

Executive Summary

HORRY COUNTY
NORTH MYRTLE BEACH
NORTHEAST AREA
TRANSPORTATION PLAN

The challenges facing the transportation system in North Myrtle Beach and eastern Horry County are the collective result of sustained growth, continued reliance on the automobile for even short trips, and competing agendas for scarce transportation funds. As the recent high rate of growth quickens and more commuters rely on single-occupancy vehicles, the few projects with committed funding will do little to address deficiencies in the transportation network.

The *Northeast Area Transportation Plan* provides a multimodal approach to the congestion and safety problems that plague the transportation system, now and in the future. The planning process was guided by the efforts of an Advisory Committee and included a series of public workshops, stakeholder interviews, and a public survey. Public outreach combined with an analysis of existing conditions formed the baseline from which recommendations were developed. Recommendations include corridor, spot, collector street, bicycle and pedestrian, and transit solutions that collectively will ensure the future transportation network operates safely and efficiently.

As we evaluate the transportation network over the next 20 years, it is evident that increasing demands will be placed on the existing road network. With limitations to new construction including natural and man-made barriers, it will become even more important to protect the integrity of the existing system. The list of proposed improvements includes projects that emerged during discussions with area stakeholders, local officials, the Transportation Plan Advisory Group (TPAG), and the general public.

Corridor Recommendations

Corridor recommendations are based on information from a variety of channels, including modeling scenarios, corridor operations, traffic safety, and field data. These improvements include widening existing roadways, paving and widening dirt roads, improving two-lane roadways, and constructing roadways on new alignments. Overall, 34.74 miles of roadway is recommended for improvement. The recommendations include:

- Widen approximately 17 miles of 2-lane roadways to a 4-lane divided cross-section in order to increase the capacity of the overall roadway system and alleviate congestion
- Widen and pave Water Tower Road and Long Bay Road (approximately 9.5 miles). Long-term both roadways will be 4-lane divided, though Long Bay Road will initially be constructed as a 2-lane divided roadway on 4-lane divided right-of-way.
- Improve Mount Zion Road, SC 9, and Sea Mountain Highway by modifying the existing roadway with turn-lane pockets, medians, and/or bike lanes to control access, increase safety, and improve mobility without widening.
- Construct the Intracoastal Parkway as a 4-lane divided roadway to connect new development south of SC 31 and provide east-west mobility.

In addition to these corridor recommendations, potential solutions that ease congestion, increase safety, and reflect the vision and goals identified by the community are identified for strategic corridors in the study area. These strategic corridors include SC 90 from SC 22 to SC 57, SC 90 from Main Street Connector to US 17, and SC 9 from SC 57 to US 17.

The cross-sections recommended for all corridors in this document are consistent with the "Complete Street Concept". A complete street is a community oriented street that safely and conveniently accommodates all modes of travel. This concept is explained in **Chapter 3** and corresponding complete street cross-sections are recommended for roadways in **Chapter 4**.

Spot Recommendations

Spot recommendations target critical congestion choke points and safety hazards in the study area and include intersection redesigns, interchange reconfiguration, and countermeasures.

Two intersections were identified for redesign. SC 90 and SC 57 currently intersect at a skewed angle and have conflicting free-flow turns. The redesigned intersection will include a more 90 degree approach by SC 57, the removal of the free flow right turn from SC 57, and signalization. The second intersection redesigned occurs where Little River Neck Road, Hill Street, 27th Avenue North, and Seaside Drive intersect at multiple angles. This second intersection is recommended to be redesigned as a five-leg roundabout.

The public identified the interchanges of SC 9 at US 17 and Sea Mountain Highway at US 17 as confusing and dangerous. Reconfiguration of SC 9 at US 17 will include the addition of two movements through the construction of new ramps. At the interchange of Sea Mountain Highway and US 17, the dangerous and confusing weave section was eliminated by realigning minor movements to Sea Mountain Highway.

Six priority crash locations were identified based on an analysis of traffic safety and crash history. These intersections included: SC 31 at SC 9, SC 90 at Sea Mountain Highway, SC 90 at Bombing Range Road, SC 90 at St. Josephs Road, SC 9 at Sea Mountain Highway, and SC 90 at Mt. Zion Highway. Field investigations at each intersection site were also performed. **Chapter 4** includes potential countermeasures for each location.

Collector Street Recommendations

Increasing the number of collector streets will enhance travel between local streets and arterials. The recommended collector street network (shown in the Official Thoroughfare Plan) includes 21 miles of collector streets on new location and 25 miles of existing roadways upgraded to collector street standards. These streets are expected to be constructed by developers during the land development process and should reduce reliance on the area's network of arterials.

Bicycle and Pedestrian Recommendations

Bicycle and pedestrian recommendations aims to fill gaps in the network, improve unsafe conditions, and provide new opportunities for recreational and utilitarian travel. The corridor, spot, and collector street recommendations include provisions for bicyclists and pedestrians. These improvements are supplemented by a series of bicycle routes that build upon the proposed East Coast Greenway.

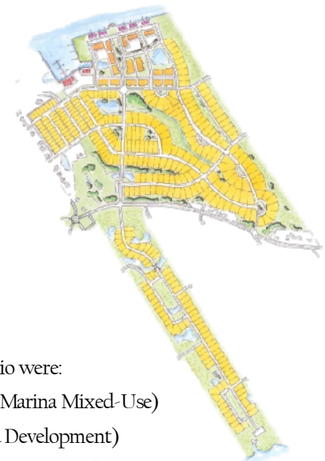
Transit Recommendations

While some transit riders choose to leave their vehicles at home to board buses, others use transit because they lack access to a personal automobile. The transit recommendations of the *Northeast Area Transportation Plan* intend to meet the demand of both choice and captive riders. Recommendations include a coordinated system of shuttle circulator routes that connect existing and emerging activity centers.

Land Use Considerations

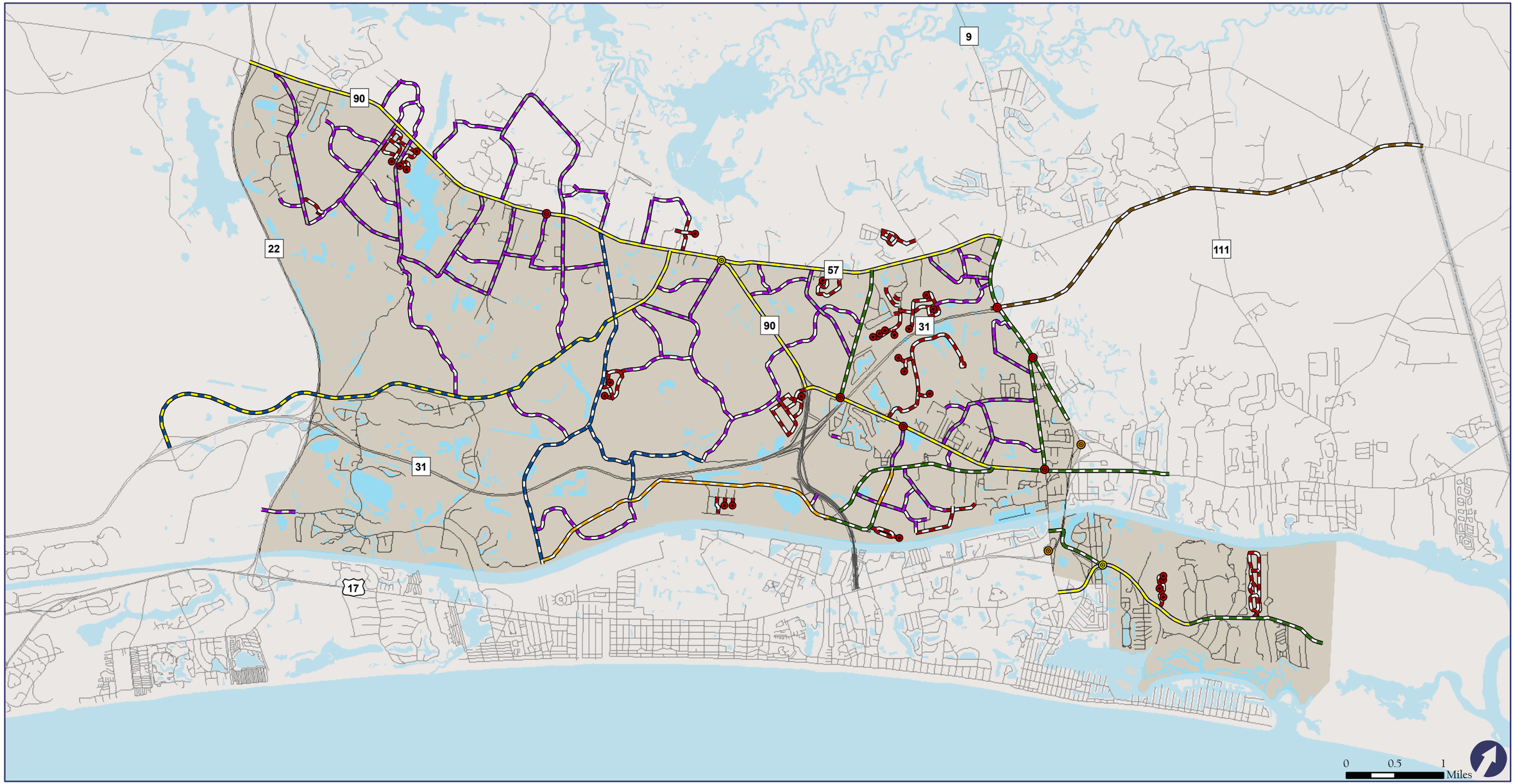
Land use and urban form considerations focus on the inherent relationship between land use (demand), urban form (design), and transportation (supply) in order to improve the efficiency of the regional transportation system while promoting livability. These relationships were analyzed in detail for three focus areas according to a four-step planning process: inventory of existing conditions, evaluation of existing development controls, formulation of development scenarios, and identification of development scenario trade-offs. This four-step process allowed the planning staff to examine the causational relationships between land use, urban form and travel behavior in each focus area.

Two development scenarios were prepared for each focus area. The first development scenario represented continuation of existing plans, programs, and policies administered by the local government under the current zoning designation (i.e., business-as-usual). The second development scenario represented a shift in planning philosophy toward planning initiatives that better link land use, urban form, and transportation planning — conservation community, Traditional Neighborhood Development, or marina mixed-use. The trade-offs of both scenarios were compared for each focus area. Recommendations and best development practices then can be applied to other areas within North Myrtle Beach and Horry County.



The three focus areas and their respective enhanced scenario were:

- Little River Neck Road (Conservation Development/Marina Mixed-Use)
- Intracoastal Residential (Traditional Neighborhood Development)
- Main Street Connector (Mixed Use/Traditional Neighborhood Development)



Transportation Recommendations for Improvement

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

Study Area Boundary
Bodies of Water
State Line
Local

Corridor Improvements
- Pave and Widen Existing Dirt Road
- Upgrade Existing Alignment (Turn Lanes, Ped/Bike, median, etc.)
- Widen Existing Alignment
- Pave Existing Dirt Road
- Proposed New Location
- Proposed Location
- Upgrade Existing Cross Section

Spot Recommendations
- Intersection
- Interchange
- Safety

Proposed Development Street Network
- Streets
- Cul de sac

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Final Report

Horry County ▫ North Myrtle Beach

Northeast Area Transportation Plan

January 2009

Horry County ▫ North Myrtle Beach

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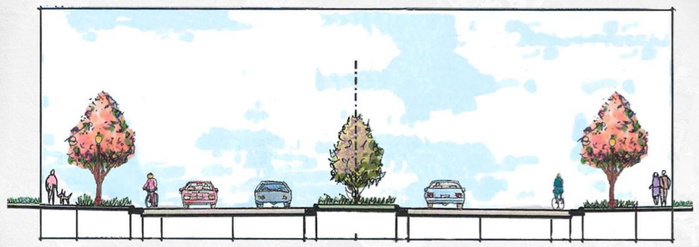

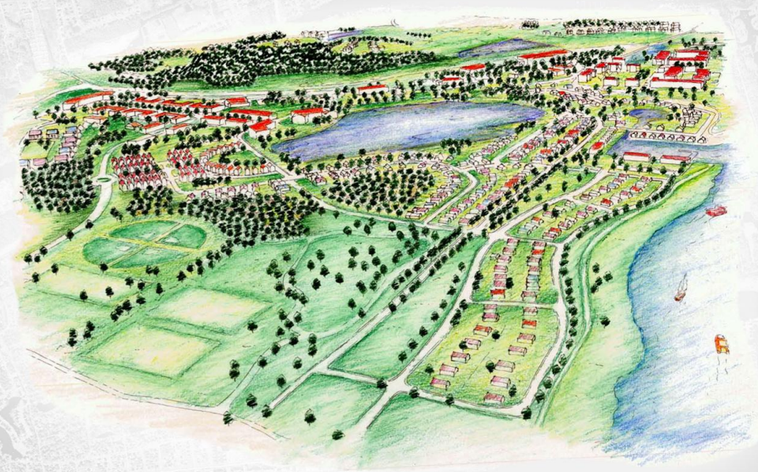

Choices.

Mobility.

Community.

Acknowledgements

The development of the *North Myrtle Beach Transportation Plan* represented a collaborative effort between local residents, numerous stakeholders, the Advisory Committee, Horry County, North Myrtle Beach, and the South Carolina Department of Transportation.

Advisory Committee

Jennifer Kiper – North Myrtle Beach
Dan Hatley – North Myrtle Beach
Jim Wood – North Myrtle Beach
Kevin Blayton – North Myrtle Beach
David Schwerd – Horry County
Andrew Markunas – Horry County
Mark Hoeweler – Waccamaw Regional COG
Chris Clark – Waccamaw Regional COG
Micheal Bethea – SCDOT
Myers Rollins – Coast RTA
George Osborne – Coast RTA
Marc Jordan – Chamber of Commerce
Walt Muller – Tidewater Homeowner
Dave Williams – Tidewater Homeowner
Bill McCriskin – Barefoot Homeowner
Pat Leibedz – Horry County Resident

Kimley-Horn and Associates, Inc.

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A special thanks to the local community for providing the foundation for this plan

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Chapter 1 — Project Background

Since the Winyah and Waccamaw Indians farmed and hunted the area they called "Chicora," meaning "the land," the unique character, cherished way of life, and economic success of today's northern Horry County has relied upon the versatility and adaptability of the region's transportation system. With major transportation and land development projects in the pipeline, the City of North Myrtle Beach and Horry County have come together to take progressive action in planning for their future

To establish and implement the desired vision of the North Myrtle Beach area of Horry County, we must understand a series of fundamental relationships — how previous decisions frame current issues, how land use interacts with transportation, and how a collective vision becomes a real, desirable future. The *Northeast Area Transportation Plan* recognizes the need to embrace the region's heritage as we plan for the future. The plan is the result of a multi-level partnership that brought local and state policy-makers to the table with residents, business owners, and stakeholders.

Our Heritage

Most local residents agree that the rich heritage of the North Myrtle Beach area has been shaped by its natural beauty, abundant resources, and friendly people. These attributes keep tourists returning year-after-year, generation-after-generation. However, few would argue that transportation also has played—and continues to play—an important role in the struggles and successes of the region.

The earliest inhabitants were Native Americans who relied on the area's network of rivers, streams, and wetlands for travel. They ultimately were joined by European settlers, who established lumber, naval stores, and tobacco farming as the predominant industries of the 18th and 19th centuries. A limiting factor in the region's agricultural expansion was the lack of viable transportation to move products inland. In fact, the rivers and swamps isolated locals to the point they referred to themselves as the "Independent Republic of Horry".

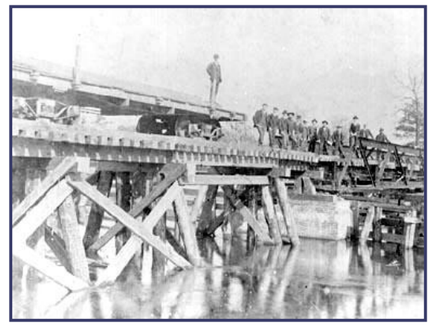
Logging, 1900

Compared to Charleston and the larger cities inland, growth in the North Myrtle Beach area was slow due to the challenges to access throughout the region. This began to change in 1900 when Burroughs & Chapin created the first railroad, the Conway & Seashore Railroad, to transport harvested timber from the coast inland. Employees of the lumber and railroad company would board flatcars and travel to the beach, essentially becoming the Grand Strands first tourists.

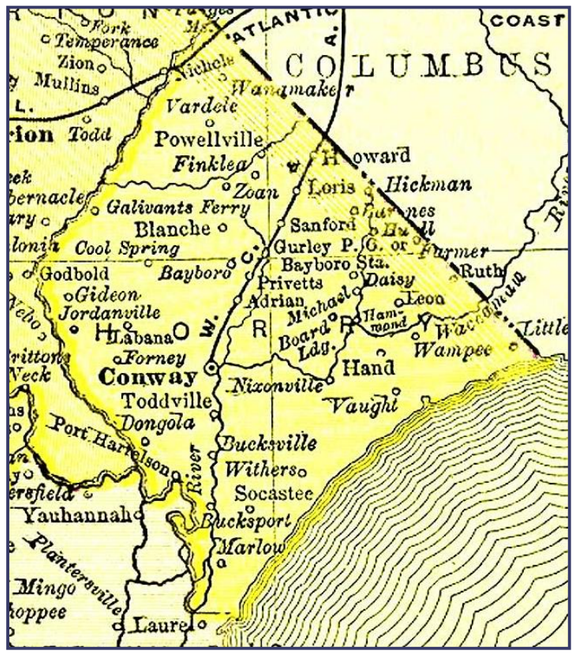
Tourism swelled as the region's network of streets and highways expanded. Many of the major highways that traverse the region began as farm-to-market roads and were improved to accommodate regional travel. Beginning with US 17 in 1926, the roadway network blossomed in the 20th century. SC 9 was an original state route that, in the mid-1920s, was extended to Little River. In the late 1980s, the route was extended again, sharing a portion of US 17 to reach Cherry Grove Beach. SC 90 was extended to Little River in the early 1970s.

In the past few decades, several new roadways have provided alternatives to the congested corridors near the coast. The completed SC 22 (Veterans Highway) corridor opened to traffic in 2002 as a 4-lane freeway extending from US 501 between Aynor and Conway to US 17 in North Myrtle Beach—providing an alternative to US 501 for motorists traveling to the northern Grand Strand from Marion and points inland. The first segment of the Carolina Bays Parkway (SC 31) also opened in 2002, providing six lanes of freeway from US 501 to SC 9. In 2005, the roadway was extended to SC 544. Today, the Carolina Bays Parkways provides a viable alternative to the congested US 17.

For the past half-century, the North Myrtle Beach area has served as a summer beach resort for residents throughout the mid-Atlantic. As the golf industry in the area erupted during the last few decades, the region has become internationally known as a year-round destination. Today, as tourism continues to drive the economy, the number of year-round residents has increased. Residents new and old recognize the critical role a safe, flexible, and multimodal transportation system plays in attracting visitors, residents, and businesses.



