measures with more turning and deceleration lanes and fewer intersections; more connector roads; less congestion*			
Community and Rural Culture Preservation *Keeping businesses in central business areas; preservation of significant existing buildings and neighborhoods; maintaining the rural culture and landscape*			
Environmental Protection *Minimizing the impact on wetlands, streams, and wildlife areas; reducing air pollution; developing greenway and wildlife corridors*			
Economic Growth *Building or improving roads, railways, and infrastructure (including island accessibility) to attract new businesses and to allow existing businesses to expand and prosper*			
Service of Special Needs *Better transportation services for special needs, elderly, and disabled residents*			

2. Please indicate below whether you agree or disagree with the strategy of how a road's ability to carry traffic should be increased:
(Please **check** the box that describes the importance of the following strategies.)

STRATEGY:	**Agree**	**Disagree**
Building additional traffic lanes		
Controlling the frequency and locations of driveways and cross streets that access the road		
Making improvements to intersections, better traffic signal timing		

3. Are you concerned with safety or crash problems at any specific locations?

☐ Yes ☐ No

If yes, please list specific locations:

4. When traveling in your area, do you find that you often have to go out of your way to get to your destination because the most direct route is too congested?

☐ Yes ☐ No

If yes, please list specific locations:

5. Is truck traffic a problem in the area?

☐ Yes ☐ No

If yes, please list specific locations:

6. What areas or roads would you like to have improved access to?
(Please **check** all that apply)

Wilmington		South Carolina please be more specific:
Jacksonville		
Camp Lejeune		Other please list:
Hampstead		
I-40		
US 17		
NC 210		
NC 50		

7. The new transportation plan will include recommendations for new pedestrian, bicycle, and mass transit facilities as well as improvements to existing facilities. Would you use the following transportation facilities if they were built or improved?
(Please **check** the appropriate box and **write in** the locations)

	Yes	**No**
Sidewalks If yes, where?		
Off-road trails or greenways for walking and biking If yes, where?		
On-road bicycle facilities such as bike lanes and wide shoulders If yes, where?		
Bus service on the island		
Bus service to Wilmington		
Bus service to Jacksonville		
Commuter rail		
Park-n-ride lots *(parking areas at transit stations or bus stops to facilitate the use of public transportation and carpooling)* If yes, where?		

8. What are the key transportation issues in your area?

We would like to know a little about you so that we can create a group profile. Your answers will be kept strictly confidential. Please answer the following questions:

9. What is your age?

under 18	
18-24	
25-34	
35-44	
45-64	
65-74	
over 74	

10. How would you classify your race?

White	
Black	
Native American	
Hispanic	
Asian	
Other	

11. How many people live in your household including yourself?

1	
2	
3	
4	
5	
6	
7 or above	

12. What was your household income last year?

Below $30,000	
$30,000-$39,999	
$40,000-$53,799	
$53,800-$70,000	
Above $70,000	
Don't know	

13. In what community of Topsail Island do you live?
(Please **check** only **one** box. If you live in a municipality, check a municipality. If you live in an unincorporated area, please check a county.)

Municipalities		**County**	
Topsail Beach		Onslow	
North Topsail Beach		Pender	
Surf City			
Holly Ridge			
I do not live in the study area			

Thank you for completing this survey. Your input is vital in developing a plan that meets the needs of the citizens of Topsail Island. Please return this survey to the address below by **June 1, 2006**.

Mail to: or **Drop off:**

Tyler Bray
NCDOT Transportation Planning Branch
1554 Mail Service Center
Raleigh, NC 27699-1554

At any of the local municipal town halls of Holly Ridge, Topsail Beach, North Topsail Beach, and Surf City or the administrative office of Onslow and Pender counties.

Survey Results

The results of the planning area's goals in the development of a CTP are shown in Appendix H, Figure 10. The goals were ranked as very important, important, or not important. As indicated by the graph, goals with over 50% in the very important category were increased transportation choice, community and rural culture preservation, and environmental protection. The results indicate that the citizens see the importance of keeping the rural and cultural character of the area intact. They would also like to have an opportunity to use pedestrian and bicycle facilities as much as possible. This would aid the goal of having the community preserve its cultural and rural character a top priority. While the participants in the survey say they would enjoy increased opportunities to bicycle and walk, they do not see the use of public transportation as an important goal. Safer, efficient travel times are important and will assist in enhancing the economic growth of the community, another important goal in the development of the Comprehensive Transportation Plan.

The next question posed in the survey was to indicate agreement/disagreement with strategies of increasing a road's ability to carry traffic. The results are illustrated in Appendix H, Figure 11. The options were building additional travel lanes, controlling the frequency and locations of driveways and cross streets that access the road, and making improvements to intersections such as better traffic signal timing. Over 90% of the group agreed that making improvements to intersections, including better signal timing, is a positive strategy for improving the amount of traffic a road can carry. The citizens also indicated that controlling the frequency of driveways and cross streets were important with 75% in agreement. Building additional travel lanes was important as well, with just over 60% in agreement. These results show that the community supports moving traffic through the area with improvements to intersections, while minimizing additional traffic lanes.