Railroad Construction, 1905



Horry County Map, 1895

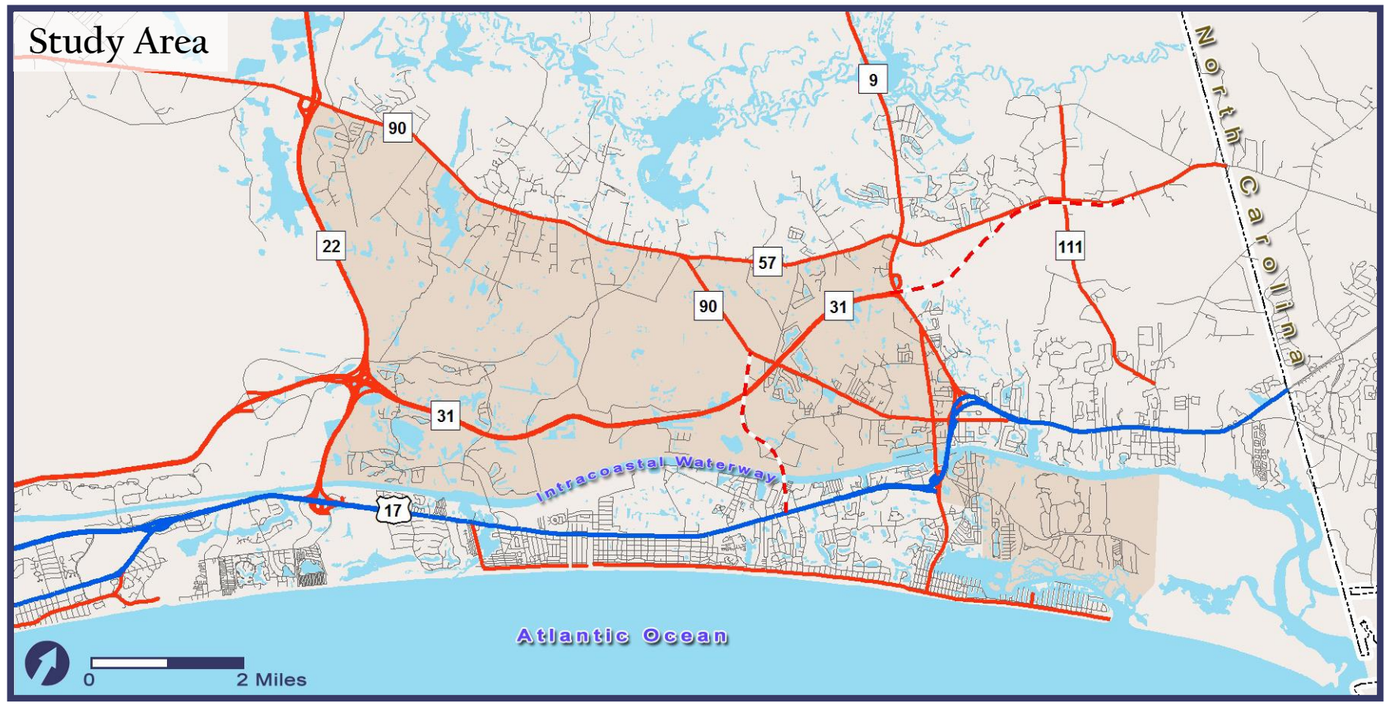
Project Overview

North Myrtle Beach and northern Horry County have grown from a low-key beach community with outlying farms and forest lands to a major beach and golf resort destination with thriving second/retirement home communities. Considering the Main Street extension, the planned extension of the Carolina Bays Parkway, and the future I-73 and I-74—as well as the impending pressure of development—the region is poised for another substantial growth spurt. It is essential the region plan for and provide appropriate transportation infrastructure to support this growth while maintaining the quality of life that has fueled its population and economic growth. Challenges to planning include deficiencies in existing roads, lack of interconnectivity between developments, natural barriers such as wetlands and the Intracoastal Waterway, and a disconnect between land use and transportation decisions.

Simply stated, good transportation is the key to continuing the region's success and leaders must find a way to overcome these challenges. Conventional transportation planning focused on improvements to highways and major roads can help only so much. Strategic investment in major roadways must be balanced with improvements to the bicycle, pedestrian, and transit network to keep people and goods moving, allow better access and mobility for residents and tourists, and maintain the region's quality of life.

The *Northeast Area Transportation Plan* addresses expected growth in the North Myrtle Beach and Northern Horry County area. The plan focuses on the development of a multimodal transportation plan to help the City of North Myrtle Beach and Horry County continue to grow while preserving the study area's appeal and character. The plan looks beyond the roadway to determine the effects of growth on the built environment and acknowledges the importance of balancing the land use and transportation equation. This project approach features tools aimed at creating a successful merger between smart growth and the demands of the roadway users.

The *Northeast Area Transportation Plan* study area is bounded by SC 22 to the west, SC 90 and SC 57 to the north, SC 9 to the east, and the Intracoastal Waterway to the south. The study area also includes the Little River Neck area south of the Intracoastal and east of SC 9.





Planning Process

Transportation planning at its best is a cooperative process led by local staff and citizens invested in their community and involves key stakeholders and the general public. The planning process should be rooted in a public involvement platform that gathers, processes, and applies a diversity of opinions from residents, the business community, and civic groups. Public outreach occurred through a variety of small- and large-group meetings and an assortment of media. Two principles of public outreach were adhered to:

1. Citizens have an intimate understanding of the transportation network and planning decisions have a direct impact on their daily lives.
2. Groups can share in the collective vision for a project even as they hold differing opinions on how this vision should be reached.

With respect to these two principles, the planning process for the *Transportation Plan* was designed to create an open dialogue about the needs of current and future residents and visitors.

Public Outreach

For most planning projects to achieve success, it is necessary to implement an inclusive process that builds on strong citizen involvement. Collaboration provided the core strategy for establishing a baseline for understanding the dynamics of the study area and building consensus throughout the planning process. Local staff, the project team, and the public began working together at the outset. Several overarching issues emerged during the public outreach efforts.

- We need parallel routes to major existing roadways and better connectivity throughout the study area.
- We need to plan for more than just cars.
- Safety and congestion is a problem now. How will all this new development make it worse?
- Funding must be a consideration.

These issues were raised through the following components of the public outreach process.

Advisory Committee

The Advisory Committee (AC) was formed as a representative group of the citizen base of the study area to ensure the final plan incorporated a diversity of viewpoints. Beginning with a kick-off meeting on June 19, 2008, the AC met monthly to fulfill its mission of examining the existing deficiencies and potential solutions for driving, bicycling, walking, and transit use. The committee also explored the relationship between transportation and land use to help shape the plan. The group's duties included serving as a sounding board for project team ideas, participating in visioning and mapping exercises, providing feedback to the project team, and spearheading the promotion of other public involvement efforts.

At its first meeting, the AC split into smaller groups to discuss and mark on maps general issues within the study area and specific locations of concern. These issues focused on the impact pending development will have on the existing and future transportation network, how smart growth principles can be incorporated into land use and transportation planning, and the need for improved wayfinding throughout the study area. Subsequent meetings delved deeper into the existing conditions and specific multimodal recommendations that form the foundation of the study.





Public Workshops

Citizens understand the strengths and weaknesses of the region's transportation system and are affected by transportation decisions on a very personal level. To tap into the special knowledge of the citizens of northern Horry County, the project team, assisted by the Advisory Committee, led a series of two public workshops.

Workshop # 1 – Visioning

The first public workshop took place July 15, 2008 in the library at the North Myrtle Beach Middle School. The evening began with an overview presentation during which the project team described the planning process and introduced background data. Following the presentation the citizens and business owners in attendance expressed concerns and needs in a large group setting. Comments from this part of the evening were scribed on large easel boards. These comments included:


2A LOCAL • WORLD

NMB aims to improve roads

Residents to share input at meeting

By Jamille Pucet
jpucet@thesunnews.com

North Myrtle Beach resident Wade Mullen would like to see less congested, more aesthetically pleasing, and safer roads and bike paths in the area.

Mullen and other residents and business owners, whom may come true is they will have an opportunity today to share their thoughts about transportation improvements in the northern part of Horry County.

North Myrtle Beach and Horry County officials have joined to develop a plan that will guide short-term and long development of land, utilities and transportat North Myrtle Beach and unincorporated areas of the said David Schwerd, County's principal plann

Officials will be looki input from residents an ness owners during t workshop at North B Beach Middle School.

"It's a good idea to star ning in advance, consi that in the past there w plans and high congested," said Mulle has lived in North Myrtle

If you go
What | North Myrtle Beach Transportation Plan public workshop
When | 6 to 8 p.m. today
Where | North Myrtle Beach Middle School, 1240 S.C. 90, Little River

"It's a good idea to start planning in advance considering that in the past there were no plans and highways congested."
Wade Mullen | North Myrtle Beach resident

transportation systems and will be used with other corridor plans throughout the area to identify projects and costs.

The transportation plan will focus on areas bounded by S.C. 22, S.C. 90, Highway 57, S.C. 9, the Intracoastal Waterway and the area surrounding Little River Neck Road, officials said.

Most studies look at Horry County, "but as North Myrtle Beach grows and [annexes land], it's important we work together on it," said Jennifer Kiser, a North Myrtle Beach planner.

Several road projects within North Myrtle Beach already are in the Grand Strand Area Transportation Study's long-range plan, but are not detailed

NORTH MYRTLE BEACH

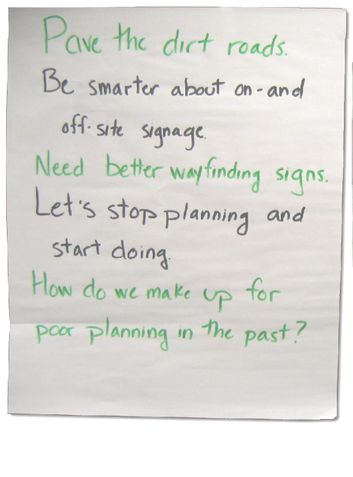
Workshop to cover transportation plan

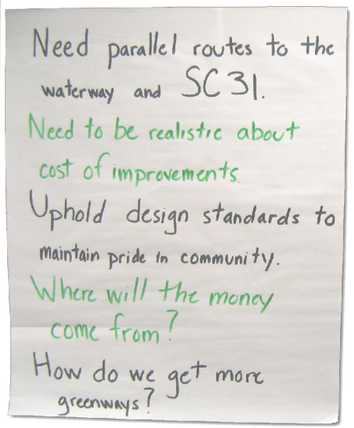
Residents and business owners are invited to a workshop North Myrtle Beach and Horry County officials will conduct from 6 to 8 p.m. Tuesday to discuss a new transportation plan.

The meeting will be at the North Myrtle Beach Middle School, 1240 S.C. 90 in Little River. Officials are asking residents and business owners for input on the plan. The study area is bounded by S.C. 22, S.C. 90, Highway 57, S.C. 9 and the Intracoastal Waterway and includes the area surrounding Little River Neck Road.

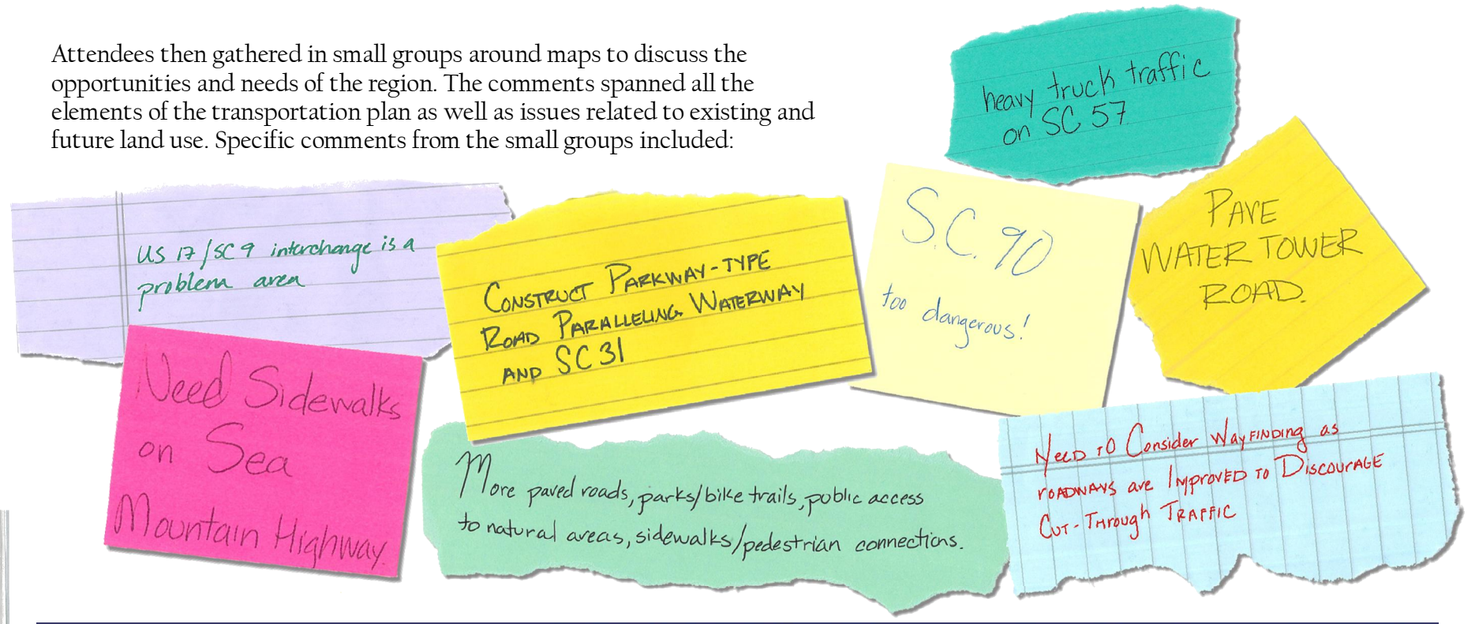
For more information, call North Myrtle Beach Planner Jennifer Kiser at 280-5566.

ARIES | 9C ■ WEATHER | 10C


Pave the dirt roads.
Be smarter about on-and off-site signage.
Need better wayfinding signs.
Let's stop planning and start doing.
How do we make up for poor planning in the past?

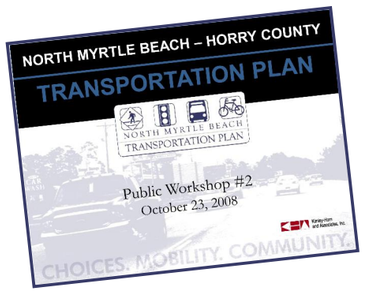

Need parallel routes to the waterway and SC 31.
Need to be realistic about cost of improvements.
Uphold design standards to maintain pride in community.
Where will the money come from?
How do we get more greenways?

Attendees then gathered in small groups around maps to discuss the opportunities and needs of the region. The comments spanned all the elements of the transportation plan as well as issues related to existing and future land use. Specific comments from the small groups included:





Workshop # 2 – Feedback



The comments received during the first workshop informed the development of recommended facilities, programs, and policies. Prior to submitting a draft plan, the project team again assembled with the public to discuss preliminary recommendations. The second workshop occurred October 23, 2008 in the library at the North Myrtle Beach Middle School.

At the workshop, the public viewed first-hand the benefits of the proposed multi-modal transportation system and discussed the merit of several land use development scenarios. The workshop allowed the public to review all recommendations and offered them a final opportunity to engage the project team in a more formal environment.

The project team conducted a brief presentation highlighting the feedback received from the first public workshop and public questionnaire before introducing the recommendations. Attendees then gathered around maps and graphics organized into four stations — System Recommendations, Access Management Solutions, Multi-Modal Recommendations, and Land Use Development Concepts. In addition to their discussions with the project team, attendees provided feedback by completing a survey that gauged their support for individual recommendations. Some of the plan's recommendations were adjusted based on the information provided at the workshop. By the time the draft plan was completed, the community had devised a shared vision for their area and multiple ways to fulfill it.

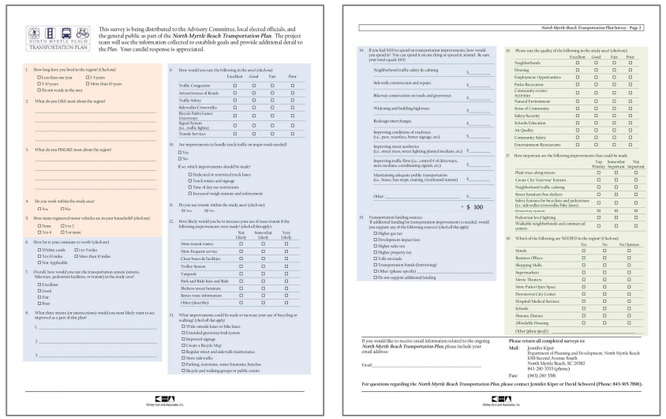
Stakeholder Interviews

Early in the public outreach process, the project team identified several key stakeholders, including representatives from the South Carolina Department of Transportation, developers, utility representatives, and citizen advocates. Interviews with these stakeholders were used to gain insight for the social, political, economic, and transportation issues facing the study area. In total, seven stakeholder interviews were held the same day as Public Workshop #1 in support of the *Transportation Plan*. Feedback received during these meetings were used to refine the work plan for the study (i.e., what do we need to get done?) and validate background information collected to date (i.e., did we get it right?). Information garnered through stakeholder interviews supplemented the information provided by the AC and the results of the public workshops.

- Infrastructure—transportation and utilities—is laying the groundwork for future residential and business growth.
- Transit must be a consideration for locals and tourists.
- Freight is an issue.
- Funding decisions must be carefully considered.
- Lack of connectivity is a concern.
- Sales tax funding only addresses regional arterials.
- Development impact fees should be considered but acceptance from the development community varies.

Public Survey

A public survey was developed to determine the community's perception of the transportation network in the study area. The survey was distributed to the Advisory Committee, local elected officials, and the general public. The 18-question survey asked a variety of questions on all aspects of the transportation network. Nearly 70 surveys were completed.

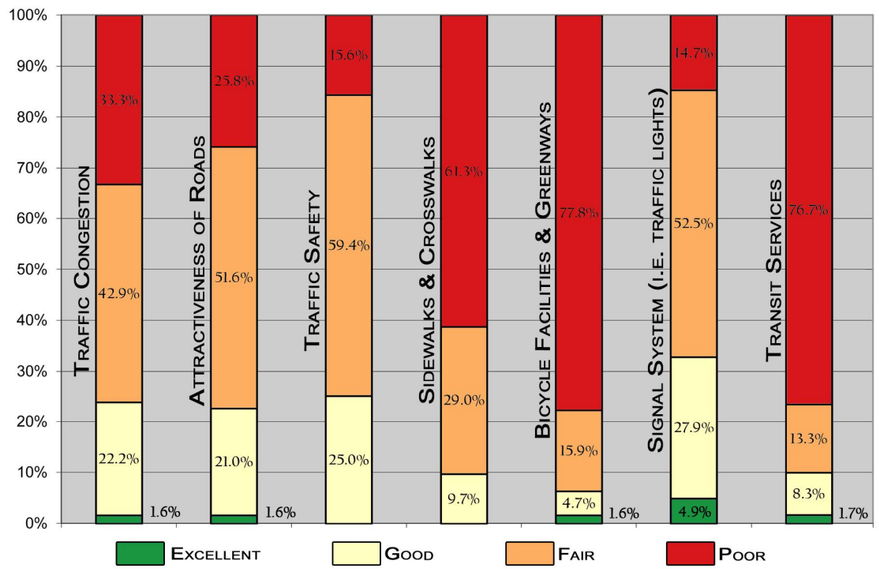


In general, the surveys reaffirmed the information gathered through other public outreach channels. The survey reiterated the features that make North Myrtle Beach an attractive place to live, work, and relax. Residents identified the weather, people, natural beauty, and general sense of community as reasons they like the region. On the other hand, they noted the rapid unorganized growth, lack of bicycle and pedestrian facilities, traffic congestion, and poor wayfinding as things they dislike about the area.

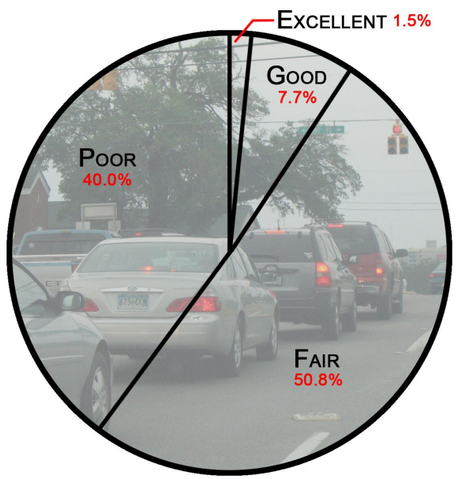
The graphs on this page illustrate some of the general trends as expressed through the public survey. The majority of responses rated the overall transportation system as Fair or Poor. When asked to dig deeper, respondents gave unfavorable ratings to most aspects of the transportation system, particularly bicycle and pedestrian facilities and transit services. Another telling question asked respondents how they would spend $100 on transportation improvements. In this case, the most money was spent on improving existing roadways and bolstering public transportation.

More results from the public survey are presented throughout the report.

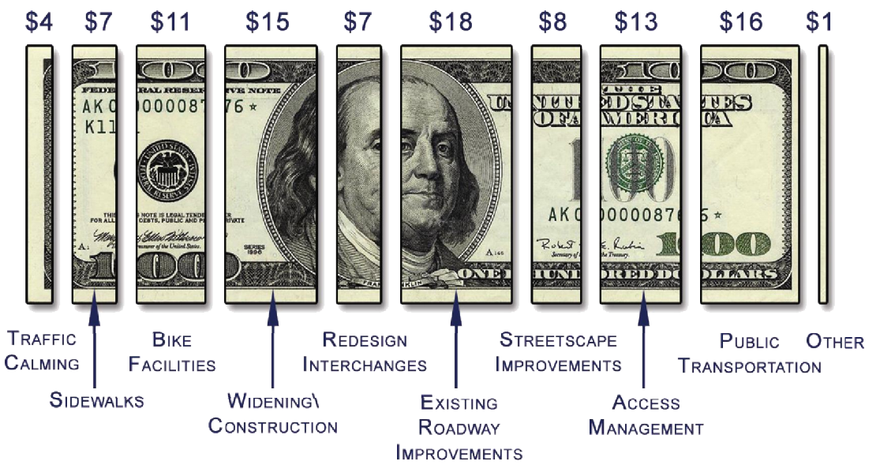
How would you rate the following in the area?



Overall, how would you rate the transportation system in the study area?



If you had $100 to spend on transportation improvements, how would you spend it?





Previous Planning Efforts

The *Northeast Area Transportation Plan* should be coordinated closely with other state, regional, county, and local plans and/or policies that impact planning efforts within the area. This section summarizes a general review of transportation plans prepared within the region and highlights issues, policies, and directives that may influence potential recommendation development and reasonable implementation of the *Northeast Area Transportation Plan*. The regional land use planning process conducted as part of this plan and described in detail in **Chapter 5** included a review of local land use plans and policies.

Grand Strand Area Transportation Study (GSATS) 2030 Long Range Transportation Plan

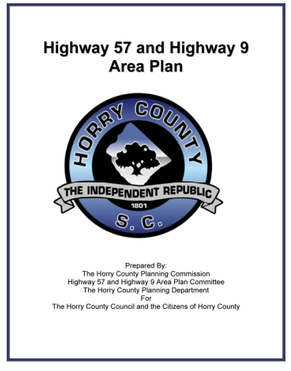
The region's long range transportation plan was adopted by the GSATS Policy Committee in January 2005. The plan addresses future transportation needs in the Grand Strand area through 2030 with a fiscally-constrained list of highway, bicycle, pedestrian, and transit projects. The outcome of the 2030 LRTP—particularly the public involvement results and list of recommendations—was considered during the planning process for the *Northeast Area Transportation Plan*. The roadway recommendations are included in the Potential and Committed Projects Map in **Chapter 2**. The existing (2007) transportation model data shown in **Chapter 2** was interpolated using data from the GSATS Transportation Model. The model also was used to show future year (2030) travel conditions on area roadways.

US Highway 17 Corridor Study

The US Highway 17 Corridor Study, completed in April 2003, outlines a long-term plan for the corridor extending from 48th Avenue to Sea Mountain Highway (SC 9). The plan addresses traffic congestion, access issues, aesthetics, alternative transportation modes, and roadway design. Though the corridor lies outside the study area for the *Northeast Area Transportation Plan*, results from the community involvement process and key transportation issues identified are applicable to other planning efforts in the North Myrtle Beach area.

Highway 57 and Highway 9 Area Plan

Completed in December 2003, the Highway 57 and Highway 9 Area Plan represented an effort by Horry County to establish guidelines to manage growth and guide development in the area surrounding the intersection of the state highways. The plan's transportation recommendations include improving drainage and paving dirt roads. The land use and transportation issues and recommendations for the Area Plan were considered during the planning process for the *Northeast Area Transportation Plan*.





Vision and Objectives

The vision for the *Northeast Area Transportation Plan* was developed in collaboration with local staff, the Advisory Committee, and stakeholders and was validated through extensive public outreach. The Vision, which is intended to be a guide for the planning process, is as follows:

> ***North Myrtle Beach and the surrounding areas of Horry County desire a healthy, vibrant community that supports accessibility and mobility for residents and visitors. Our transportation needs should be linked to land use decisions, be environmentally accountable, and provide true choice to all users all the while enhancing the quality of life we cherish.***

Following the establishment of the plan's vision, a set of objectives were developed. The final plan attempts to balance the vision and objectives expressed by Advisory Committee and community leaders with the comments received at the first public workshop. The objectives of the *Northeast Area Transportation Plan* include:

- **Enhance Quality of Life** — The plan must find ways to coordinate social and community initiatives with the timing, design, and placement of transportation infrastructure; the plan also must seek ways to minimize adverse impacts to the natural and built environment.
- **Create a System of Interconnected Streets** — By incorporating a system of interconnected streets and considering each roadway's intended purpose and function, the plan can improve mobility and distribute traffic equitably and efficiently.
- **Improve Travel Safety** — Travel safety should be improved for motorists, bicyclists, and pedestrians through cost-effective applications, best management practices, and local access and land use policies.
- **Address Congestion** — Existing and expected future traffic congestion must be considered, and congestion should be better managed through the implementation of creative strategies.
- **Mode Integration** — The plan must provide seamless connections among the various modes, especially those associated with cyclists and pedestrians. Connections and gaps with the bicycle and pedestrian networks should be improved.
- **Land Use/Transportation Integration** — Land use and transportation should be integrated to ensure the transportation system supports local initiatives and is complementary to existing and future land use objectives. Transportation design should be sensitive to local context, but also should be responsive to overarching mobility and access management goals.
- **Develop a Compatible Plan** — The plan must recognize the benefits of corridor-based planning that balances the transportation facilities with the function and land uses that the corridor is trying to serve.
- **Support Regional Tourism and Other Economic Development Opportunities** — Regional tourism and economic development (business and industry) must be considered when formulating recommendations. The plan must anticipate the needs of visitors, as well as industry, to ensure the economic vitality of the region.
- **Promote Pedestrian- and Bicycle-Friendly Environments** — Connections and gaps within the sidewalk system should be improved, while bicycle and pedestrian needs can be prioritized by focusing on areas with high pedestrian attractions (e.g., schools, shopping and employment centers, and parks).
- **Enhance Funding Opportunities** — Potential funding shortfalls must be identified as well as alternative funding sources which may help expedite implementation of the plan.
- **Respect the Environment** — The plan should seek innovative ways to respect and minimize impacts to the natural environment.
- **Implementation** — This plan's recommendations must be realistic, functional, and implementable.
- **Documentation** — The plan must be easy to read, informative, and suitable for use by a broad audience. It should focus on communicating visually through appropriate use of maps, figures, tables, and graphs.



Plan Organization

The *Northeast Area Transportation Plan* serves as a tool and guide for decision makers in the implementation of the region's transportation system. The plan represents the collective vision of a safe, multimodal, and interconnected transportation system that supports continued economic development without compromising the natural, historic, and social resources vital to the area's sustainability. Elements of the plan include:

Chapter 2 – Existing Conditions

This chapter presents the successes and deficiencies of the existing transportation and land use framework in the area. This information served as a baseline measure for the development of the plan's multimodal recommendations and land use development scenarios.

Chapter 3 – Transportation Best Practices Toolbox

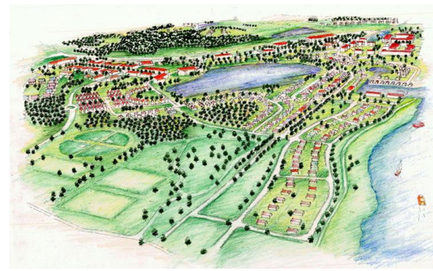
This chapter provides a one-stop reference for policy-makers and citizen advocates on the tools available for improving the area's transportation network. These tools include access management, collector street planning, complete streets, bicycle and pedestrian planning, and interchange design.

Chapter 4 – Multimodal Recommendations

This chapter outlines the system (roadway), bicycle and pedestrian, and transit solutions that collectively will ensure the safe and efficient operation of the future transportation network. Systems recommendations include detailed solutions for three strategic corridors.

Chapter 5 –Land Use Considerations

This chapter evaluates the relationship between land use, urban design, and transportation by analyzing three focus areas representative of the opportunities to better integrate land use, urban form, and transportation decision-making processes. The chapter concludes with a regional land use scenario planning exercise in which a spatial data planning model was developed to evaluate impact of land use decisions on surrounding public facilities and services.



Chapter 6 – Implementation Plan

Completion of the *Northeast Area Transportation Plan* represents an important step toward creating a safe, efficient multimodal transportation system. But it's only the first step. This chapter provides general policy recommendations, reviews funding opportunities, and presents an action plan to assist local decision-makers and planning staff in taking the necessary steps toward implementing the *Plan*.

References

http://www.horrycounty.org/photo_gallery



Chapter 2 — Existing Conditions

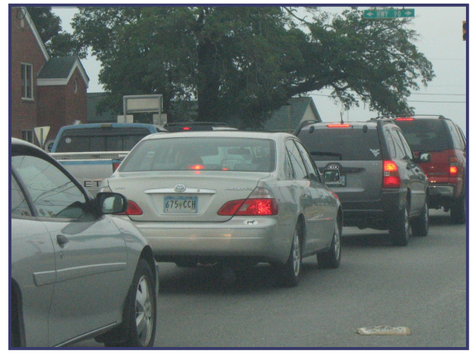
In order to determine the needs of the future roadway network, it is important to understand the successes and deficiencies of the existing network and to catalogue the potential resources that could be impacted while carrying out the community's desired vision. Prior to meeting with the public, the project team inventoried the study area, gaining a better understanding of aspects such as transportation, land use, urban design, and the environment. The team tapped into a variety of sources to gather data, including a field review, GIS mapping, transportation forecast modeling, SCDOT data, and stakeholder interviews.

The natural, social, and cultural resources; existing roadway characteristics; and multimodal network were considered during the development of the *Northeast Area Transportation Plan*. Examining these elements helped establish a foundation for determining critical improvements in the context of current growth and development patterns. This chapter details the result of this process.

Planning Guidelines

During the development of the transportation plan, the project team used the available data to avoid and minimize impacts to known environmental features. The collection and consideration of this data early in the planning process is intended to lessen environmental impacts and reduce potential conflicts during permitting. In addition, when considering new roadway alignments and extensions, planners and engineers should use a guiding set of principles, including those listed below, to ensure that environmental considerations are followed:

- Minimize impacts to the built environment.
- Avoid or minimize impacts to neighborhoods.
- Avoid unnecessary or disproportionate impacts to minority and low-income communities.
- Avoid impacts to parks and designated open spaces.
- Minimize impacts to school sites.
- Minimize the number and size of impacts to historic features and districts.
- Be aware of existing development patterns.
- Capitalize on street connectivity opportunities such as stub streets.
- Encourage a multimodal system with the promotion of pedestrian, bicycle, and transit networks.
- Minimize the number of wetland (National Wetland Inventory) impacts.
- Minimize the amount of each wetland impact (e.g., do not cross a wide wetland when a narrower one can be crossed).
- Stay away from FEMA designated floodplains.
- Minimize the number and length of stream crossings.
- Minimize the number of new facilities in critical watershed areas.
- Minimize the number and size of impacts to threatened and endangered species.



Natural, Social, and Cultural Resources

Though transportation projects improve traffic mobility, they also can significantly impact the natural environment and disrupt communities. Only through early awareness and responsible planning can these impacts be minimized or even avoided. Environmental and social issues must be addressed early in the planning process in order to avoid inefficient use of time and resources. The result is a transportation plan that is respectful of the environment and cost-effective in its implementation.

The majority of impacts from projects in a typical transportation plan are associated with roadway projects, mainly due to the large amounts of land required to build roadway projects. The resulting facility can not only become a conduit for traffic—but also a barrier to the surrounding community. Sidewalks and bicycle facilities are much more limited in the magnitude of their impacts, due to smaller cross-sections and greater flexibility to avoid problem areas. Furthermore, pedestrian and bicycle facilities are most often built in conjunction with roadway facilities and have only marginal impacts, if any, beyond those of the roadway itself.

Transit improvements, such as bus route and service expansions, typically involve no new construction and therefore tend to have minimal impacts on either the natural or manufactured environment. In general, transit improvements improve social and environmental conditions because increased service typically reduces vehicle miles traveled (VMT), lowers air emissions, and improves accessibility in disadvantaged neighborhoods.

The following sections examine the social and environmental conditions in the study area. They also include a series of maps that illustrate the result of the plan's environmental screening. These maps include elements such as parks, wetlands, 401 certified sites, air regulated facilities, infectious waste generators, hazardous waste facilities, and a variety of attractions. Additional maps depict socioeconomic distributions in the study area. When overlaid with the proposed transportation projects, this data will prove useful in assessing the potential relative impacts of proposed projects.

Social and Environmental Features

When considering the growth rate of the past few decades and the residential and commercial projects on the horizon, it is clear that the North Myrtle Beach area will continue to grow at a rapid rate. As growth occurs, impacts to the environment are inevitable. With the development of new infrastructure it will be important to manage and minimize these impacts. Some natural amenities such as clean water and open spaces must be maintained to satisfy not only residents' desires for a high quality of life, but also to satisfy state and federal environmental policies. Impacts to area attractions and destinations also should be minimized, particularly as improvements to the roadway, bicycle, and pedestrian networks improve access to these locations. The environmental and social features shown in these figures should be considered together in order to create a more complete picture of the study area.

Environmental Features

The numerous wetlands in the North Myrtle Beach area presented a major obstacle to its earliest residents. Today, these wetlands are a scenic resource and must be considered when laying out widening projects, potential new roadways, and developments. **Figure 2.1** shows the location of wetlands and various manmade environmental features in the vicinity of the study area.

Wetlands are a prominent feature on the map. While some wetlands such as swamps are easily identified, others are dry during part of the year and harder to recognize as wetlands. Carolina Bays are a good example of this type of wetland. These oval-shaped depressions in low-lying areas usually are oriented on a northwest-southeast axis and can range in size from less than an acre to several thousand acres. Vegetation includes scattered longleaf pine trees with thick, shrubby areas. A ridge of white sand usually forms on the southeastern end. The aerial image to the right shows an example of Carolina Bays northeast of the Carolina Bays Parkway/SC 22 interchange.

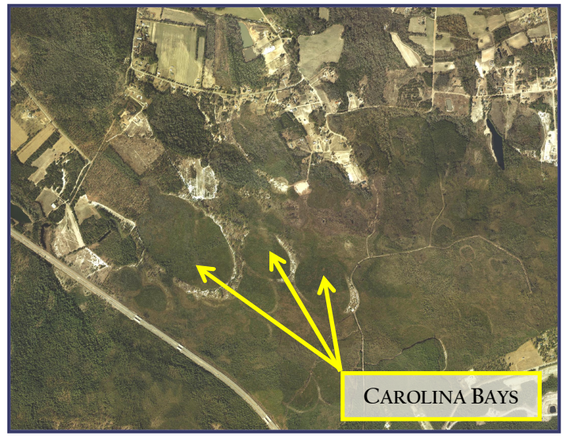


Figure 2.1 | Environmental Resources

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NORTHEAST AREA TRANSPORTATION PLAN

- Study Area Boundary
- Body of Water
- State Line
- Wetland
- 401 Certified Site
- Air Regulated Facility
- Infectious Waste Generator
- Hazardous Waste Facility

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Attractions and Destinations

Figure 2.2 shows the location of existing attractions and destinations in the vicinity of the study area. These locations include social features (schools, churches, and hospitals), government facilities (libraries, government buildings, EMS, police and fire stations, post offices, and recycling centers), recreational facilities (parks, athletic facilities, boat facilities, and golf courses), and commercial facilities (shopping centers and hotels). These locations serve as popular destinations as well as important community landmarks; they additionally serve as a useful tool when locating new transportation connections for all modes. Consideration also should be made to minimize potential impacts to these locations.

Environmental Justice

Environmental justice is a law intended to avoid the use of federal funds for projects, programs, or other activities that generate disproportionate or discriminatory adverse impacts on minority or low-income populations. This effort is consistent with Title VI of the 1964 Civil Rights Act, and is promoted by the U.S. Department of Transportation (USDOT) as an integral part of the long-range transportation planning process as well as individual project planning and design. The environmental justice assessment incorporated in this plan was based on three basic principles, derived from guidance issued by the USDOT:

- The planning process should avoid, minimize, or mitigate environmental impacts (including economic, social, and human health impacts) that affect minority and low-income populations with disproportionate severity.
- Transportation benefits should not be delayed, reduced, or denied to minority and low-income populations.
- Any community potentially affected by outcomes of the transportation planning process should be provided with the opportunity for complete and equitable participation in decision-making.

As part of the planning process, Census 2000 data was used to identify the geographic distribution of minority, Hispanic, and low-income populations to assess the positive and negative effects of various transportation recommendations. It should be noted that while this data represents the most recent available data, some changes are expected to have occurred since the data was compiled by the U.S. Census Bureau. This information is depicted on **Figures 2.3**, **2.4**, and **2.5**.

- **Figure 2.3** depicts the minority population in the study area. This figure indicates large minority populations in the northwest corner of the study area, east of Punk Road between SC 57 and the Intracoastal Waterway, and the western portion of the Little River Neck Road area.
- **Figure 2.4** depicts the Hispanic population in the study area. As is shown in the figure, the Hispanic population is very low with small populations between West Shore Drive and Bombing Range Road.
- **Figure 2.5** depicts the percentage of the population in the study area that is below the poverty line. The figure locates the most concentrated area of persons living below poverty in the West Shore Drive/Bombing Range Road area off SC 90. It should be noted that the information presented in this map is at the Census Tract level, a larger census geography area.

While it is nearly impossible to construct infrastructure without impacts, it is through careful planning and early consideration that the *Northeast Area Transportation Plan* intends to manage impacts to communities effectively. Rather than an ad hoc approach to environmental justice planning, this transportation plan identified sensitive communities early in the process. Early identification influenced the selection and alignment of future transportation improvements.