Participants of the survey were then asked to identify if there were concerns in the areas of safety and accidents, congestion, and truck traffic. If they answered yes then they were prompted to give specific locations in the planning area where this was a problem. The specific answers and data collected are located in Table H-1 through Table H-6. 64% of the answers indicated that there were no safety concerns in the area, while 92 participants think that there are safety or accident problems. NC 50 and NC 210 on and off the island constituted for 69% of the open-ended responses. Nine people responded that the speed limits on NC 210 and NC 50 on the island were too high and provided a risk to commuters. Only 91 of the 242 survey participants felt they had to find an alternate route because the direct route was too congested. This congested route was identified as NC 50/210 corridor near the Surf City Bridge and in the heart of Surf City. Truck traffic was found to be a minor problem with only 13% in agreement. The trouble spots identified are NC 50/NC 210 on the mainland, parking on sidewalks, and along South Shore Drive.

The next survey question consisted of asking what areas or roads citizens would like improved access. The choices included are listed in Table H-7. Participants were allowed to choose more than one response and also to add any areas not listed. These additions are indicated in Table H-8. Wilmington was selected by 57% of the respondents and I-40 was chosen by 55%. NC 210 and NC 50 were second and third among routes with 36% and 27%, respectively. Hampstead was selected by 20% of the participants making it the only municipality over that threshold other than Wilmington.

The next set of questions concentrated on the areas of pedestrian, bicycle, and mass transit. Participants were asked if they would use those types of facilities if they were built or improved and where they would like to see each in the planning area. In regards to sidewalks, 71% of those surveyed indicated they would use that type of facility. The majority wanted them located in Surf City and on the entire length of Topsail Island as shown in Table H-9 and Table H-10. The respondents were then asked that if they would use off-road trails or greenways and where they would like to see them built. Of the 67% that answered "yes" three-quarters indicated they would like to see them on the entire length of Topsail Island, in Surf City, and in North Topsail Beach (see Table H-11). 62% of those surveyed said they would use on road bicycle facilities if they were provided. The majority wanted this type of improvement on all roads along the island according to Table H-12. Contrary to the bicycle and pedestrian improvements, there was not a majority of positive responses to mass transit. An average of 75% of the survey participants said they would not use bus service or commuter rail in the planning area. A yes response was given by only 22% of the community when asked if they would use park and ride lots. However, of those who responded positively, 36% would prefer a park and ride lot in the Holly Ridge area.

The final question was open-ended. Participants were asked to list the key transportation issues in the planning area. All 102 responses are listed in Table H-18. The top two issues that constituted over 50% of the responses were summer traffic congestion and the replacement of the swing bridge over the waterway in Surf City. Bicycle/pedestrian safety and lowering of speed limits were the next highest responses and accounted for over 30% of the answers.

Conclusions

Based upon the results of this survey, the citizens of the Topsail Area take an active interest in the transportation system of the planning area. By examining these results, it appears that environmental protection and preserving the community and rural culture are primary goals for the area. In addition, the community is concerned with congestion issues during the peak summer season and safety concerns throughout the area. They would like to see better signal timing on the island at intersections and lower speed limits. The community

views bicycle and pedestrian facilities as an important part of the transportation network and would like to see this type of facility used across the planning area. The citizens within the area have evaluated which areas of comprehensive transportation planning are important through this survey. In a cooperative effort between the NCDOT and local governments, the CTP will address the needs of the area and incorporate the goals and objectives from this survey.