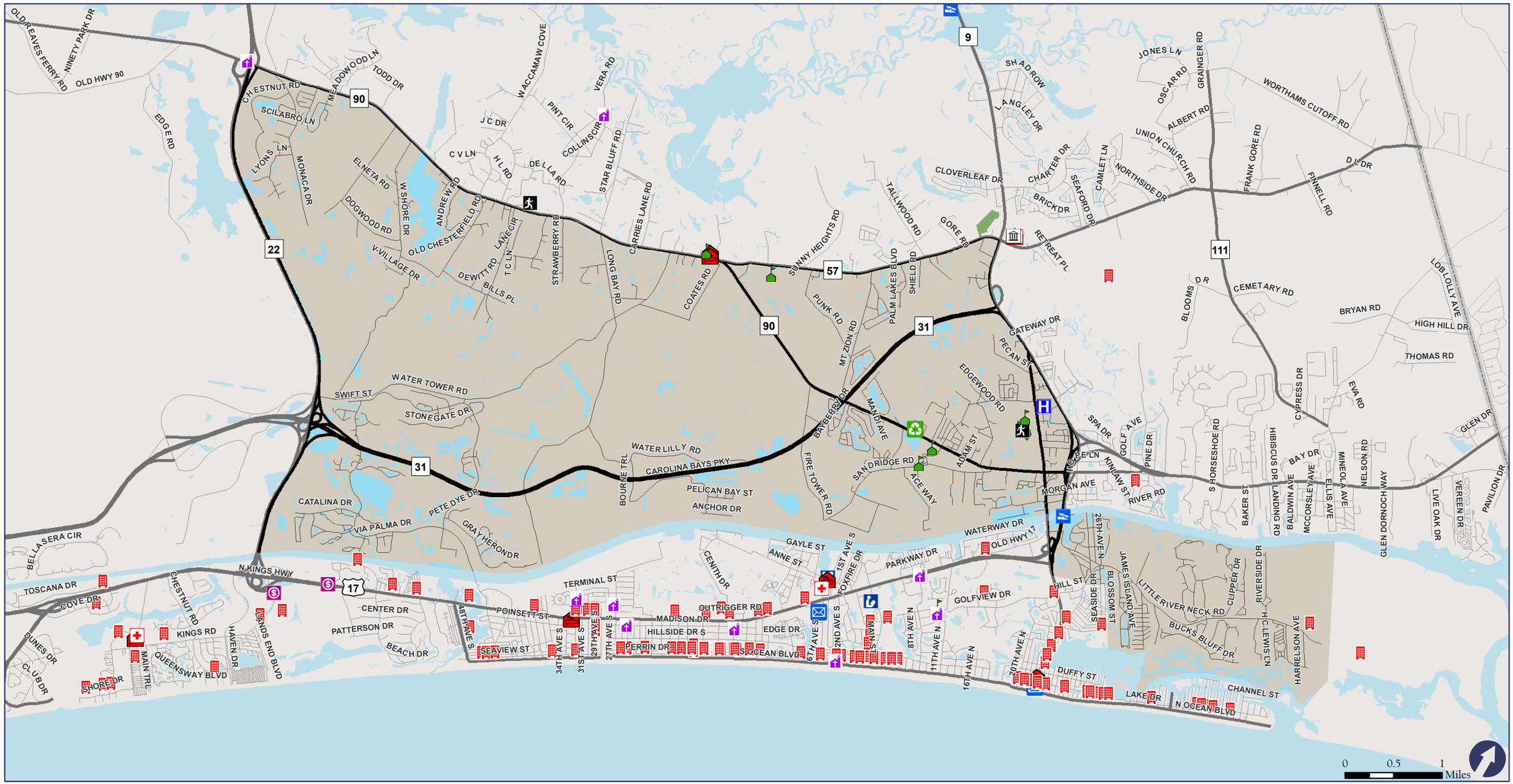

Figure 2.2 | Attractions and Destinations

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NORTHEAST AREA TRANSPORTATION PLAN

- Study Area Boundary
- Body of Water
- Park
- State Line

Social
- School
- House of Worship
- Hospital

Government
- Library
- Recycling Center
- County Government

- Post Office
- EMS Station
- Fire Station
- Police Station

Recreation
- Athletic Facility
- Boat Facility

Commercial
- Shopping Center
- Hotel

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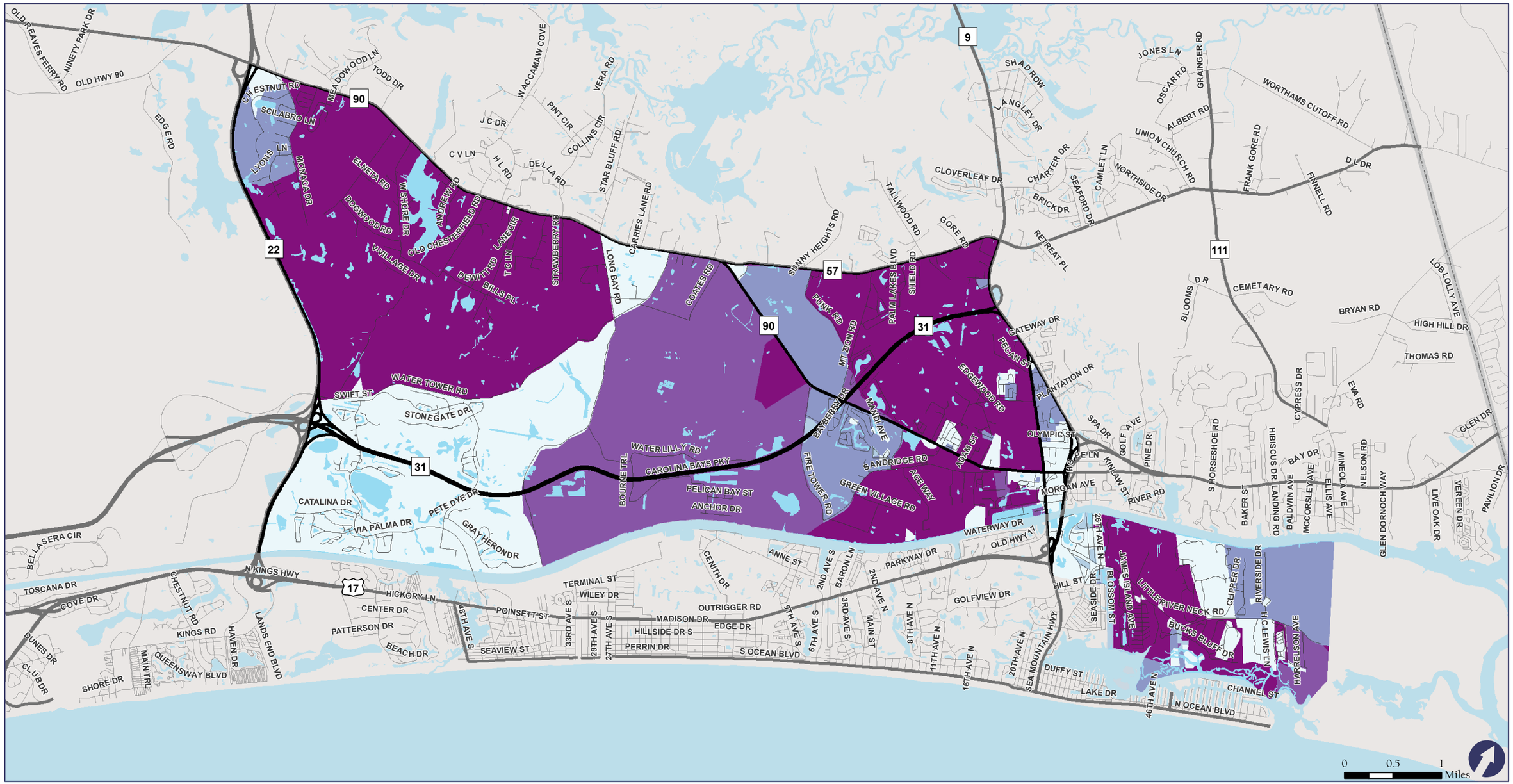

Figure 2.3 | Percent Minority (based on 2000 US Census Data)

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

US and State Route
Local Road
Body of Water
State Line

Percent Minority
Less than 5%
5 to 10%
10 to 25%
25 to 50%
Greater than 50%

Note: Data shown is at the Census Block level.

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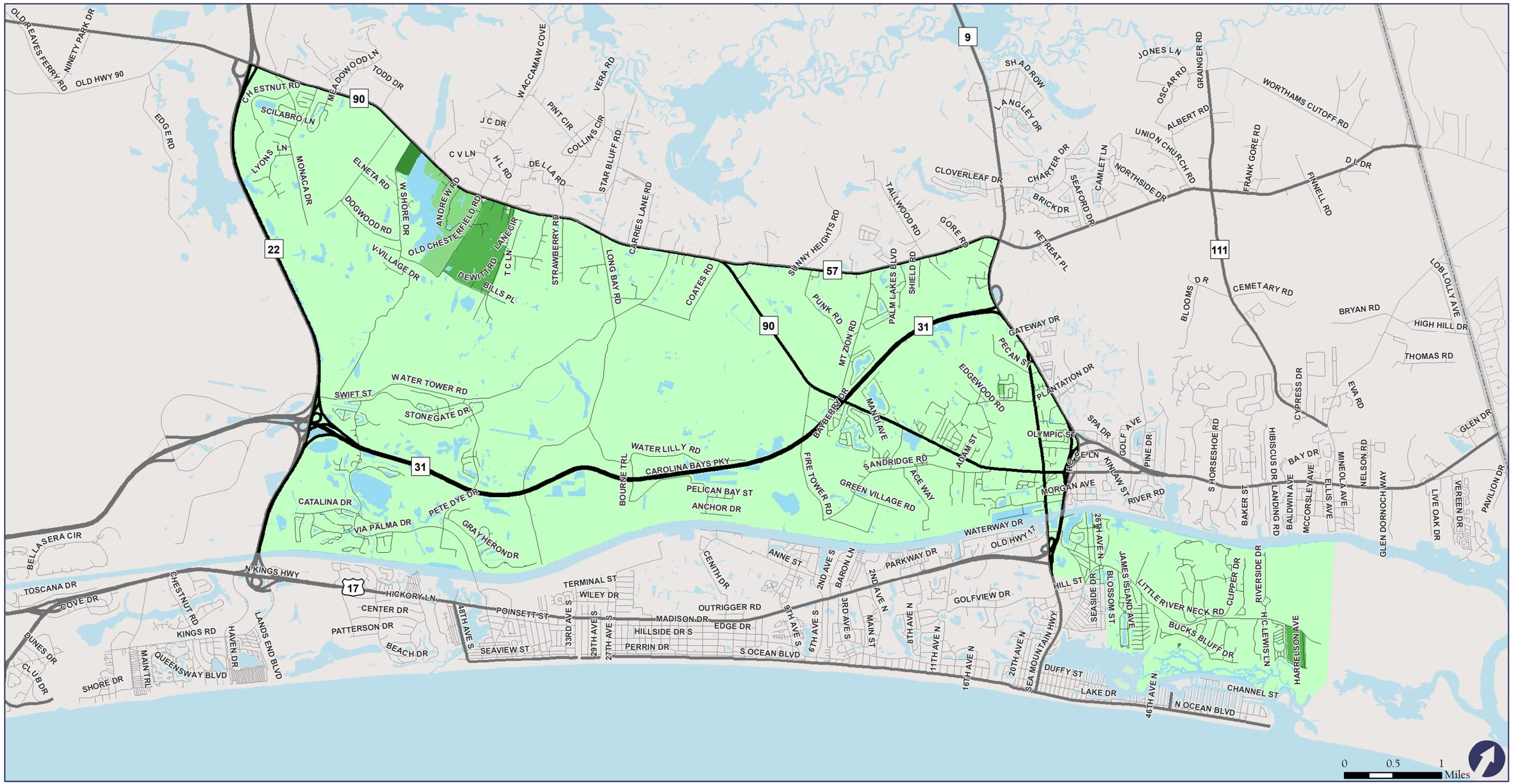

Figure 2.4 | **Percent Hispanic** (based on 2000 US Census Data)

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

US and State Route
Local Road
Body of Water
State Line

Percent Hispanic
Less than 5%
5 to 10%
10 to 25%
25 to 50%
Greater than 50%

Note: Data shown is at the Census Block level.

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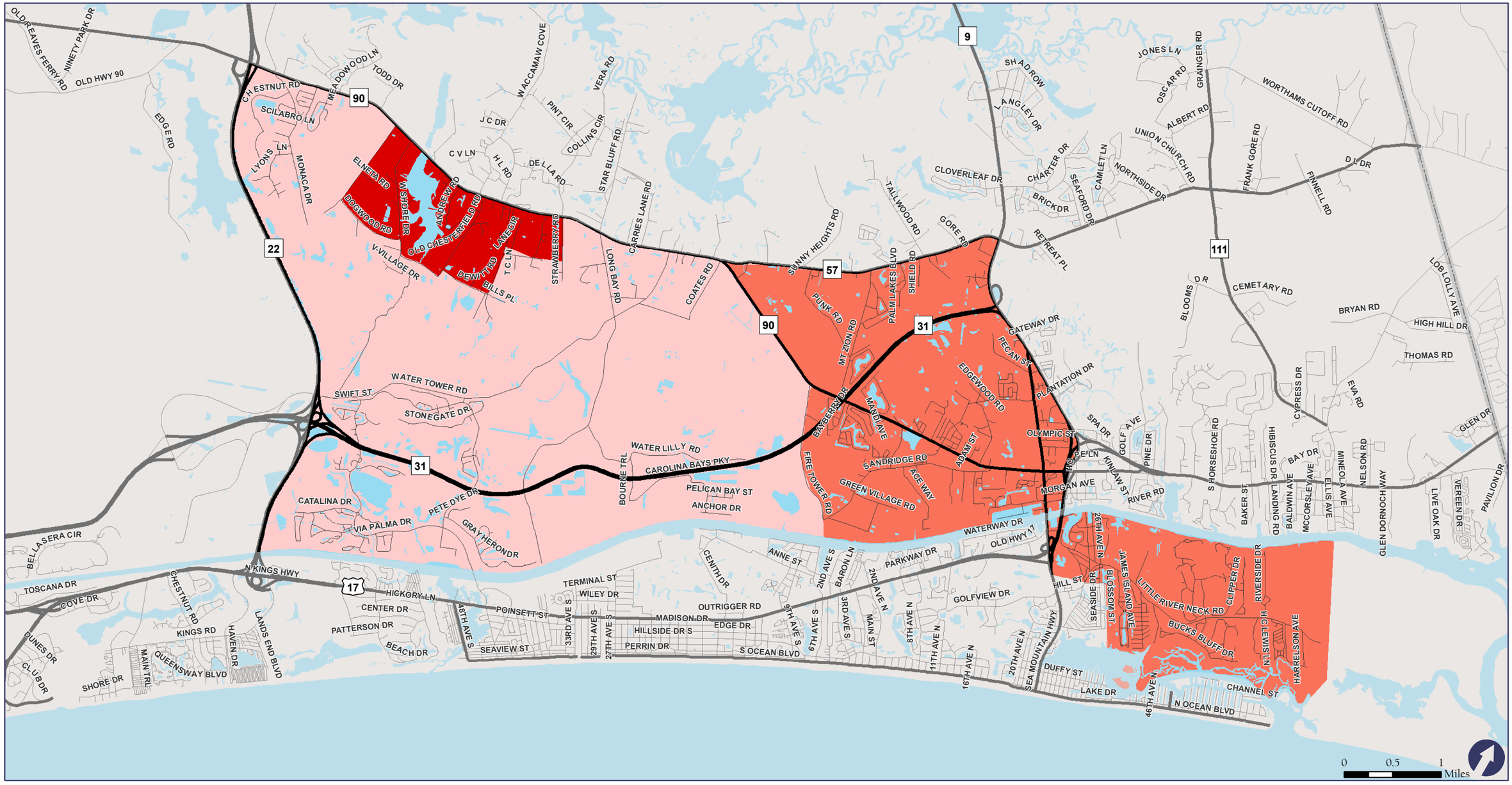

Figure 2.5 | **Percent Below Poverty** (based on 2000 US Census Data)

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

US and State Route
Local Road
Body of Water
State Line

Percent Below Poverty
Less than 10%
10 to 20%
Greater than 20%

Note: Data shown is at the Census Tract level.

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Existing Roadway Characteristics

As the year-round tourism-based economy expands and more and more permanent residents relocate to the area, the frequency and length of trips on the current system of highways and streets can be expected to increase. This increase in traffic volumes will create new deficiencies on the existing transportation network. Traffic bottlenecks may become evident in places that currently function adequately and existing deficiencies will be magnified. Prior to anticipating future traffic problems, it is helpful to gain an understanding of the existing roadway characteristics. The discussion of existing roadway characteristics is organized into five sections — Corridors and Activity Centers, Functional Classification, Corridor Operations, Traffic Safety and Crash History, and Programmed and Committed Improvements.

Corridors and Activity Centers

As development occurs and more vehicles take to the road, roadway improvements are needed to reduce traffic congestion. These roadway improvements often enhance access, thus raising land values and attracting more development. The figure to the right illustrates this continuing cycle of influence between land use and transportation.

The interaction between activity centers and the transportation corridors that link them to other centers is important, as is the mobility choices that are provided within the center. Often neighborhoods and activity centers rely on a small number of transportation corridors to provide essential links between home, school, employment, shopping, social, and recreational destinations. The extent to which these origins and destinations blend into multi-purpose activity centers has a dramatic effect on a person's ability to choose between modes for their trip. In many cases, the range of trip alternatives (walk, bike, drive, or transit) also can influence the overall perception of a community. **Table 2.1** summarizes three types of activity centers and provides local examples.

The level of success for corridors within and between activity centers depends in large part on the intended function of the street. A unique challenge for the future will be to balance the area's mobility needs with other priorities. Often traffic mobility has been given priority without regard for other considerations such as the function of the street, corridor relationship to land use, urban design, and the promotion of alternate modes.

A unique challenge in creating a successful transportation system for the study area is blending connectivity and access functions with preservation of natural features and the unique character of the North Myrtle Beach area. Neighborhoods and smaller communities within the region may have different needs and priorities. While recognizing these differences, it is important not to lose focus of the practical concept of overall connectivity. This concept is particularly relevant as it relates to people's desires to make safe and efficient trips not only by driving, but also by walking, bicycling, or using public transportation. The discussion of complete streets in **Chapter 3** sets the stage for the region to balance the mobility and access functions of a roadway through the recommendations detailed in **Chapter 4**.

Table 2.1 – Activity Centers

Regional Activity Center

- Large-scale, transit-supportive center of employee-intensive land uses
- Core areas contain large-scale and high intensity urban land uses supported by and serving communities within the region
- Accessed by interstates/freeways, principal arterials, and public transportation
- Served by municipal water and sewer
- Higher residential densities
- Balance between residential/non-residential land uses

Community Activity Center

- Include a combination of retail, personal services, civic, educational, and social uses
- Core areas contain medium-scale development that serve the day-to-day needs and activities of the core area occupants and the surrounding neighborhoods
- Accessed by principal arterials and public transportation
- Served by municipal water and sewer
- Medium density residential areas
- Land use mix is approximately 60% residential and 40% non-residential

Neighborhood Activity Center

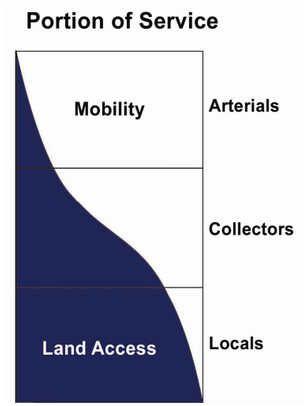
- Mostly residential with a mixed-use core that serves as a focal point for the neighborhood and provides retail and service needs
- Accessed by major and minor arterials with integrated collector street access
- Mixture of low and medium density residential areas
- Transit service provided or desired

Often neighborhoods and activity centers rely on a small number of transportation corridors to provide essential links.



Functional Classification

The classification of streets into several "functional" categories aids in communication among policy makers, planners, engineers, and citizens for expanding the transportation system. The functional classification system groups streets according to the land use served (or to be served) and provides a general designation of the type of traffic each street is intended to serve. The street functional classification system primarily defines the street in terms of roadway design and character, as well as operational features for the movement of vehicles.



Two major considerations for classifying arterials from neighborhood streets are access and mobility. The primary function of local or neighborhood streets is to provide access. These streets are intended to serve localized areas or neighborhoods, including local commercial land uses and mixed-use areas (i.e. low speeds, low volumes, and short distances). Local streets are not intended for use by through traffic. The primary function of arterials is mobility. Limiting access points (intersections and driveways) on arterials enhances mobility. Too much mobility at high speeds limits access by pedestrians and bicyclists. The arterial is designed with the intent to carry more traffic than is generated within its corridor (i.e. higher speeds, higher volumes, and longer distances).

Classifying the street system in the vicinity of the study area required close examination of roles that each street performs in the overall transportation system. Existing plans, as well as quantitative and qualitative classification criteria, also helped in the development of the hierarchy of streets within the study area transportation system. The existing public street network in the study area is divided into several functional classifications, including arterials, collectors, and locals. **Figure 2.6** illustrates the functional classifications for the study area's roadway network. The functional classifications shown in this figure are based on GSATS and SCDOT input. An updated functional classification map is shown in **Chapter 4**.

Arterials

Arterials provide high mobility, operate at higher speeds (45 mph and above), provide significant roadway capacity, have a great degree of access control, and serve longer distance travel. Arterials can be subdivided into categories that include facilities with full access control such as freeways and expressways, as well as major and minor arterials. Arterials usually connect to one another or to collector streets. Very few arterials connect to local streets.

Expressways and Freeways

Expressways and freeways provide the most mobility and least access (since access is only available at interchanges). Expressway/freeway facilities typically serve longer distance travel and support regional mobility. The state funds roadway improvement and maintenance on these facilities. The Carolina Bays Parkway (SC 31) and the Veterans Highway (SC 22) are examples of expressways and freeways in the study area.

Principal Arterials

Principal arterials typically have tightly controlled access and few, if any, individual site driveways. These facilities serve medium to longer distance travel and typically connect minor arterials and collector streets to freeways and other higher type roadway facilities. Generally, roadway improvements and maintenance on principal arterials are funded by the state. Principal arterials within the study area include SC 9 and US 17.

Minor Arterials

Minor arterials primarily serve a mobility function but often have more closely spaced intersections, some individual site driveways, and generally lower design and posted speeds compared to other arterials. The minor arterial network primarily serves local traffic and connects to other minor arterials, principal arterials, and collector streets. Minor arterials provide a higher level of access to adjacent land uses than principal arterials and typically have lower traffic volumes. For the most part, minor arterials are maintained by the state but the cost may be the responsibility of local governments.

In general, minor arterials in the study area have two-lane undivided cross sections with little or no paved shoulders and an occasional left-turn lane at intersections and major driveways. Posted speed limits range from 35 mph to 45 mph. SC 90 and Sea Mountain Highway are minor arterials.

Expressway/Freeway – Carolina Bays Parkway

Principal Arterial – SC 9

Minor Arterial – SC 90

Figure 2.6 | Functional Classification (Per SCDOT and GSATS)

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NORTHEAST AREA TRANSPORTATION PLAN

Functional Classification

- Freeway/Expressway
- Principal Arterial
- Minor Arterial
- Collector
- Study Area Boundary
- Bodies of Water
- State Line
- Local

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Collectors

Collectors typically provide less overall mobility, operate at lower speeds (less than 35 mph), have more frequent and greater land use access flexibility, and serve shorter distance travel than arterials. Collectors provide critical connections in the roadway network by bridging the gap between arterials and locals. Thus, the majority of collector streets connect with one another, with local streets, and with non-expressway/freeway arterials.

The primary purpose of the collector street system is to collect traffic from neighborhoods and distribute it to the system of major and minor arterials throughout an area. In general, collector streets have two lanes and often have exclusive left-turn lanes at intersections with major and minor arterials and less frequently at intersections with other collector streets. While many existing collector streets in the study area are state owned and maintained, new collector streets are rarely constructed and funded by the state. Responsibility for collector streets usually falls to the local government and the development community for funding, design, and construction.

Within the study area, collector streets have a wide range of physical characteristics, some of which are attributable to the neighborhoods in which they exist. One commonality between collector streets, however, is that of providing good connectivity. Examples of collector streets in the study area include Little River Neck Road and SC 57.

Locals

Local facilities provide greater access and the least amount of mobility. These facilities typically connect to one another or to collector streets and provide a high level of access to adjacent land uses/development (i.e., frequent driveways). Locals serve short distance travel and have low posted speed limits (25 mph to 35 mph). Many of the local roads within the study area are unpaved, unimproved facilities. Most roadways within the study area are classified as locals.

Corridor Operations

Regional Mobility

Regional mobility in the study area is provided by one major US route and three major state routes: US 17, SC 9, SC 22, and the Carolina Bays Parkway (SC 31). US 17, also known as the Coastal Highway, runs primarily along the Atlantic Coast between Florida and Virginia. Regionally, US 17 connects North Myrtle Beach and Horry County to its sister cities along the Grand Strand, Charleston to the south, and the Atlantic Coast communities of North Carolina to the north.

SC 9 and SC 22 provide east-west mobility in Horry County and North Myrtle Beach and are the primary travel corridors for many tourists traveling into the region. These routes, while not directly connected to the Interstate system, provide access to Interstates 20 and 95, the major interstate routes in South Carolina. The current cross section for SC 22 is configured much like a freeway, with the expectation that the route will be upgraded to I-73 in the future.

The Carolina Bays Parkway (SC 31) is a recently constructed facility that provides a more efficient route between North Myrtle Beach and Myrtle Beach. The 26-mile facility, with two phases completed, runs between SC 544 and SC 9. A third phase is planned for the near future, extending south from SC 544 to the US 17 Bypass in Surfside Beach. A northern extension also is planned, taking the facility from SC 9 to the North Carolina state line. Eventually, the facility is planned to become part of the I-74 corridor.

SC 22 (Conway Bypass) provides regional mobility for tourists and commuters.

Existing Laneage

The rural — but developing — nature of the study area is evident in the existing laneage of the transportation network. **Figure 2.7** illustrates existing laneage of study area roads. The largest facilities, Carolina Bays Parkway (SC 31) and Veterans Highway (SC 22), are multi-lane highways. The only other multi-lane roadways are US 17/SC9 on the eastern edge of the study area. These roadways serve tourists and regional traffic.

Most of the roadways in the study area are two-lane paved roads such as SC 90 and SC 57 or unpaved roads. Several existing neighborhoods are disconnected due to the unpaved roads. Along the Intracoastal Waterway, valuable land remains vacant because of a lack of paved facilities. The surrounding transportation network has developed with the assumption that existing unpaved roads will be paved as development warrants. For example, at three locations (Long Bay Road, Bourne Trail, and Water Tower Road), bridges connect dirt roads to grade-separated crossings of Carolina Bays Parkway. An interchange has been constructed at another crossing of Carolina Bays Parkway and the unpaved Water Tower Road. At the time of this study, Water Tower Road remained unpaved, though plans are in place to pave the roadway.


Many roads in the study area are two-lanes or unpaved.

Figure 2.7 | Existing Laneage

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NORTHEAST AREA TRANSPORTATION PLAN

- Study Area Boundary
- Bodies of Water
- State Line
- Existing Laneage
- Ramp
- Dirt Road
- Two Lane Road
- Three Lane Road
- Four Lane Undivided
- Four Lane Divided Road
- Five Lane Road
- Six Lane Divided Road
- Local

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Congested Corridors

Congested corridors result from several factors (often because of bottlenecks located primarily at intersections) along the corridor. Aside from individual bottleneck locations in corridors, congestion frequently results from too many people trying to use a route that is already at or over-capacity. Motorists generally do not have the option to take alternative corridors.

Traffic volumes signify the total number of vehicles traveling along a roadway segment on an average day. **Figure 2.8** illustrates 2007 average daily traffic (ADT) volumes on study roadways in North Myrtle Beach and Horry County. The region's highest traffic volumes occur along US 17, ranging from 31,000 to 61,000 vehicles per day. Carolina Bays Parkway (SC 31) and SC 22 also experience high traffic volumes, in excess of 20,000 vehicles per day. Minor arterials with high traffic volumes include SC 90 between Sea Mountain Highway and US 17 (15,000 vehicles per day). Compared to freeways/expressways and arterials, the volumes on collectors and locals are lower due to their design and location.

However, traffic volumes alone should not be used to determine congested corridors because this measurement does not take into account different functional classifications and roadway capacity. A better measurement for this comparison is volume-to-capacity (V/C) ratios. V/C ratios are calculated by dividing the traffic volume of a roadway segment by the theoretical capacity of the roadway. The result is a universal measurement.

Congestion on SC 90 during peak school hours.

These ratios can be compared to roadway Level of Service (LOS), which places roadways into six letter grade levels of the quality of service to a typical traveler on a facility. An "A" describes the highest level (least congestion) and level "F" describes the lowest level (most congestion). The Levels of Service (and V/C ratios) shown in **Figure 2.8** are grouped into one of the following categories. The level of service analysis for this plan was corridor based. As a result, the mid-block congestion shown in **Figure 2.8** does not fully represent congestion that may be occurring at intersections and ramp merges.

- **LOS A or B** — *Well Below Capacity* (V/C = less than 0.75) — Roadways operating with a V/C ratios less than 0.75 operate at optimal efficiency with no congestion during peak travel periods.
- **LOS C** — *Approaching Capacity* (V/C = 0.75 to 1.0) — A roadway with a V/C less than 0.8 typically operates with efficiency. As the V/C nears 1.0, the roadway becomes more congested. A roadway approaching capacity may operate effectively during non-peak hours, but may be congested during morning and evening peak travel periods.
- **LOS D** — *At Capacity* (V/C = 1.0 to 1.1) — Roadways operating at capacity are somewhat congested during non-peak periods, with congestion building during peak periods. A change in capacity due to incidents impacts the travel flow on corridors operating within this V/C range.
- **LOS E** — *Slightly Over Capacity* (V/C = 1.1 to 1.3) — Roadways operating with V/C ratios between 1.1 and 1.3 experience heavy congestion during peak periods and moderate congestion during non-peak periods. Changes in capacity can have major impacts on corridors and may create gridlock conditions.
- **LOS F** — *Well Over Capacity* (V/C = greater than 1.3) — Roadways in this category represent the most congested corridors in the study area. These roadways are congested during non-peak hours and most likely operate in stop-and-go gridlock conditions during the morning and evening peak travel periods.

The rapid rate of growth in the North Myrtle Beach area has made it difficult if not impossible for local decision-makers to construct enough road lanes to handle increases in traffic. The result is peak hour traffic congestion on several major area roadways. The most notable congestion occurs on US 17 and SC 90.

Figure 2.8 | **Congested Corridors** (results based on GSATS Travel Demand Model)

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NORTHEAST AREA TRANSPORTATION PLAN

US and State Routes
Local Roads
Study Area Boundary
Bodies of Water
State Line

2007 Level of Service
LOS A or B
LOS C
LOS D
LOS E
LOS F

2007 Average Daily Traffic

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Traffic Safety and Crash History

Traffic safety is a key component to any successful transportation plan, and a thorough examination of crash history and traffic patterns usually can predict key locations where an improvement in traffic safety will benefit motorists and the community as a whole. SCDOT maintains a list of priority safety locations throughout the state. Two locations within the study area appear on this list: the SC 90 corridor and the intersection of the Carolina Bays Parkway (SC 31) and SC 9. The crash analysis for the *Northeast Area Transportation Plan* considered intersections throughout the study area.

A traditional approach to determining locations for safety countermeasures involves studying the number and type of crashes in a location as well as the associated crash rate for the location. The methodology used in this analysis builds on that traditional approach by factoring in other key components such as total volume of vehicles entering the intersection, the intersection crash rate, and severity. The inclusion of these components allows for the establishment of a priority ranking system that ensures funds earmarked for safety projects are spent in the most efficient and cost-effective manner.

The worst-case crash locations considered for safety improvement in the study area are shown in **Table 2.2**. The summary of crash data shown in the table represents reported crashes at the specified locations from January 2005 through December 2007. These locations also are identified in **Figure 2.9**. Each location was analyzed and given a weighted score for influential factors. The sum of these weighted scores was used to determine the overall safety ranking of the intersection. The analyzed crashes occurred prior to design and geometric changes at three intersections ranked in the top ten (SC 9 at SC 57, SC 90 at Bombing Range Road, and SC 90 at SC 57).

Contributing factors to a location's high crash frequency include intersection design, access considerations, and traffic congestion. Many of the locations identified with high crash frequency were also locations where congestion often exists. A direct relationship exists between traffic congestion and crash frequency, which justifies the ongoing efforts to provide adequate funding for transportation projects that minimize traffic congestion. Driveway access in proximity to intersections also can contribute to crash frequency by increasing unexpected conflict points near the intersection.

A more detailed analysis of the priority crash locations can be found in **Chapter 4**. This discussion includes recommendations for potential countermeasures based on the priority ranking system and a detailed engineering field review.

Table 2.2 – Crash Study Intersections (January 2005 to December 2007)

Rank[1]	Road 1	Road 2	Crashes[2]	Injuries	Fatality	Average ADT[3]	EPDO Rate[4]	EPDO Rate per ADT[5]
1	SC-9	SC-57	186	71	3	14,450	601	42
2	SC-9	SC-31	40	25	1	21,650	185	9
3	SC-90	Sea Mountain Hwy. (SC-20)	65	23	0	21,200	180	8
4	SC-90	Mt. Zion Rd.	30	29	0	16,550	175	11
5	SC-22	SC-90	59	23	0	11,275	174	15
6	SC-90	Bombing Range Rd. (Sec-1173)	17	17	2	6,800	142	21
7	SC-90	St. Joseph Rd. (Sec-1347)	21	10	0	13,100	71	5
8	SC-9	Sea Mountain Hwy. (SC-20)	66	0	0	21,200	66	3
9	SC-90	SC-57	27	11	0	6,075	82	13
10	Little River Neck Rd. (SC-236)	Churchview Lane	3	4	0	4,600	23	5

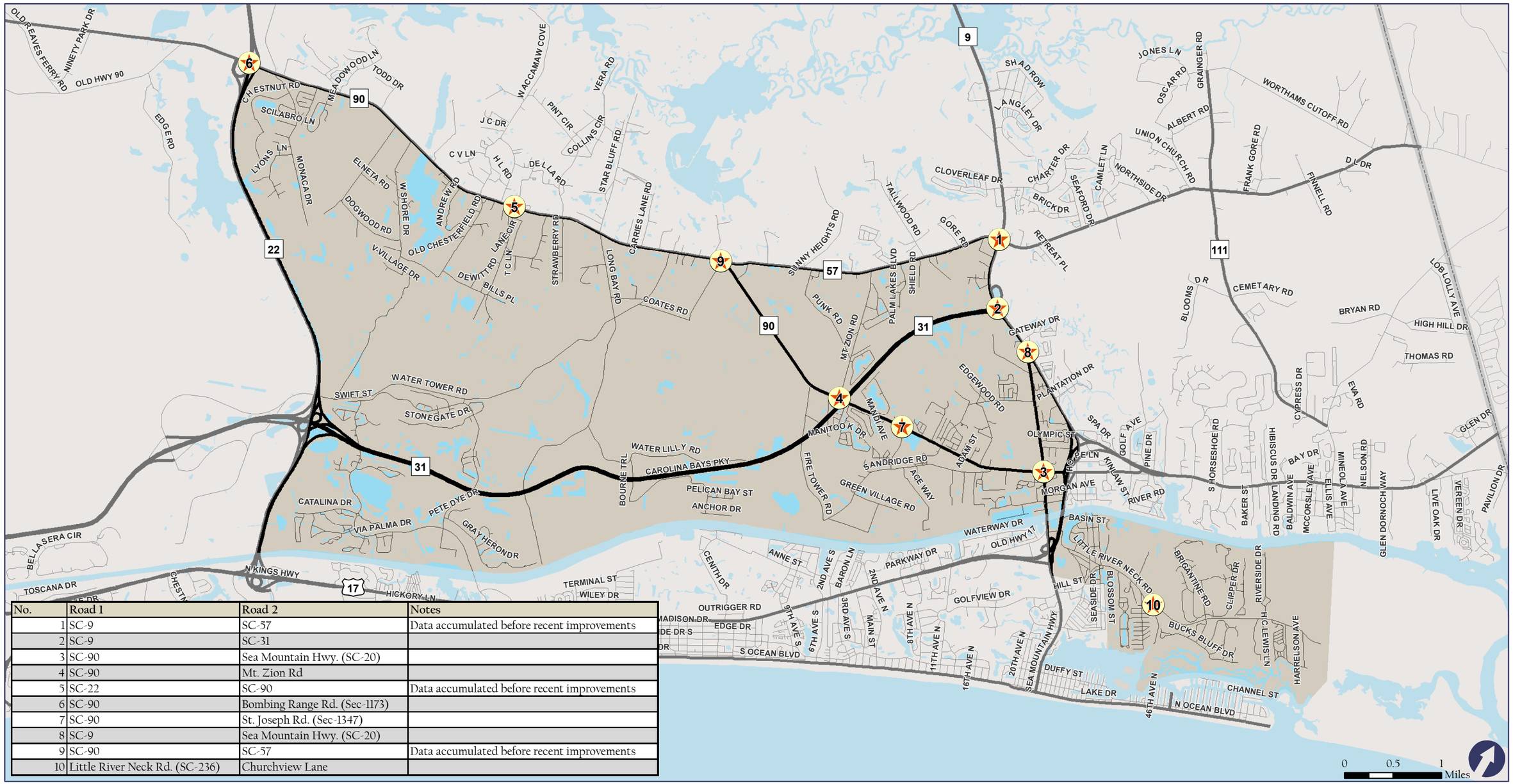
1 *Ranking based on Equivalent Property Damage Only Rate (EPDO) Rate*

2 *Crashes were evaluated for a three year period between January 2005 and December 2007*

3 *Average ADT is the average amount of daily traffic experienced at each intersection*

4 *EPDO Rate = (Fatal Crashes x 20) + (Injury Crashes x 5) + (Not-fatal/injury crashes); EPDO rate is a measure of the total crash costs, with higher severity crashes weighted higher*

5 *EPDO Rate per ADT = EPDO Rate/(ADT x 1,000); EPDO Rate per ADT is a variable used to compare crash frequencies for intersection with varying traffic levels*



No.	Road 1	Road 2	Notes
1	SC-9	SC-57	Data accumulated before recent improvements
2	SC-9	SC-31	
3	SC-90	Sea Mountain Hwy. (SC-20)	
4	SC-90	Mt. Zion Rd	
5	SC-22	SC-90	Data accumulated before recent improvements
6	SC-90	Bombing Range Rd. (Sec-1173)	
7	SC-90	St. Joseph Rd. (Sec-1347)	
8	SC-9	Sea Mountain Hwy. (SC-20)	
9	SC-90	SC-57	Data accumulated before recent improvements
10	Little River Neck Rd. (SC-236)	Churchview Lane	

Figure 2.9 | Crash Analysis Locations

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NORTHEAST AREA TRANSPORTATION PLAN

US and State Routes
Local Roads
Study Area Boundary
Bodies of Water
State Line
Crash Study Intersections

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The City of North Myrtle Beach

Potential and Committed Projects

The assessment of existing conditions also should look to the future and consider projects that appear in local, regional, and state plans. These projects include a wish list of potential projects found in long-range transportation plans as well as committed projects with funding allocated for their implementation. As a growing area with increasing traffic problems, many improvements are proposed for the existing roadway network. These improvements include projects associated with RIDE-II and sales tax funding, the GSATS Long-Range Transportation Plan, and miscellaneous planning studies. The projects in **Table 2.3** were incorporated into the recommended improvements of the *Northeast Area Transportation Plan* and were evaluated to determine any necessary modifications to meet the needs of the future transportation system.