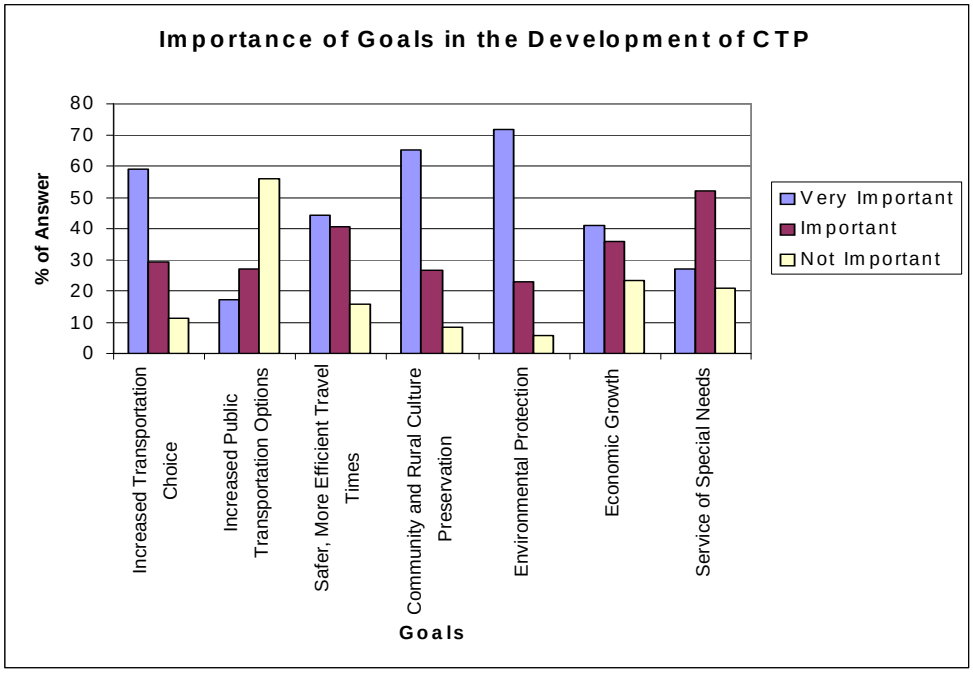


Figure 13

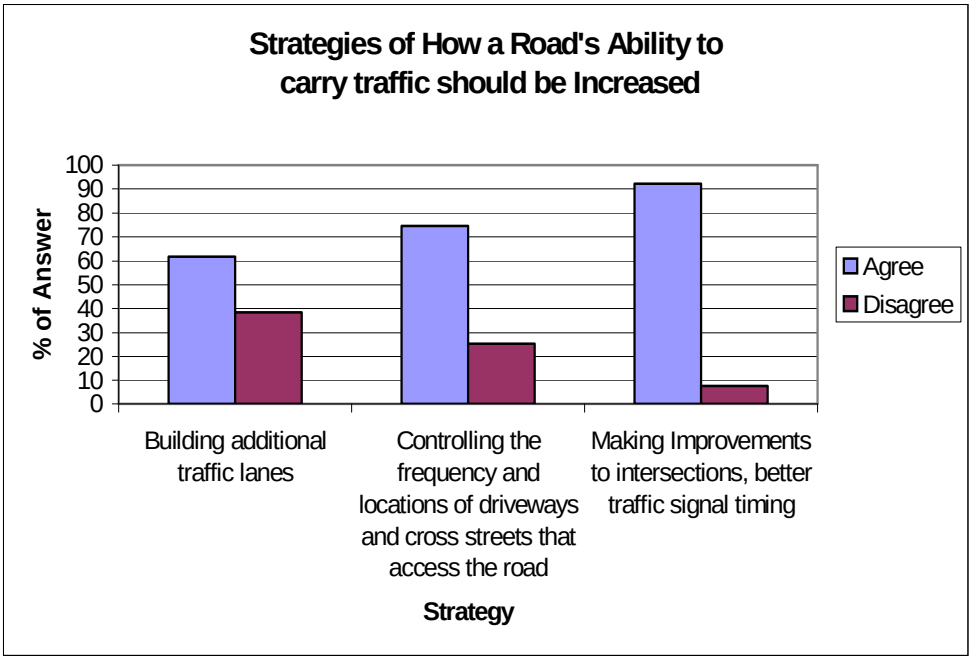


Figure 14

Are you concerned with safety or crash problems at any specific areas?

Table 6

Answer	Total Response	Percent Response
Yes	82	36.1
No	145	63.9

List the specific locations where safety or accident problems are a concern.

Table 7

ISSUE	Number of Responses	% of Total Responses
Intersection of NC 50 and NC 210 (mainland)	35	38.0
Intersection of NC 50 and NC 210 (on the island)	25	27.2
Entire route of NC 50 and NC 210 on the island (too fast)	9	9.8
Atkinson Point Road and NC 210/NC 50	6	6.5
New River Inlet Road (SR 1568) and NC 210	3	3.3
NC 210 and US 17 (south)	3	3.3
US 17 and Sloop Point Road	1	1.1
US 17 and Long Leaf Drive	1	1.1
US 17 and NC 172	1	1.1
Peru Road and Old Folkstone Road	1	1.1
US 17 and NC 50	1	1.1
Davis Ave. and S. Anderson Blvd.	1	1.1
NC 50 and Little Kinston Road	1	1.1
NC 210 near Dixon Elementary School	1	1.1
NC 172 (left turns in Snead Ferry)	1	1.1
Cedar Ave between NC 210/NC 50/US 17	1	1.1
NC 210 and SR 1185 and SR 1215 (Frazier Curve)	1	1.1
Total Responses	92	100

When traveling in your area, do you find that you often have to go out of your way to get to your destination because the most direct route is too congested?

Table 8

Answer	Total Response	Percent Response
Yes	91	39.2
No	141	60.8

List the specific locations where you must go out of your way to get to your destination because the most direct route is too congested.

Table 9

ISSUE	Number of Responses	% of Total Responses
NC 50/NC 210 and Atkinson Point Road (bridge)	33	62.3
NC 210 and NC 50 (on Topsail Island)	20	37.7
Total Responses	53	100

Is truck traffic a problem in your area?

Table 10

Answer	Total Response	Percent Response
Yes	29	12.6
No	202	87.4

List the specific locations in which truck traffic is a problem.

Table 11

ISSUE	Number of Responses	% of Total Responses
NC 50/NC 210 (mainland)	3	30.0
Parking on Sidewalks	2	20.0
S. Shore Drive	2	20.0
Sloop Point Road	1	10.0
Pine Needle Way	1	10.0
US 17	1	10.0
Total Responses	10	100

What areas or roads would you like improved access to? (Please check all that apply)

Table 12

Answer	Total Response	Percent Response
Wilmington	120	57.1
Jacksonville	35	16.7
Camp Lejeune	9	4.3
Hampstead	43	20.5
I-40	115	54.8
US 17	61	29
NC 210	76	36.2
NC 50	56	26.7
South Carolina	6	2.9

Other areas or roads that you would like access.