Table 2.3 – Potential and Committed Projects

RIDE-II (committed projects with dedicated funding)

- Widen: US 17 from SC 9 to 8th Ave North

Sales Tax Projects (committed projects with dedicated funding)

- Pave: Gore Road, Andrew Road, Rainbow Drive, Dessie Drive, Churchview Lane, Old Sawmill Circle
- Resurface: Robin Hood Circle, Red Tip Boulevard, Olympic Street, Dewitt Road/Willard Road, Sandridge Road, Old Chesterfield Road

GSATS Long-Range Transportation Plan

- New Construction: New parkway connecting Long Bay Road and Main Street Connector/Robert Edge Sr. Parkway
- New Construction: Additional connection across Intracoastal waterway between US 17 and new parkway
- New Construction: New collector between new parkway and Water Tower Road
- Improve: Water Tower Road from dirt road to 4-lane boulevard
- Improve: Long Bay Road as part of new parkway
- Widen: SC 90 to 4 lanes between SC 22 and SC 9 and from SC 501 to SC 22
- Widen: US 17 bridge over Intracoastal Waterway
- Widen: Little River Neck Road to 3 lanes within North Myrtle Beach city limits
- Widen: S-111 to 4 lanes between SC 57 and S-50
- Widen: S-50 to 4 lanes between S-111 and Little River

US 17 Corridor Study

- Connect: Ocean Drive through Atlantic Beach
- Widen: Ocean Boulevard to 3 lanes between 17th Avenue and 28th Avenue
- Improve: Various intersections

Other

- Extend: Carolina Bays Parkway to North Carolina state line
- Implement: I-73 and I-74 corridors

Existing Multimodal Network

The existing multimodal network in the study area is limited at best. Few amenities for bicyclists and pedestrians combined with a lack of transit service do little to provide adequate choices and encourage travel by modes other than personal automobile.

On-road bicycle facilities are limited to signed routes, such as the Cherry Grove-Little River Neck Road route that uses Little River Neck Road and 24th Street North. This route connects the Little River Neck area with Hill Street Park, Cherry Grove Park, and the East Coast Greenway. Sidewalks are limited to some neighborhood streets and portions of Sea Mountain Highway. While no transit currently exists in the study area, a previous route along US 17 connected shopping centers and local neighborhoods. These limited facilities create a disconnected network that forces cyclists and pedestrians to mix with motor traffic in an unsafe manner.

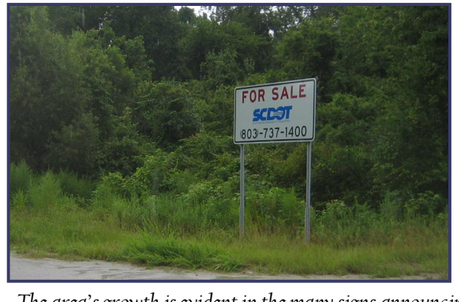
Few amenities for bicyclists and pedestrians combined with a lack of transit service do little to provide adequate choices or encourage travel by modes other than personal automobiles.

Planned Development

The impetus behind the *Northeast Area Transportation Plan* is the area's recent growth from a low-key beach community to a major beach and golf resort destination. This growth has brought pressure on the existing infrastructure, particularly the transportation network. Local officials recognized the need to proactively plan for future growth and the transportation planning process provides a tangible representation of their efforts.

Figure 2.10 illustrates the planned development in the study area. The commercial and residential developments shown in the figure exist in various stages of implementation. The Barefoot Planned Unit Development is largely built out while others remain in the earliest stages of planning. Overall, the planned development shown within the study area includes more than 4,000 single family units, nearly 10,000 multi-family units, and more than 5,000,000 square feet of commercial space.

The figure illustrates the importance of access to development. Many of the developments, including the larger ones, take advantage of Carolina Bays Parkways which opened only a few years ago. The full implementation of other developments may depend on expected improvements to the existing transportation network. For these reasons, the need exists now to plan transportation infrastructure to meet the needs of the residents and visitors of North Myrtle Beach.



The area's growth is evident in the many signs announcing new developments or advertising land for sale.

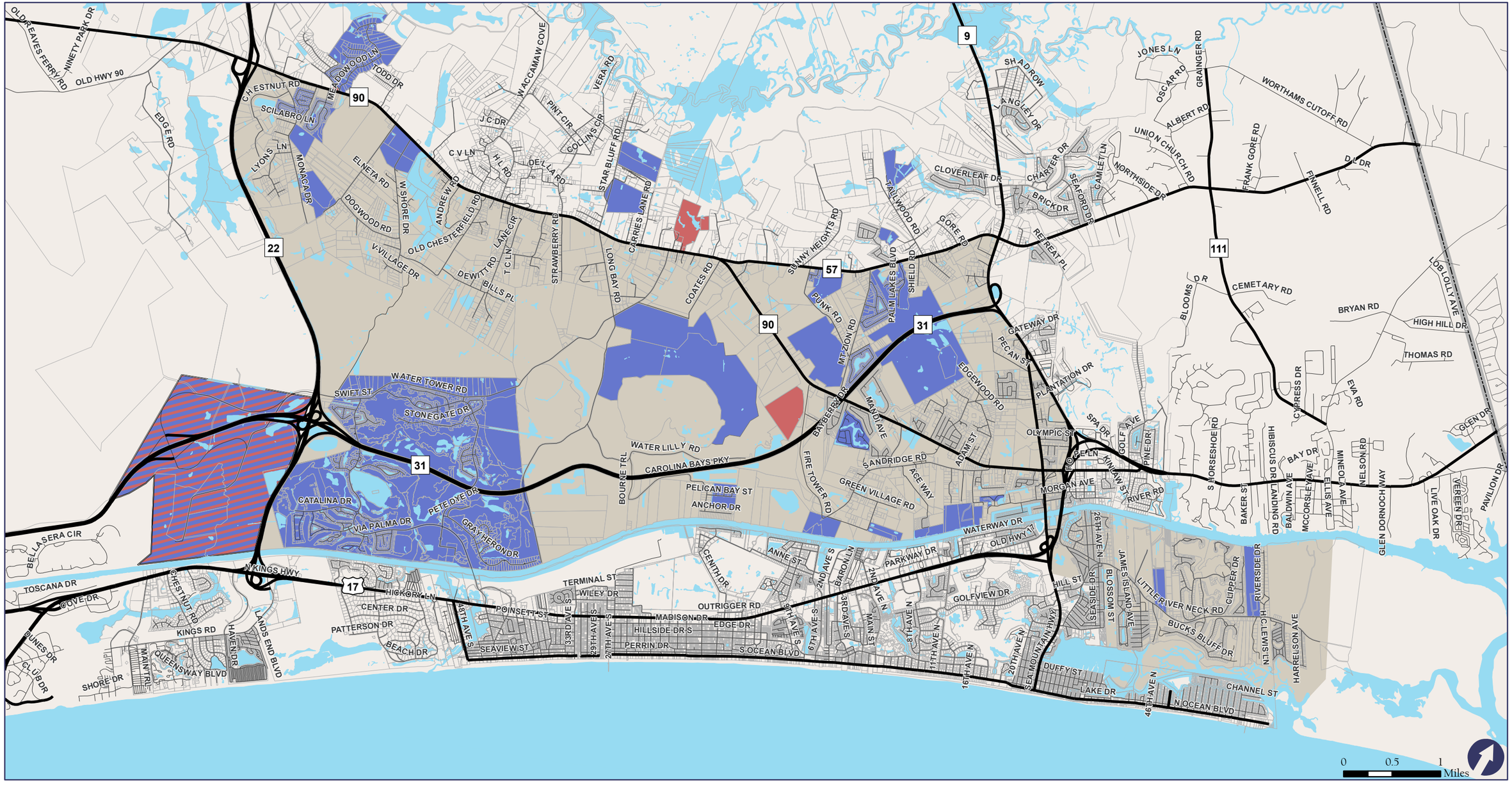


Figure 2.10 | Proposed Developments

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NORTHEAST AREA TRANSPORTATION PLAN

- US and State Route
- Local Road
- Study Area Boundary
- State Line
- Body of Water
- Parcels

Proposed Devlopment

- Commercial
- Mixed Use
- Residential

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Chapter 3 — Transportation Best Practices Toolbox

The *Northeast Area Transportation Plan* addresses expected growth in the project study area, which includes portions of the City and northern Horry County. While the core of the plan is a coordinated set of multimodal transportation recommendations, the plan also serves as a guide for policy-makers and citizen advocates. Sustained growth brings benefits (new cultural, recreational, and economic opportunities) and creates challenges (additional traffic congestion, pollution, safety concerns, loss of open space, and difficulty maintaining the established quality of life). A goal of this project is to provide local planners and administrators a set of tools to answer these challenges. The Transportation Best Practices Toolbox provides background information and guiding principles on access management, collector street planning, complete streets, and interchange design. This information sets the stage for the multimodal recommendations that follow in **Chapter 4**.

Access Management

As the region's most traveled corridors continue to attract commercial development, protecting the ***through capacity*** becomes essential for the efficiency of the transportation system and continued economic growth. Access management balances the needs of motorists using a roadway with the needs of adjacent property owners dependent upon access to the roadway. In an environment with limited funds for transportation projects and competing agendas, ***access management*** is not just good policy but crucial to the health of the entire transportation network.

The Federal Highway Administration (FHWA) defines access management as "the process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding system in terms of safety, capacity, and speed." According to the Access Management Manual, access management results from a cooperative effort between state and local agencies and private land owners to systematically control the "location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway."[1] Access management requires cooperation between government agencies and private land owners.

[1] Access Management Manual, Transportation Research Board, National Academy of Sciences, Washington DC, 2003

Symptoms and Benefits of Access Management

Poor access management directly affects the livability and economic vitality of commercial corridors, ultimately discouraging potential customers from entering the area. A corridor with poor access management lengthens commute times, creates unsafe conditions, lowers fuel efficiency, and increases vehicle emissions. Signs of a corridor with poor access management include:

- Increased crashes between motorists, pedestrians, and cyclists
- Worsening efficiency of the roadway
- Congestion outpacing growth in traffic
- Spillover cut-through traffic on adjacent residential streets
- Limited sustainability of commercial development

Without access management, the function and character of major roadway corridors can deteriorate rapidly and adjacent properties can suffer from declining property values and high turnover. Access management has wide-ranging benefits to a variety of users as shown in **Table 3.1.**

Poor access management contributes to congestion on heavily travelled corridors throughout the study area.

Access management results from a cooperative effort between state and local agencies and private land owners to systematically control the "location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway.

Table 3.1 - Benefits of Corridor Access Management

User	Benefit
Motorists	▪ Fewer delays and reduced travel times ▪ Safer traveling conditions
Bicyclists	▪ Safer traveling conditions ▪ More predictable motorist movements ▪ More options in a connected street network
Pedestrians	▪ Fewer access points and median refuges increases safety ▪ More pleasant walking environment
Transit Users	▪ Fewer delays and reduced travel times ▪ Safer, more convenient trips to and from transit stops in a connected street and sidewalk network
Freight	▪ Fewer delays and reduced travel times lower cost of delivering goods and services
Business Owners	▪ More efficient roadway system serves local and regional customers ▪ More pleasant roadway corridor attracts customers ▪ Improved corridor aesthetics ▪ Stable property values
Government Agencies	▪ Lower costs to achieve transportation goals and objectives ▪ Protection of long-term investment in transportation infrastructure
Communities	▪ More attractive, efficient roadways without the need for constant road widening

Access Management Strategy Toolkit

Access management is not a one-size fits all solution to corridor congestion. Successful strategies differ throughout a region and even along the same road. The Access Management Strategy Toolkit provides a general overview of the various strategies available to mitigate congestion and its effects. A comprehensive access management program includes evaluation methods and supports the efficient and safe use of the corridors for all transportation modes. The purpose of the toolkit is to provide local engineering and planning officials with access management strategies as well as an overview of their application, use, and in some cases unit costs.

Site Access Treatments

Improvements that reduce the total number of vehicle conflicts should be a key consideration during the approval of redeveloped sites along corridors identified for access management programs. Site Access Treatments include the following:

- Improved On-Site Traffic Circulation
- Number of Driveways
- Driveway Placement/Relocation
- Cross Access

Improved On-Site Traffic Circulation

One way to reduce traffic congestion is to promote on-site traffic circulation. Pushing back the throat of an entrance, as shown in the figures to the right, helps to avoid spillback onto the arterial. This action improves both the safety and efficiency of the roadway. A minimum separation of 100 feet should be provided to prevent internal site operations from affecting an adjacent public street, ultimately causing spillback problems. Approximate construction cost varies and usually is the responsibility of private development.

Driveway Throat

Number of Driveways

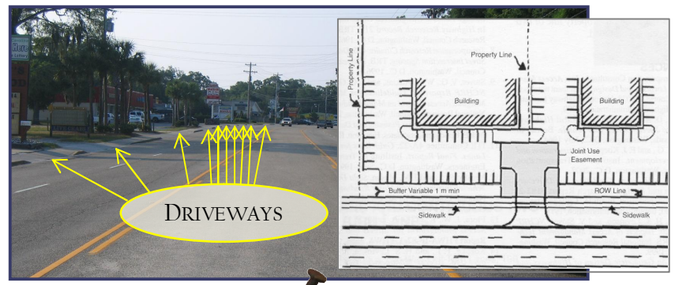
Only the minimum number of connections necessary to provide reasonable access should be permitted. For those situations where outparcels are under separate ownership, easements for shared access can be used to reduce the number of necessary connections. Reducing the number of access points also decreases the number of conflict points, making the arterial safer and more efficient. Approximate construction cost varies and is usually the responsibility of private development.

Driveway Placement/Relocation

Driveways located close to intersections create and contribute to operational and safety issues. These issues include intersection and driveway blockages, increased points of conflict, frequent/unexpected stops in the through travel lanes, and driver confusion as to where vehicles are turning. Driveways close to intersections should be relocated or closed, as appropriate. As a best planning practice, no driveway should be allowed within 100 feet of the nearest intersection.

Cross Access

Cross access is a service drive or secondary roadway that provides vehicular access between two or more continuous properties. Such access prevents the driver from having to enter the public street system to travel between adjacent uses. Cross access can be a function of good internal traffic circulation at large developments with substantial frontage along a major roadway. Similarly, backdoor access occurs when a parcel has access to a parallel street behind buildings and away from the main line. When combined with a median treatment, cross access and backdoor access ensure that all parcels have access to a median opening or traffic signal for left-turn movements.



Driveways on Sea Mountain Highway

As a best planning practice, no driveway should be allowed within 100 feet of the nearest intersection.

Cross Access Opportunities

Median Treatments

Segments of a corridor with sufficient cross access, backdoor access, and on-site circulation may be candidates for median treatments. A median-divided roadway improves traffic flow, reduces congestion, and increases traffic safety – all important goals of access management. While medians restrict some left-turn movements, overall traffic delays are reduced by removing conflicting vehicles from the mainline. Landscaping and gateway features incorporated into median treatments improve the aesthetics of the corridor, in turn encouraging investment in the area. Median Treatments include the following:

- Non-Traversable Median
- Median U-Turn Treatment
- Directional Cross (Left-Over Crossing)
- Left-Turn Storage Bays
- Offset Left-Turn Treatment

Non-Traversable Median

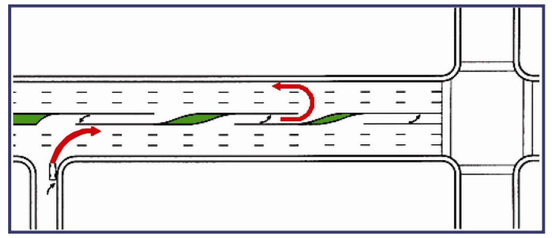
These features are raised or depressed barriers that physically separate opposing traffic flows. Inclusion in a new cross-section or retrofit of an existing cross-section should be considered for multi-lane roadways with high pedestrian volumes or collision rates as well as in locations where aesthetics are a priority. A non-traversable median requires sufficient cross and backdoor access. As these treatments are considered, sufficient spacing and locations for U- and left-turn bays must be identified.

The advantage of non-traversable medians include increased safety and capacity by separating opposing vehicle flows, providing space for pedestrians to find refuge, and restricting turning movements to locations with appropriate turn lanes. Disadvantages include increased emergency vehicle response time (indirect routes to some destinations), inconvenience, increased travel distance for some movements, and potential opposition from the general public and affected property owners. To overcome some of these disadvantages, sufficient spacing and location of U- and left-turn bays must be identified. Approximate construction cost varies.

Median U-Turn Treatment

These treatments involve prohibiting or preventing minor street or driveway left turns between signalized intersections. Instead, these turns are made by first making a right turn and then making a U-turn at a nearby median opening or intersection. These treatments can increase safety and efficiency of roadway corridors with high volumes of through traffic, but should not be used where there is not sufficient space available for the provision of U-turn movements. The location of U-turn bays must consider weaving distance, but also not contribute to excessive travel distance.

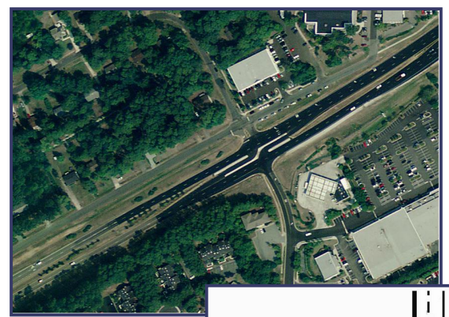
Advantages of median u-turn treatments include reduced delay for major intersection movements, potential for better two-way traffic progression (major and minor streets), fewer stops for through traffic, and fewer points of conflict for pedestrians and vehicles at intersections. Disadvantages include increased delay for some turning movements, increased travel distance, increased travel time for minor street left turns, and increased driver confusion. Approximate construction cost is $50,000 to $60,000 per median opening.



Median U-Turn Movement

Directional Crossover (Left-Over Crossing)

When a median exists on a corridor, special attention must be given to locations where left turns are necessary. A left-over is a type of directional crossover that prohibits drivers on the cross road (side street) from proceeding straight through the intersection with the main road but allows vehicles on the mainline to turn left onto the cross road. Such designs are appropriate in areas with high traffic volumes on the major road and lower volumes of through traffic on the cross road, particularly where traffic needs to make left turns from the main line onto the minor street. A properly implemented left-over crossing reduces delay for through-traffic and diverts some left-turn maneuvers from intersections. By reducing the number of conflict points for vehicles along the corridor, these treatments improve safety

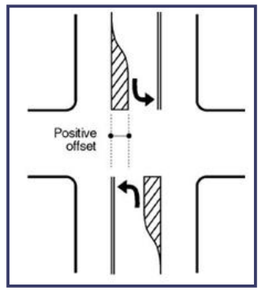


Left-Over Crossing

Left-Turn Storage Bays

Where necessary, exclusive left-turn lanes/bays should be constructed to provide adequate storage space exclusive of through traffic for turning vehicles. The provision of these bays reduces vehicle delay related to waiting for vehicles to turn and also may decrease the frequency of collisions attributable to lane blockages. In some cases, turn lanes/bays can be constructed within an existing median. Where additional right-of-way is required, construction may be more costly.

Offset Left-Turn Treatment



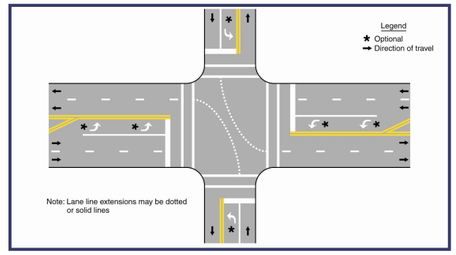
Exclusive left-turn lanes at intersections generally are configured to the right of one another, which causes opposing left-turning vehicles to block one another's forward visibility. An offset left-turn treatment shifts the left-turn lanes to the left, adjacent to the innermost lane of oncoming through traffic. In cases where permissive left-turn phasing is used, this treatment can improve efficiency by reducing crossing and exposure time and distance for left-turning vehicles. In addition, the positive offset improves sight distance and may improve gap recognition. In locations with sufficient median width, this treatment can be easily retrofitted. Where insufficient right-of-way width exists, the construction of this treatment can be difficult and costly. As a result, approximate construction costs vary.

Intersection and Minor Street Treatments

The operation of signalized intersections can be improved by reducing driver confusion, establishing proper curb radii, and ensuring adequate laneage of minor street approaches. Intersection and Minor Street Treatments include the following:

- Skip Marks (Dotted Line Markings)
- Intersection and Driveway Curb Radii
- Minor Street Approach Improvements

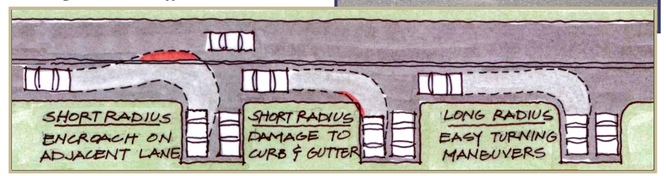
Skip Marks (Dotted Line Markings)



These pavement markings can reduce driver confusion and increase safety by guiding drivers through complex intersections. Intersections that benefit from these lane markings include offset, skewed, or multi-legged intersections. Skip marks are also useful at intersections with multiple turn lanes. The dotted line markings extend the line markings of approaching roadways through the intersection. The markings should be designed to avoid confusing drivers in adjacent or opposing lanes.

Intersection and Driveway Curb Radii

Damage due to insufficient curb radius



Locations with inadequate curb radii may cause turning vehicles to use opposing travel lanes to complete their turning movement. Inadequate curb radii may cause vehicles to "mount the curb" as they turn a corner and cause damage to the curb and gutter, sidewalk, and any fixed objects located on the corner. This maneuver also can endanger pedestrians standing on the corner. Curb radii should be adequately sized for area context and likely vehicular usage.

Minor Street Approach Improvements

At signalized intersections, minor street vehicular volumes and associated delays may require that a disproportionate amount of green time be allocated to the minor street, contributing to higher-than-desired main street delay. With laneage improvements to the minor street approaches, such as an additional left-turn lane or right-turn lane, signal timing often can be re-allocated and optimized.



Intelligent Transportation System

Intelligent Transportation Systems (ITS) have many potential benefits when implemented in concert with an overall transportation management strategy. ITS solutions use communications and computer technology to manage traffic flow in an effort to reduce crashes, mitigate environmental impacts such as fuel consumption and emissions, and reduce congestion from normal and unexpected delays. Successful systems include a variety of solutions that provide surveillance capabilities, remote control of signal systems components, seamless sharing of traveler information with the public, and even allow emergency vehicles to have priority to proceed safely through signalized intersections. Intelligent Transportation Systems include the following:

- Signalization
- Progressive-Controlled Signal System
- Dynamic Message Signs (DMS)
- Closed Circuit Television Traffic Monitoring
- Emergency Vehicle Preemption

Signalization

The volume of traffic attracted to some side streets or site driveways is more than can be accommodated acceptably under an unsignalized condition. Delays for minor street movements as well as left-turn movements on the main street may create or contribute to undue delays on the major roadway and numerous safety issues. The installation of a traffic signal at appropriate locations can mitigate these types of issues without adversely affecting the operation of the major roadway provided they are spaced appropriately. Approximate construction cost is $50,000 to $60,000 per signal.

Progressive-Controlled Signal System

A progressive-controlled signal system coordinates the traffic signals along a corridor to allow vehicles to move through multiple signals without stopping. Traffic signals are spaced appropriately and synchronized so when a vehicle is released from one intersection the signal at the next intersection will be green by the time the vehicle reaches it.

Likewise, adaptive signal control involves continuously collecting automated intersection traffic volumes and using the volumes to alter signal timing and phasing to best accommodate actual—real-time—traffic volumes. Adaptive signal control can increase isolated intersection capacity as well as improve overall corridor mobility by up to 20% during off-peak periods and 10% during peak periods. Approximate construction cost is $250,000 per system and $10,000 per intersection in addition to 25% of capital costs in training, etc.

Dynamic Message Signs (DMS)

Dynamic Message Signs alert vehicles of congestion or incidents. DMS units give general alerts, such as “congestion ahead” or specific details on the location of the incident or predicted travel times so motorists can mentally prepare. Often, drivers are more patient if they can anticipate how long the delay will be or how far the congestion spreads. Perhaps most importantly, DMS informs drivers who can choose alternate travel routes during heavy congestion, thereby reducing the volume on the freeway, the likelihood of additional incidents, and the average travel time for the system as a whole.

Closed Circuit Television Traffic Monitoring

Closed Circuit Television (CCTV) cameras are primarily used on interstate facilities and major arterials to provide visual traffic volume and flow information to traffic management or monitoring centers. These centers use this information to deploy incident response patrols/equipment and to provide roadway travel delay information to motorists. By having visual roadway information, traffic management centers are able to identify incidents quickly and respond appropriately and efficiently, helping to reduce the effect of incidents on a single location or on multiple roadways. Approximate construction cost is $20,000 per location.

Emergency Vehicle Preemption

This strategy involves an oncoming emergency or other suitably equipped vehicle changing the indication of a traffic signal to green to favor the direction of desired travel. Preemption improves emergency vehicle response time, reduces vehicular lane and roadway blockages, and improves the safety of the responders by stopping conflicting movements. Approximate construction cost is $5,000-$7,000 per intersection plus $2,000 per equipped vehicle.

Access Management Solutions

While acknowledging some access management strategies are better suited to one corridor type than another, detailed analysis of three strategic corridors was undertaken to provide an overview of the concepts that could be applied throughout the study area. The result of this analysis is presented in **Chapter 4**.

Collector Street Planning

As mentioned in **Chapter 2**, the role of a collector street in a balanced transportation system is to collect traffic from neighborhoods and distribute it to the network of arterials. As such, these streets provide relatively less mobility but higher overall accessibility compared to higher level streets. The lower design speeds and multimodal amenities make these streets attractive for bicyclists and pedestrians. The proper design and spacing of collector streets is critical to ensuring the balanced transportation network envisioned by the residents and local officials in the North Myrtle Beach area.

Policy Considerations

The design of a collector street network must respect present and future conditions, the public's vision for the future, and how the network can best balance the natural environment, connectivity, access, mobility, and safety.

Natural Environment

With abundant wetlands — including the Carolina Bays — in the area, local planners face challenges related to the natural environment. The local geography has created a network of creeks, wetlands, and floodplains that impact land use and transportation decisions. These features affect how the community develops, where streets can be constructed and maintained, and where connections between streets can be made. Collector streets, as part of the development process, must respect the natural environment.

Street Spacing and Access

Local officials also must consider street spacing guidelines to promote the efficient development of an expanding transportation system. Ultimately, these street spacing guidelines could be used as "rules of thumb" during the development review process. Different spacing standards are necessary for different development types and intensities. Understanding this principle, Kimley-Horn developed a theoretical model largely influenced by land use intensity ranges that shows the desired collector street spacing for different intensities.

Land Use/Type of Collector Street	Intensity (dwelling units per acre)	Access Function	Approximate Street Spacing
Very Low Intensity Residential	Less than 2	High	3,000 to 6,000 ft
Low Intensity Residential	2 to 4	High	1,500 to 3,000 ft
Medium and High Intensity Residential	More than 4	High	750 to 1,500 ft
Activity Center	Mixed-use	Medium	750 to 1,500 ft

In addition to these recommendations, individual driveway access to collector streets should be limited to local streets when possible.

Design Elements

As most communities' largest collection of public space, streets need to reflect the values of the community and reinforce a unique 'sense of place' to be enjoyed by citizens – whether in urban, suburban, or rural contexts. This is especially true for a collector street system that serves as the backbone for local mobility, property access, and non-vehicular transportation modes.

Recently, municipalities across the country have started implementing "complete streets" as one way to transform their transportation corridors from vehicle-dominated roadways into community-oriented streets that safely and efficiently accommodate all modes of travel – not just motor vehicles. The complete street movement as described later in this chapter does not advocate for one size fits all — a complete street in an urban area may look quite different from a complete street in a more rural area. However, both facilities are designed to balance mobility, safety, and aesthetics for everyone using the travel corridor. Furthermore, design considerations supportive of complete streets include elements in both the traditional travel corridor (i.e., the public realm) as well as adjacent land uses (i.e., the private realm) for reinforcing the desired 'sense of place.'

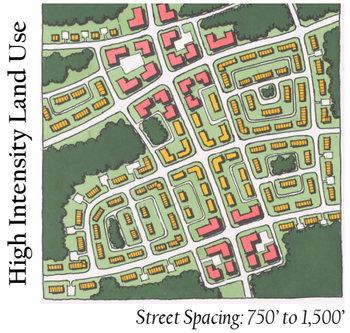
Future Collector Street Network

A future collector street network was developed using the policy considerations discussed above and the guiding set of planning principles discussed in **Chapter 2**. This network is presented in detail in **Chapter 4**.

Collector Street Spacing

Street Spacing: 3,000' to 6,000'

Street Spacing: 1,500' to 3,000'



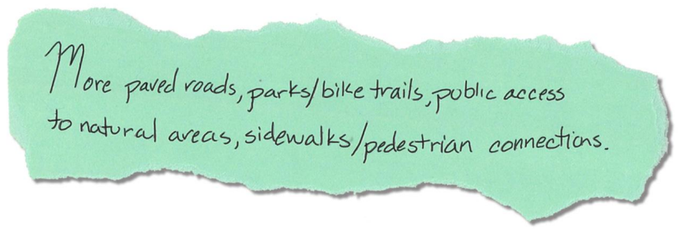
Street Spacing: 750' to 1,500'



Complete Streets

"Complete streets" is a term used nationally to describe the transformation of vehicle-dominated thoroughfares in urban and suburban areas into community-oriented streets that safely and conveniently accommodate all modes of travel, not just motorists. This section of the transportation best practices toolbox describes the process and components of a complete street, setting the stage for the plan's transportation and land use recommendations.

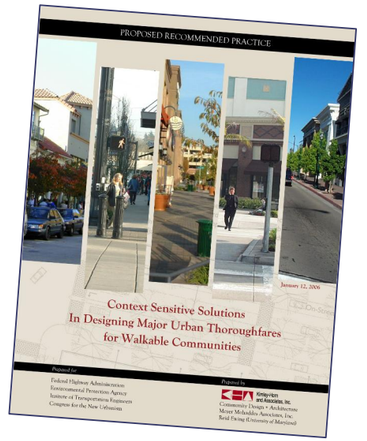
The inclusion of complete streets in the *Northeast Area Transportation Plan* is a response to a public interest. The citizens, business owners, and local officials in the study area recognize the importance of a shift from an automobile-dominated roadway to a balanced, multi-modal transportation system that respects all users of the roadway and the rights of adjacent land owners. Outreach meetings with citizens were well-attended and provided an opportunity for a majority of the participants to voice their concerns about the apparent single-focus transportation vision in this region.



Implementing Complete Streets

Transforming major thoroughfares into complete streets is complicated, requiring a diverse range of skill sets and broad support from the community. Fortunately, other metropolitan areas have demonstrated success stories that have been translated into guiding documents. The most detailed guidance comes from a joint effort of the Institute of Transportation Engineers and Congress for the New Urbanism. With funding from the U.S. Department of Transportation and the U.S. Environmental Protection Agency, best practices have been published as "Context-Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities."

Successful complete street transformations require community support and leadership, as well as coordination between various disciplines. In particular, support must include economic revitalization, business retention and expansion, property owner involvement, urban planning, urban design, landscape architecture, roadway design, utility coordination, traffic engineering, transportation planning, transit planners, architects, graphic artists, and developers.



Guiding Principles

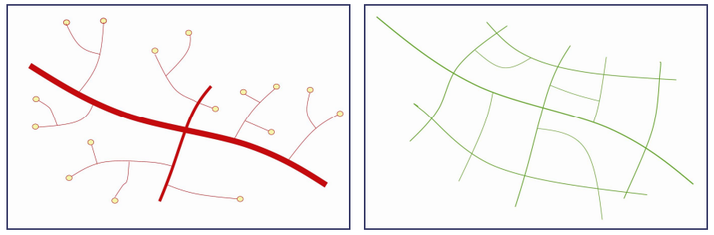
The following principles embody the most important aspects of a successful complete streets program:

- Achieve community objectives.
- Blend street design with the character of the area served.
- Capitalize on a public investment by working diligently with property owners, developers, economic development experts, and others to spur private investment in the area. A minimum return-on-investment of $3 private for every $1 of public investment should be expected. Often in more densely populated areas, the ratio is 10:1 or more.
- Design in balance so that traffic demands do not overshadow the need to walk, bicycle, and ride transit safely, efficiently, and comfortably. The design should encourage people to walk.
- Empower citizens to create their own sense of ownership in the success of the street and its myriad characters.

Caveats

Street transformations, however, require a tremendous effort by many stakeholders. Several factors contribute to the successful implementation of a complete street transformation, including:

- **An interconnected network of major and minor streets** with some redundancy in traffic capacity on parallel major streets. Concern over a "loss" of traffic capacity can be tempered with "surplus" capacity elsewhere.



Limited connectivity resulting in heavy reliance on arterial system (left) versus well-connected system of streets (right).

- **A demonstrated and well-defined problem that can be addressed with a complete street transformation.** The community should agree that the problem demands a solution and enough citizens feel compelled to "show up, stand up, and speak up in support." It will never be possible to get everyone to agree with every detail of the new design, but near universal agreement on the problem definition is critical.
- **A non-profit group to create an agenda for change.** During the early phases of the transformation project, a non-profit group can help facilitate change and participate in design meetings to make sure that designers continue to pursue solutions and decisions that will ultimately achieve the community objective.

Policy Support

Beyond the support provided with this update of the community transportation plan, the other important policy documents that should reflect complete street policies or enabling language include:

- City or County Comprehensive Plans
- City or County Comprehensive Transportation Plans
- Area Plans (for the applicable area served by the complete street)
- Park Master Plans (if adjacent to the corridor)
- Economic Revitalization/ Development Strategies

Street Realms

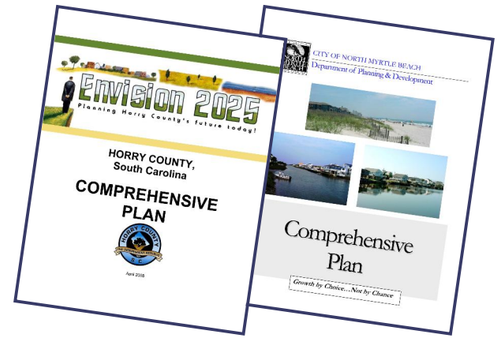
As described below, complete streets can be viewed in terms of four basic zones or realms: the **context realm**, **pedestrian realm**, **travelway realm**, and **intersection realm**. The Multimodal Recommendations chapter (**Chapter 4**) concludes with a series of illustrations that show typical cross section and plan views for different street types. Together these street designs ensure the needs of all users are accommodated.

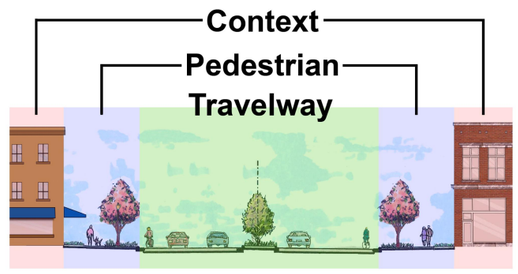
Context Realm

The context realm of a complete street is defined by the buildings that frame the major roadway. Identifying distinct qualities of the context realm requires focusing on four areas: building form and massing, architectural elements, transit integration, and site design.

Building Form and Massing

To enhance an already high-quality street design and help create a complete street, buildings should be located close enough to the street that they are able to frame the public space enjoyed by pedestrians. In more urban areas, these buildings should be located directly behind the sidewalk. Buildings with stairs, stoops, or awnings may even encroach into the pedestrian realm to provide visual interest and access to the public space. Suburban environments that must incorporate setbacks for adjacent buildings should limit this distance to 20 feet or less and avoid off-street parking between buildings and the pedestrian realm.





Inviting and varied building facades that address the street and appropriate building heights with regard to street width are important in the Context Realm.

Larger setbacks in these suburban areas will diminish the sense of enclosure afforded to the pedestrian and move access to the buildings farther away from the street. In both environments, building heights should measure at least 25% of the corridor width. For example, a 100-foot wide roadway right-of-way should be framed by buildings that are at least 25 feet high (a typical two-story building) on both sides with facades that are at most 20 feet from the edge of right-of-way.

Architectural Elements

Careful placement and design of buildings adjacent to the major roadway offer opportunities for meaningful interaction between those traveling along the corridor and those using the corridor for other purposes. These opportunities are greatly enhanced when restaurants, small shops and boutiques, residential units, and offices are located adjacent to the street. Building scale and design details incorporated into individual buildings foster a comfortable, engaging environment focused on the pedestrian. Common building design treatments generally favored in a pedestrian environment include awnings, porches, balconies, stairs, stoops, windows, appropriate lighting, promenades, and opaque windows.

Transit Integration

Areas that are targeted for high-quality transit service must be supported through land use and zoning policies that support transit-oriented development and reflect the benefits of increased access to alternative modes of travel. Policy examples include appropriate densities and intensities for supporting transit use, parking ratios that reflect reduced reliance on the automobile, and setback and design guidelines that result in pedestrian-supportive urban design. In addition, potential transit service identified for transportation corridors within the community should take into consideration the land use, density/intensity, and urban design characteristics of the surrounding environment before selecting proposed technologies or finalizing service plans.

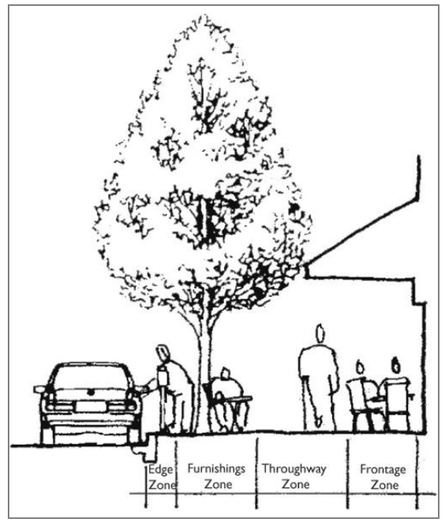
Site Design

The complete street truly is integrated into the surrounding environment when the interface between the site and the street is complementary to the pedestrian environment created along the entire corridor. Access to the site should be controlled through a comprehensive access management program to minimize excessive driveways that create undesirable conflicts for traveling pedestrians. Building orientation, further defined by landscape and architectural elements incorporated into the site should reinforce the public space protected between the buildings. Public paths through sites should be provided to shorten blocks longer than 600 feet.