Table 13

ISSUE	Number of Responses	% of Total Responses
Southern access to Topsail Island	3	21.4
Brunswick County, NC	2	14.3
New Bern, NC	2	14.3
I-95	2	14.3
Myrtle Beach, SC	2	14.3
Greenville, NC	1	7.1
Charlestown, SC	1	7.1
Castle Hayne, NC	1	7.1
Total Responses	14	100

The new transportation plan will include recommendations for new pedestrian, bicycle, and mass transit facilities as well as improvements to existing facilities. Would you use the following transportation facilities if they were built or improved?

Sidewalks

Table 14

Answer	Total Response	Percent Response
Yes	163	71.2
No	66	28.8

Where would you like to see sidewalks?

Table 15

ISSUE	Number of Responses	% of Total Responses
Surf City	34	31.8
Total Length of Topsail Island	30	28.0
NC 210 (mainland)	12	11.2
Topsail Beach	8	7.5
NC 50 (mainland)	7	6.5
North Topsail Beach	7	6.5
S. Shore Drive	4	3.7
Island Drive	3	2.8
New River Inlet Road	2	1.9
Total Responses	107	100

Off-road trails or greenways

Table 16

Answer	Total Response	Percent Response
Yes	152	66.7
No	76	33.3

Where would you like to see additional off-road trails or greenways for walking and biking?

Table 17

ISSUE	Number of Responses	% of Total Responses
Total Length of Topsail Island	23	37.1
Surf City	15	24.2
North Topsail Beach	10	16.1
Mainland	8	12.9
Holly Ridge	3	4.8
Off island parks	1	1.6
Holly Shelter	1	1.6
Power line Right of Ways	1	1.6
Total Responses	62	100

On-road bicycle facilities

Table 18

Answer	Total Response	Percent Response
Yes	134	61.5
No	84	38.5

Where would you like to see additional on-road bicycle facilities such as bike lanes and wide shoulders?

Table 19

ISSUE	Number of Responses	% of Total Responses
All Facilities on Topsail Island	26	29.5
All major roads	22	25.0
Surf City	18	20.5
All Facilities on the mainland within the planning area	8	9.1
Topsail Beach	7	8.0
North Topsail Beach	6	6.8
Sloop Point Road	1	1.1
Total Responses	88	100

Bus Service and Commuter Rail

Table 20

	Total Response	Percent Response
Bus Service on the island		
Yes	54	24.4
No	167	75.6
Bus Service to Wilmington		
Yes	65	29.4
No	156	70.6
Bus Service to Jacksonville		
Yes	45	20.8
No	171	79.2
Commuter Rail		
Yes	52	24.3
No	162	75.7

Park and Ride Lots

Table 21

Answer	Total Response	Percent Response
Yes	49	22.3
No	171	77.7

Where would you like to see park-and-ride lots in the area?

Table 22

ISSUE	Number of Responses	% of Total Responses
Holly Ridge	8	36.4
US 17 and NC 210 intersection (south)	5	22.7
Food Lion (Surf City)	4	18.2
US 17 and NC 210 intersection (north)	1	4.5
Topsail Island Police Department	1	4.5
Pier Area	1	4.5
South Topsail Island	1	4.5
North Topsail Beach	1	4.5
Total Responses	22	100

What are the key transportation issues in the area?

Table 23

ISSUE	Number of Responses	% of Total Responses
Summer Traffic Congestion	34	33.3
Replacement of Swing bridge in Surf City to a High Rise Bridge	22	21.6
Bicycle and Pedestrian Safety	18	17.6
Lower Speed Limits	13	12.7
Public Transportation During the summer	5	4.9
Lack of parking on the island	3	2.9
More traffic lights	3	2.9
Main island road is too narrow	2	2.0
Large Developments in Surf City	1	1.0
Too many trucks	1	1.0
Total Responses	102	100

Appendix I

US 17 Scenario and Alternatives Analysis

According to the Strategic Highway Corridor Initiative, US 17 through North Carolina has a long term vision of a freeway facility. Currently, US 17 through the Topsail Area CTP is a combination of boulevard and expressway facilities. Due to the SHC and capacity issues previously identified US 17 was recommended to be a freeway through the study area.

Improving the existing facility to a freeway cross-section can be accomplished on the southwestern portion of US 17 near the NC 210 intersection and the northern part of the facility near NC 172 with minimal impact. However, attempting to improve the existing facility through the town limits of Holly Ridge would do detrimental damage to the town. The steering committee analyzed nine options including east and west of the existing facility and improving existing with maps and impacts provided in this appendix.

The steering committee identified that the most beneficial option for US 17 improvements for locals as well as through traffic would be to look at providing a new location US 17 in the project area. There are major concerns when looking at new roads in this area of the state. Environmental concerns limit the areas in which impacts would be limited. Additionally, west of the existing facility are two federal lands, the Holly Shelter Game Land and Camp Lejeune Military Base.

After reviewing the five alternatives with the steering committee and discussing the alternatives with military representatives, a small adjustment was made to the DOT preferred alternative to avoid a landing strip that is to be used in future training. Provided in this appendix are maps and impact reports during the process of selecting a recommendation for US 17. The final selection of the corridor is shown in the adopted Highway CTP Map in Chapter 1.

SUMMARY OF ENVIRONMENTAL IMPACTS

IMPACT TABLE FOR US 17 ALTERNATIVES									
OCCURANCES PER ALTERNATIVE									
	ALT 1A	ALT 1B	ALT 2A	ALT 2B	ALT 3C	ALT 3D	ALT 4C	ALT 4D	ALT 5
PROJECT FACTORS									
Mainline New Location Length - miles[1]									
Number of new interchanges	-	-	-	-	-	-	-	-	-
Number of grade separations (roadway)	-	-	-	-	-	-	-	-	-
Railroad Crossings At-grade									
Railroad Crossings Grade Separated									
SOCIOECONOMIC FACTORS									
Houses Impacted	-	-	-	-	14	1	63	62	51
Businesses Impacted	-	-	1	-	-	-	2	2	24
Employees Impacted	-	-	-	-	-	-	-	-	-
Schools Impacted	-	-	-	-	-	-	-	-	-
Parks Impacted	-	-	-	-	-	-	-	-	-
Churches	-	-	-	-	-	1	1	1	-
ENVIRONMENTAL FACTORS									
Conservation Tax Credit Property	-	-	-	-	-	-	-	-	-
Federal Land Ownership	7,420,416 sq. ft.	6,057,792 sq. ft.	-	-	-	-	-	-	3,587,399 sq. ft.
Fish Nursery Area	-	-	-	-	791,280 sq. ft.	-	-	970,584 sq. ft.	-
Gamelands	865,164 sq. ft.	-	-	-	-	-	-	-	-
Groundwater Incidents	-	-	-	-	-	-	-	-	5
High Quality Outstanding Water Resources	-	-	-	-	5,735,232 sq. ft.	-	-	4,451,850 sq. ft.	915,600 sq. ft.
Lands Managed Conseravtion Open Space	869,799 sq. ft.	-	-	-	-	-	-	-	-
Recreation Projects Land Water Conservation Fund	-	-	-	-	-	-	-	-	-
Sanitary Sewer Discharges	-	-	-	-	-	-	-	-	-
Solid Waste Facilities	-	-	-	-	-	-	-	-	-
Water Storage Tanks	-	-	-	-	-	-	-	-	-
Water Treatment Plants	-	-	-	-	-	-	-	-	-
Wells Groundwater Intakes	-	-	-	-	-	-	-	-	-
RESTRICTED FACTORS									
Historic National Register Structures	-	-	-	-	-	-	-	-	-
Historic Study List Structures	-	-	-	-	-	-	-	-	-
Managed Area	8,273,568 sq. ft.	6,039,267 sq. ft.	-	-	-	-	-	-	106,345 sq. ft.
Natural Heritage Element Occurrence	1	-	-	-	-	-	-	-	1
Significant Natural Heritage Areas	865,875 sq. ft.	-	-	-	-	-	-	-	-

Notes: Unless otherwise noted, estimates of impacts based on 300 foot corridor (estimated right of way limits)

[1] Lengths are approximate. Mainline lengths include all new location corridors in the alternative

[2] Rebuilt interchanges are those that would need to be reconstructed to accommodate a new or additional traffic

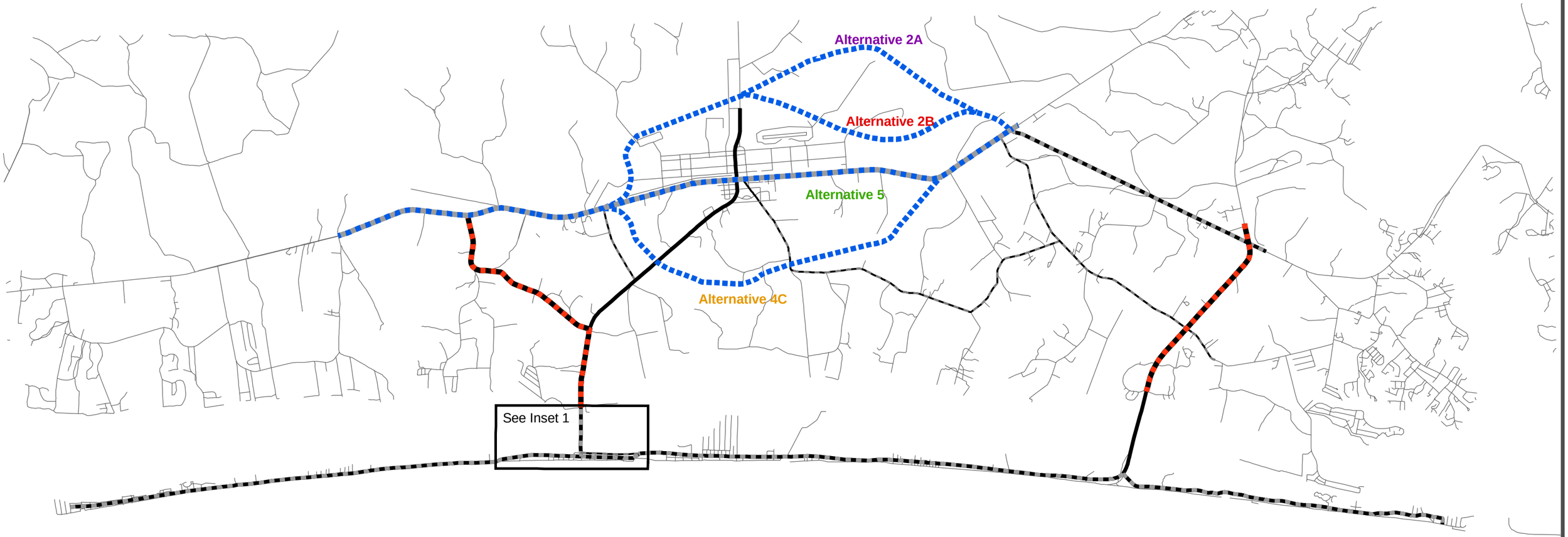
[3] Includes ponds and lakes, includes entire pond acreage if pond is anticipated to be drained

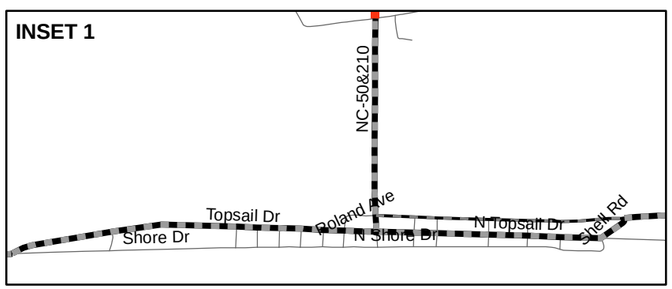
[4] Impacts include superfund points and sites, groundwater incidents, and hazardous waste facilities

Those in yellow have been eliminated per comments from the 8/26/08 CTP Team Meeting and require no further study.

Disclaimer: Only one alternative for US17 Freeway Improvements will be selected and overpasses and interchanges will be added in at that time.

Working Map





Plan date: 10/15/08

Sheet 2 of 5

Base map date: September 2008

0 0.3 0.6 1.2 1.8 Miles

Refer to CTP document for more details

Freeways
- Existing
- Needs Improvement
- Recommended

Expressways
- Existing
- Needs Improvement
- Recommended

Boulevards
- Existing
- Needs Improvement
- Recommended

Other Major Thoroughfares
- Existing
- Needs Improvement
- Recommended

Minor Thoroughfares
- Existing
- Needs Improvement
- Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation

Highway Map

Topsail Area
North Carolina

Comprehensive Transportation Plan

IMPACT TABLE FOR US 17 ALTERNATIVES (Updated 9/17/08)				
OCCURANCES PER ALTERNATIVE				
	ALT 2A	ALT 2B	ALT 4C	ALT 5[6]
PROJECT FACTORS				
Mainline New Location Length - miles[1]	7.60	7.37	6.11	0.00
Existing US 17 Improvement	0.00	0.00	1.26	6.43
Total Project Length	**7.60**	**7.37**	**7.37**	**6.43**
Number of new interchanges	3	3	3	2
Number of grade separations (roadway)	0	0	1	0
Railroad Crossings At-grade	0	0	0	0
Railroad Crossings Grade Separated	0	0	0	0
SOCIOECONOMIC FACTORS				
Houses Impacted	31	31	70	51
Businesses Impacted	3	3	5	24
Employees Impacted				
Schools Impacted	0	0	0	0
Parks Impacted	0	0	0	0
Churches	0	0	0	3
ENVIRONMENTAL FACTORS				
Conservation Tax Credit Property[5]	0	0	0	0
Federal Land Ownership[5]	165	157	0	0
Fish Nursery Area[5]	0	0	25	0
Gamelands[5]	0	0	0	0
Groundwater Incidents	0	0	0	4
High Quality Outstanding Water Resources[5]	0	0	104	19
Lands Managed Conseravtion Open Space[5]	0	0	0	0
Recreation Projects Land Water Conservation Fund[5]	0	0	0	0
Sanitary Sewer Discharges	0	0	0	0
Solid Waste Facilities	0	0	0	0
Water Storage Tanks	0	0	0	0
Water Treatment Plants	0	0	0	0
Wells Groundwater Intakes	0	0	0	0
RESTRICTED FACTORS				
Historic National Register Structures	0	0	0	0
Historic Study List Structures	0	0	0	0
Managed Area	165	157	0	0
Natural Heritage Element Occurrence	1	0	2	4
Significant Natural Heritage Areas	0	0	0	0

Notes: Unless otherwise noted, estimates of impacts based on 300 foot corridor (estimated right of way limits)

[1] Lengths are approximate. Mainline lengths include all new location corridors in the alternative

[2] Rebuilt interchanges are those that would need to be reconstructed to accommodate a new or additional traffic

[3] Includes ponds and lakes, includes entire pond acreage if pond is anticipated to be drained

[4] Impacts include superfund points and sites, groundwater incidents, and hazardous waste facilities

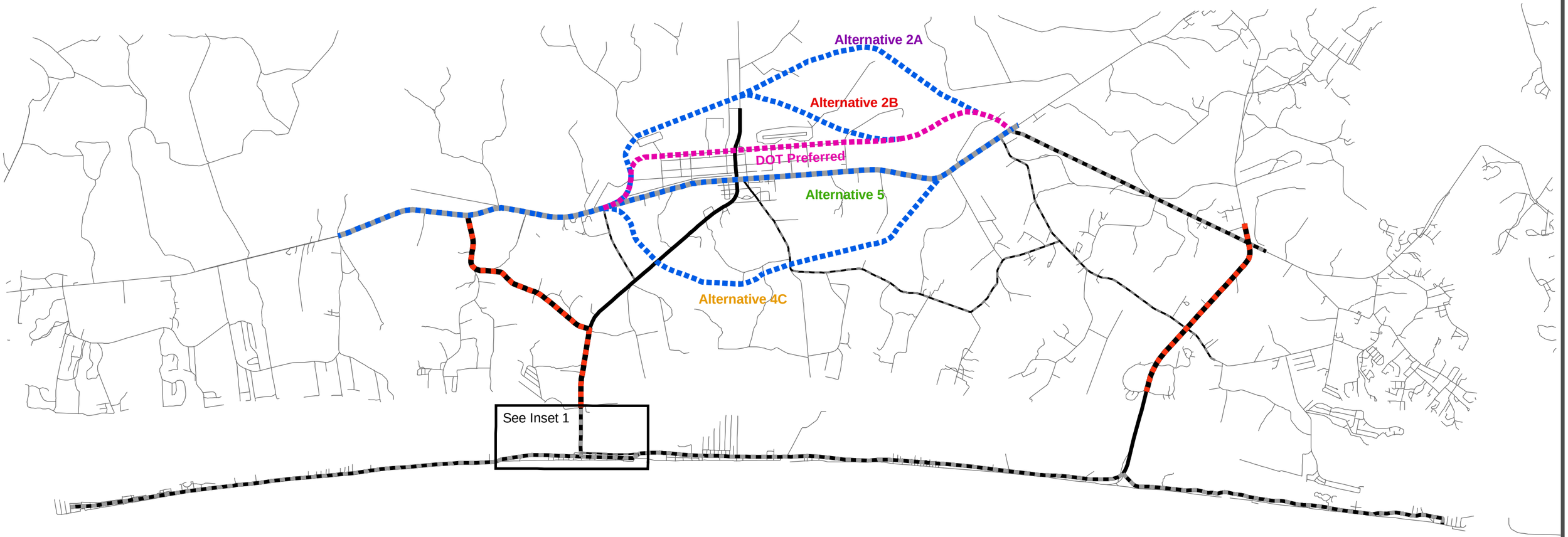
[5] Area Impacts are given in acres

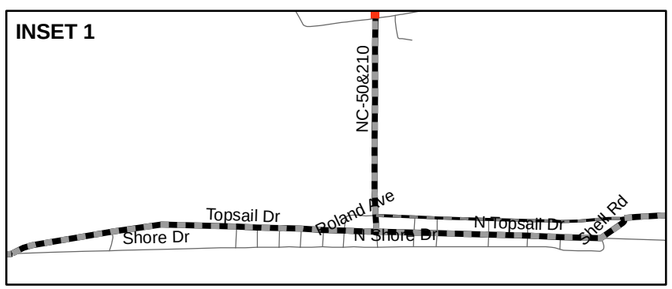
[6] This is from Shephards Road to NC172

Those in yellow have been eliminated per comments from the 8/26/08 CTP Team Meeting and require no further study.

Disclaimer: Only one alternative for US17 Freeway Improvements will be selected and overpasses and interchanges will be added in at that time.

Working Map





Plan date: 10/15/08

Sheet 2 of 5

Base map date: September 2008

0 0.35 0.7 1.4 2.1 Miles

Refer to CTP document for more details

Freeways
- Existing
- Needs Improvement
- Recommended

Expressways
- Existing
- Needs Improvement
- Recommended

Boulevards
- Existing
- Needs Improvement
- Recommended

Other Major Thoroughfares
- Existing
- Needs Improvement
- Recommended

Minor Thoroughfares
- Existing
- Needs Improvement
- Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation

Highway Map

Topsail Area

North Carolina

Comprehensive Transportation Plan

IMPACT TABLE FOR US 17 ALTERNATIVES (Updated 1/26/09)						
OCCURANCES PER ALTERNATIVE						
	ALT 2A	ALT 2B	ALT 4C		ALT 5[6]	DOT Preferred Alternative
PROJECT FACTORS			New Location	Existing		
Mainline New Location Length - miles[1]	7.60	7.37	6.11	1.26	6.43	6.82
Number of new interchanges	3	3	3	0	2	2
Number of grade separations (roadway)	0	0	1	0	0	1
Railroad Crossings At-grade	0	0	0	0	0	0
Railroad Crossings Grade Separated	0	0	0	0	0	0
SOCIOECONOMIC FACTORS						
Houses Impacted	31	31	52	18	51	31
Businesses Impacted	3	3	3	2	24	3
Employees Impacted						
Schools Impacted	0	0	0	0	0	0
Parks Impacted	0	0	0	0	0	0
Churches	0	0	0	0	3	0
ENVIRONMENTAL FACTORS						
Conservation Tax Credit Property[5]	0	0	0	0	0	0
Federal Land Ownership[5]	165	157	0	0	0	158
Fish Nursery Area[5]	0	0	25	0	0	0
Gamelands[5]	0	0	0	0	0	0
Groundwater Incidents	0	0	0	0	4	0
High Quality Outstanding Water Resources[5]	0	0	104	0	19	0
Lands Managed Conseravtion Open Space[5]	0	0	0	0	0	0
Recreation Projects Land Water Conservation Fund[5]	0	0	0	0	0	0
Sanitary Sewer Discharges	0	0	0	0	0	0
Solid Waste Facilities	0	0	0	0	0	0
Water Storage Tanks	0	0	0	0	0	0
Water Treatment Plants	0	0	0	0	0	0
Wells Groundwater Intakes	0	0	0	0	0	0
RESTRICTED FACTORS						
Historic National Register Structures	0	0	0	0	0	0
Historic Study List Structures	0	0	0	0	0	0
Managed Area	165	157	0	0	0	167
Natural Heritage Element Occurrence	1	0	0	2	4	0
Significant Natural Heritage Areas	0	0	0	0	0	0

Notes: Unless otherwise noted, estimates of impacts based on 300 foot corridor (estimated right of way limits)

[1] Lengths are approximate. Mainline lengths include all new location corridors in the alternative

[2] Rebuilt interchanges are those that would need to be reconstructed to accommodate a new or additional traffic

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[5] Area Impacts are given in acres

[6] This is from Shephards Road to NC172

Those in yellow have been eliminated per comments from the 8/26/08 CTP Team Meeting and require no further study.

Appendix J
Hand Allocated – Travel Demand Model

This appendix includes documentation of the hand-allocation travel demand model that was created for the 2009 Topsail Area CTP. The *Hand Allocation Method* (also known as Travel Allocation Method, or Manual Allocation Model) is usually prepared in small urban areas generally under 5,000 in population. Also, this methodology is best for an area where growth is anticipated with new facilities.

Travel Demand Models (TDM) utilize data from many sources such as the US Census Bureau, NCDOT, and local governments to create a tool that predicts travel demand in present and future years. Areas of homogeneous land-use (i.e. an industrial park, central commercial district, or a large residential subdivision) are grouped into Transportation Analysis Zones (TAZ). TDMs estimate trips (traffic) produced and attracted by these TAZs and assigns them to a roadway network. Given a defined Planning Area Boundary (PAB), TAZs help predict traffic in a given study area. In addition to TAZs, external stations (which behave like TAZs outside of the planning area) allow the TDM to account for traffic coming, going, or passing through the study area. Figure 15 on the following page shows the TAZs and external station locations that were used for the 2009 Topsail Area CTP.

Table 24 shows basic parameters used in the base year of the TDM (2005) and the future year (2030). This data was approved by the Topsail Area CTP Steering Committee on June 24th, 2008.

Table 24 – Model Parameters

Parameter	2005	2030
Planning Area Population	6,000	11,250
Persons per Dwelling Unit	0.59	0.75
Trip Rate – (Trips / Day / Household)	2	2
Percent Commercial Vehicles	12.5%	12.5%
Percent Internal-Internal Trips	40%	50%
Percent Non-Home Based Trips	10%	20%

Field surveys were conducted by TPB staff to gather housing and employment data and land use information was supplied by local governments. These data were organized by TAZ. A growth rate of 1.8%, developed by the Topsail Area CTP Steering Committee, was used to estimate future growth in housing and employment. This resulted in an estimated increase of 5883 houses and 1264 jobs in a period from 2005 to 2030. The committee then allocated the future houses and jobs to the TAZs in the

study area. Table 25 shows the estimated house and job data in the study area for 2005 and 2030.

Table 25 – TAZ Data

Zone #	2005 # of Houses	2005 # of Jobs	2030 # of Houses	2030 # of Jobs
1	990	652	1100	792
2	774	234	1100	442
3	2185	209	2500	242
4	704	76	1400	362
5	434	73	1700	142
6	198	39	800	70
7	602	363	900	524
8	554	23	1300	40
9	608	408	1244	624
10	1657	43	2000	70
11	1455	94	2000	170

Average Annual Daily Traffic (AADT) collected by the NCDOT – Traffic Survey's Unit were used to determine the external station traffic volumes. Based on historic growth, land use plans, and planned and future development in the study area, the Steering Committee developed and applied a growth rate to forecast future travel demand at these external stations for the year 2030. Table 26 shows the data related to the survey of the external stations.

Table 26 – External Station Data

External Station	Route	2005 AADT (vpd)	Growth Rate (%)	2030 AADT (vpd)	Through Trips (%)
1	US 17	19,000	3.0	39,800	42.8
2	NC 50	1,600	2.0	2,600	10.0
3	US 17	8,100	3.0	17,000	68.1
4	NC 210	11,000	3.0	23,000	73.8
5	NC 172	16,000	3.0	33,500	65.1
6	Old Folkstone Road (SR 1518)	3,500	2.0	5,700	13.2

For any additional information regarding the TDM developed for the 2009 Topsail Area CTP, please contact the NCDOT – TPB at (919) 733-4705 or http://www.ncdot.gov/doh/preconstruct/tpb/.

PENDER COUNTY

ONSLOW COUNTY

1600
2600

8100
17000

11000
23000

16000
33500

3500
5700

19000
39800

17

210

172

50

7

5

4

6

2

8

9

3

1

10

11

TAZ and External Stations Map

0 0.5 1 2 3 Miles

LEGEND

TAZ Boundary

(Vehicles per day)
(Vehicles per day)
Base Year AADT - 2005 at External Station
Future Year AADT - 2030 at External Station

Roads

County Boundary

Transportation Analysis Zone (TAZ)

AREA OF

TOPSAIL ISLAND

PENDER AND ONSLOW COUNTIES
NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING BRANCH

IN COOPERATION WITH THE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

BASE MAP DATE: DECEMBER 1, 2005

Figure 15