Pedestrian Realm

The pedestrian realm of a complete street extends between the outside edge of sidewalk and the face-of-curb located along the street. Safety and mobility for pedestrians within this realm is predicated upon the presence of continuous sidewalks along both sides of the street built to a sufficient width for accommodating the street's needs as defined by the environment. For example, suburban settings will require different widths than downtown settings. The quality of the pedestrian realm also is greatly enhanced by the presence of high-quality buffers between pedestrians and moving traffic, safe and convenient opportunities to cross the street, and consideration for shade and lighting needs.

The pedestrian realm may consist of up to four distinct functional zones: frontage zone, throughway zone, furnishing zone, and edge zone. The frontage zone is located near the back of the sidewalk and varies in width to accommodate potential window shoppers, stairs, stoops, planters, marquees, outdoor displays, awnings, or café tables. The throughway zone provides clear space for pedestrians to move between destinations and varies between 5 and 16 feet wide, based on the anticipated demand for unimpeded walking area. The furnishing zone provides a key buffering between pedestrians and moving traffic. It generally measures at least 4 to 6 feet wide to accommodate street trees, planting strips, street furniture, utility poles, sign poles, signal and electrical cabinets, phone booths, fire hydrants, bicycle racks, or retail kiosks targeted for the pedestrian realm. The edge zone is incorporated into the pedestrian realm concurrent with the presence of on-street parking to allow sufficient room for opening car doors.



Sidewalk Pedestrian Zones

Source: CD+A

Incorporation of one or more of these function zones in the pedestrian realm of a street generally is based upon the context of the surrounding built environment. For example, a more urban, downtown environment will include all four zones in the pedestrian realm and could measure up to 24 feet wide. An equally important link to the pedestrian network that is located in a more suburban setting may omit one or more of the function zones listed above, resulting in an overall minimum width of 11 feet.

Recommended design elements for promoting a healthy pedestrian realm generally focus on one of four areas of concentration: pedestrian mobility, quality buffers, vertical elements, and public open space. Together, these best practices can be implemented in both urban and suburban environments, to varying degrees, for promoting healthy pedestrian environments.

Pedestrian Mobility

The presence of a comprehensive, continuous pedestrian network serves as the foundation for fostering a walkable community that supports active transportation and mode choice. Sidewalks generally provide clear zones of 6 to 8 feet wide to accommodate pedestrian travel. In more urban environments, amenities in the frontage zone and furniture zone will greatly increase the overall width of the corridor when compared with more suburban settings. Mid-block pedestrian crosswalks should be incorporated into the urban fabric as needed to make sure that convenient crossing opportunities are provided approximately every 300 feet for maximizing efficiency and safety within the pedestrian system. As a general rule, mid-block crossings should be considered on two-lane streets when the block length is greater than 500 feet and the posted speed limit for the travel lanes does not exceed 40 miles per hour.

Quality Buffers

Providing separation between pedestrians and moving traffic greatly enhances the character of the pedestrian realm. The amount of separation incorporated into the pedestrian realm may vary between corridors based on the context of the surrounding built environment or on streets with different travel speed and/or traffic volume characteristics. In downtown areas, parallel or angled on-street parking provides sufficient distance (8 to 18 feet) for separating pedestrian and vehicle traffic. Likewise, landscape planting areas (typically 6 feet wide) incorporated into either urban or suburban environments provide adequate lateral separation for pedestrians. In urban areas, street trees may be placed in tree wells within an overall hardscaping surface instead of using suburban-style grass areas.

Vertical Elements

Vertical elements traditionally incorporated into the pedestrian realm include street trees, pedestrian-scale street lighting, and utilities. Street trees provide necessary shade to pedestrians and soften the character of the surrounding built environment. They should be spaced between 15 and 30 feet apart, be adapted to the local environment, and fit the scale and character of the surrounding area. Pedestrian-scale street lighting incorporated into the pedestrian realm should use metal halide fixtures mounted between 12 and 20 feet high. Utilities should not interfere with pedestrian circulation or block entrances to buildings, curb cuts, or interfere with sight distance triangles. In some cases, burying utilities underground avoids conflicts and clutter caused by utility poles and overhead wires. Relocation of overhead utilities to tall poles on just one side of the roadway, however, can be a cost-effective aesthetic alternative to burial of utilities in a duct bank under the road.

Public Open Space

The pedestrian realm serves a dual purpose within the built environment, acting as both a transportation corridor and a public open space accessible to the entire community. As a result, specific design elements incorporated into the pedestrian environment should reinforce this area as a public space. Properly planned, these design elements could provide opportunities for visitors to enjoy the unique character of the corridor in both formal and informal seating areas. Public art and/or specialized surfaces and materials

Lack of a buffer between the sidewalk and travel lane forces the pedestrian off the sidewalk (top). A landscape buffer creates a safer and more inviting pedestrian environment (bottom).

A seat wall creates informal outdoor public space



introduced into the pedestrian realm are appreciated by slower moving pedestrians. In more urban areas, street furniture and/or outdoor cafes provide opportunities that foster community ownership in the pedestrian realm, such as "people watching." Furthermore, building encroachments in downtown areas, such as stairs and stoops, provide for interesting points of access to the pedestrian realm. Lastly, awnings and canopy trees provide shade which is helpful in the temperate climate of the region.

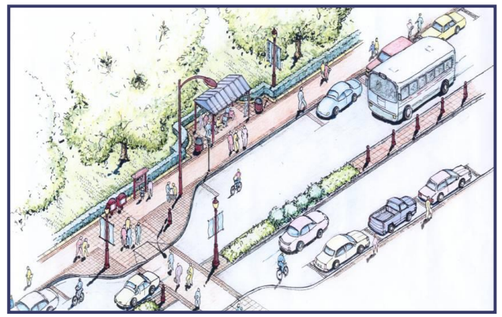
Travelway Realm

The travelway realm of a street is defined by the edge of pavement or curb line (in more urban areas) that traditionally accommodates the travel or parking lanes needed to provide mobility for bicycles, transit, and automobiles sharing the transportation corridor. This area also separates the pedestrian and context realms and may provide carefully-designed crossing opportunities between intersections. Recommended design elements incorporated into the travelway realm serve to achieve greater balance between travel modes sharing the corridor and favor design solutions that promote human scale for the street and minimize pedestrian crossing distance. Recommendations for the travelway realm in a complete street focus on two areas of consideration: modes of travel and medians.

Multimodal Corridors

Balance between travel modes within the same transportation corridor fosters an environment of choice for mobility that could lead to reduced congestion on major roadways and a healthier citizenry. On a complete street, safe and convenient access to the transportation network for bicycles, transit, and automobiles is afforded within the travelway realm. Travel lanes for automobiles and transit vehicles should measure between 10 and 11 feet wide, depending on the target speed, to manage travel speeds and reinforce the intended character of the street. Parking lanes incorporated into the travelway realm should not exceed 8 feet in width (including the gutter pan) and may be protected by bulb-outs evenly spaced throughout the corridor.

Bus stops located along the corridor should be well-designed to include shelters, as well as benches that comfort patrons while waiting for transit service. On-street bicycle lanes (typically 4 to 6 feet wide) should be considered when vehicle speeds range from 30 to 40 miles per hour. Wide outside lanes may be preferred on streets with higher speeds. To avoid situations where citizens with only basic bicycle skills may be attracted to a corridor, designated bicycle routes on parallel corridors may be the best option when speeds on the major street exceed 40 mph. According to state law, bicyclists are considered vehicles and are permitted on all corridors except freeways and access-controlled highways.



A multi-modal corridor includes provisions for bicyclists, pedestrians, and transit riders.

Median Treatments

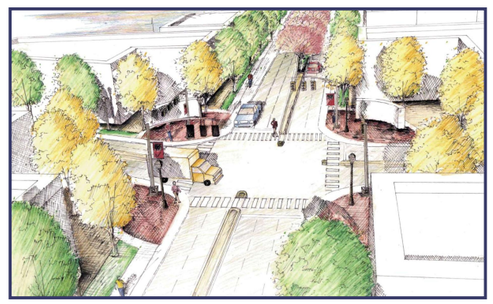
Medians often are incorporated into the travelway realm to provide dedicated left-turn lanes, landscaping, and pedestrian refuge at crossings. They generally vary between 7 and 18 feet wide, depending on their intended application and the limitations of the surrounding built environment. Medians also reinforce other access management solutions provided within the travelway to reduce the number of conflict points and maintain the human scale intended for the complete street.

In addition to center medians, other access management solutions incorporated into the travelway realm should limit the number of individual driveways along the corridor and avoid the use of right-turn deceleration lanes. Together, these improvements will reduce the overall pedestrian crossing distance for the travelway and maximize the safety for pedestrians traveling inside the pedestrian realm.

A before and after illustration of installing a landscaped median on a five-lane roadway.

Intersection Realm

Evaluating potential changes for the intersection realm of a street requires careful consideration for the concerns of multiple travel modes that could meet at major intersections within the transportation system. Recommendations for improving the multimodal environment in and around these major intersections focus on two areas of the facility: operations and geometric design.



Geometric Design

Geometric design of an intersection should reinforce the operational characteristics of a traffic signal or roundabout. With traffic signals, this includes the introduction of curb extensions, or bulb-outs, to shorten pedestrian crossing distance and protect on-street parking near the intersection. Curb return radii designed for signalized intersections should be 15 to 30 feet to control turning speed around corners. At roundabouts, special consideration should be given to entry and exit speeds, pedestrian refuge in the splitter islands, and assigning predictability to the intersection for pedestrians, bicycles, and vehicles. Both intersection treatments may consider special pavement markings to distinguish pedestrian areas or bicycle lanes, although these surfaces need to be stable, firm, and slip resistant. Additional consideration should be given to maintaining adequate sight triangles in the intersection, addressing the treatment of bicycle lanes through the intersection, and compliance with federal requirements per the American with Disabilities Act for crosswalk and curb ramp design.

Operations

In terms of operations, traffic signals or roundabouts are the two most appropriate applications for traffic control devices that also could maintain the pedestrian scale of the street reinforced in the context, pedestrian, and travelway realms. The merits of a traffic signal rather than a roundabout for intersection control should be determined on a case-by-case basis after taking into consideration key issues such as desired traffic speed, availability of right-of-way, anticipated traffic patterns, and the context of the built environment surrounding the intersection.

Bicycle and Pedestrian Planning

Transportation plans once focused solely on roadway solutions, with planners and local officials concentrating on commuter traffic and travel patterns. Livable communities balance travel between modes by accommodating pedestrians and cyclists for both recreational and utilitarian trips. The benefits of cycling and walking include improved health, cost savings, and a cleaner environment. But the transition from potential use of non-motorized transportation to its reality is not easy. The increasing demand for bicycle and pedestrian facilities as expressed by the public has culminated in an enhanced focus on these modes during the transportation planning process. This focus includes the background information that follows as well as the multi-modal recommendations in **Chapter 4**.

Users and Facilities

In order to develop and integrate the recommended bicycle and pedestrian network into the overarching vision for the transportation system, the types of users, facilities, and programs must be understood. For bicycling, the most effective set of recommendations addresses the needs and expectations of all advanced, basic adult, and child bicyclists.

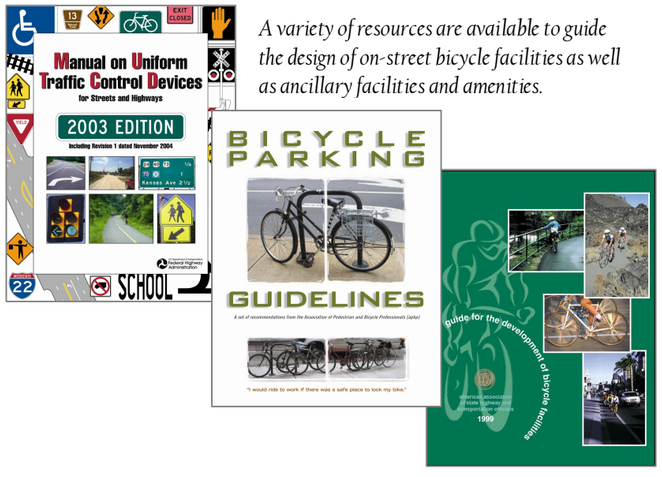
- **Advanced** — Usually the most experienced on the road, advanced cyclists have the ability to safely ride in typical arterial conditions of higher traffic volume and speeds. Most advanced cyclists prefer shared roadways in lieu of striped bike lanes and paths, but may be more willing to accept striped bike lanes when the street gutter is cleaned regularly. Although this group represents approximately 20% of all cyclists, they account for nearly 80% of annual bicycle miles traveled.
- **Basic Adult** — Due to being less secure in their ability to ride in traffic without special accommodations, basic cyclists are casual or new adult/teenage riders who typically prefer multi-use paths or bike lanes. Such facilities reduce basic cyclists' exposure to fast-moving and heavy traffic. Surveys of the cycling public indicate that about 80% of cyclists can be categorized as basic cyclists.

Source: www.pedbikeimages.org

- **Child Bicyclists** — The children on bicycles that make up this group have a limited field of vision while riding and generally keep to neighborhood streets, sidewalks, and greenways. On busier streets, this group is likely to stay on sidewalks or off-street facilities that protect them from traffic. While in general riding on sidewalks should be discouraged, the comfort level of child and basic cyclists may warrant riding on sidewalks provided they yield to pedestrians.

Like drivers, cyclists gain experience over time by riding. As cyclists ride and gain more experience operating in traffic, they graduate from basic to advanced cyclists. This transition ensures that the needs of all three types of cyclists must be constantly evaluated and accommodated. Roadways need to be designed with an eye toward both the intended use by cyclists and pedestrians and how the facility fits into a system-wide network. **Table 3.2** summarizes the major bicycle and pedestrian facilities.

Design considerations should also be given to ancillary bicycle facilities and amenities such as bike racks, bikes on buses and bike amenities at transit stops, and bike-friendly drainage inlets. For pedestrians, attention must be given to curb ramps as well as marked crosswalks and enhancements such as raised crosswalks, pedestrian refuge island, and curb extensions.



A variety of resources are available to guide the design of on-street bicycle facilities as well as ancillary facilities and amenities.

Table 3.2 Bicycle and Pedestrian Facility Overview

Striped Bike Lanes <u>Description</u> • Exclusive-use area adjacent to the outer most travel lane • Typical width: 4' to 5'		<u>Target User</u> • Basic and Intermediate Cyclists <u>Estimated Cost</u> • $18,000 per mile
Wide Outside Lane <u>Description</u> • Extra width in outermost travel lane • Best on roadways with speed limits of 35 mph or higher and moderate to high daily traffic volumes • Typical width: 14' outside lane preferred		<u>Target User</u> • Advanced Cyclists <u>Estimated Cost</u> • $18,000 per mile
Multi-Use Path <u>Description</u> • Separated from traffic and located in open space (greenway) or adjacent to road with more setback and width than sidewalks (sidepath) • Typical width: 10' preferred; 8' in constrained areas		<u>Target User</u> • All Cyclists; Pedestrians <u>Estimated Cost</u> • $600,000 per mile (includes clearing, grubbing, grading, and construction)
Sidewalk <u>Description</u> • Dedicated space within right-of-way for pedestrians • Should include a landscaped buffer from roadway • Typical width: 5' preferred		<u>Target User</u> • Pedestrians <u>Estimated Cost</u> • $150,000 per mile
Unpaved Trail <u>Description</u> • Formal/informal hiking trail made of dirt, mulch, or pea gravel • Typically connects recreational and environmental features of a community • Typical width: 5-8' footpath; 8-10' bike trail		<u>Target User</u> • Off-Road Cyclists; Pedestrians; Hikers <u>Estimated Cost</u> • $10,000 to $20,000 per mile

Programs and Policies

The friendliest areas for bicyclists and pedestrians balance the Five E's — Engineering, Education, Encouragement, Enforcement, and Evaluation. The facilities described above must be supplemented with coordinated programs and policies that instruct and encourage bicyclists and pedestrians in the full and proper use of the non-motorized transportation network.

Engineering

Engineering refers to the network of pathways that must be planned, designed, and constructed. A well-planned bicycle and pedestrian system can enhance user safety and enjoyment and may increase the attraction of each mode.

Education

Once the pathways are in place, new and experienced cyclists and pedestrians must be made aware of their locations and the destinations that can be reached by using them. Bicyclists, pedestrians, and motorists must be educated on the "rules of the road" to ensure everyone's safety while operating on and adjacent to the bicycle and pedestrian facilities. Education programs can be initiated from a variety of sources. Local governments can host workshops and bike rodeos, law enforcement officers can launch school-based education programs, and local advocacy groups can distribute educational materials.

Encouragement

People need to be encouraged to bicycle and walk. Encouragement should become easier as the network of pathways makes the region more bicycle- and pedestrian-friendly. Encouragement becomes more critical as these facilities are constructed to justify the investment. Popular encouragement programs include Safe Routes to School, Walk/Bike to School Days, Bicycle to Work Week, Bicycle Rodeos, and Bicycle Mentor Programs.

Enforcement

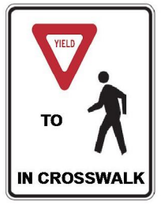
To ensure the safety of all users and the long-term sustainability of the bicycle and pedestrian system, the formal and informal "rules of the road" must be heeded by all. Effective enforcement programs ensure consistent enforcement of traffic laws affecting motorists and bicyclists. These programs include bicycle licensing/registration efforts and positive reinforcement programs implemented by local law enforcement.

Evaluation

Though often overlooked, evaluation is a critical component of bicycle and pedestrian planning. The friendliest communities for cyclists and pedestrians have a system in place to assess existing programs and outline steps for future expansion.

Bicycle and Pedestrian Element

The bicycle and pedestrian element presented in **Chapter 4** focuses on a system of routes in the study area. It should be noted that the inclusion of bicycle and pedestrian facilities on upgrades of existing roadways and newly constructed roadways will contribute to friendliness of the study area to bicyclists and pedestrians.





Interchange Design Toolbox

The following sections provide insight on typical interchange configurations, design standards, existing conditions and problem areas at local interchanges and recommendations for future improvements.

Typical Interchange Designs

The following interchange configurations are the most common types found in the United States. While other variations exist, the following configurations are most likely to be found in a typical freeway setting. When determining the optimal configuration for a freeway interchange, it is important to consider many factors, including projected traffic volumes, land availability, and projected area growth.

Freeway-to-Surface-Street Connections

Freeway-to-surface-street interchanges are intended to provide access to and from the freeway without interrupting its flow, usually by grade separating one of the facilities and providing directional ramps between the freeway and the surface street. A complete interchange between a freeway and a surface street requires four ramps to provide full movements between the two facilities. The following configurations are the most common freeway-to-surface-street interchanges found in the study area and the United States.

A **diamond** interchange is the most basic four-ramp interchange configuration. This layout provides basic entrance and exit movements between the freeway system and the crossing facility. This configuration is effective when traffic volumes are not particularly high or when there are no special constraints governing the construction of the interchange. This configuration does not handle large volumes of traffic or large left-turning volumes well, often causing congestion on the ramps and freeway spillback. For higher traffic volumes on ramps and surface streets, traffic signals need to be installed to accommodate demand. The recently completed interchange at Carolina Bays Parkway and Water Tower Road is a diamond interchange.

Diamond Interchange

An alternative to the diamond is a **partial cloverleaf** interchange, which also utilizes the four-ramp configuration. With two entrance and exit ramps, the partial cloverleaf is functionally equivalent to the diamond; however, the ramps can be configured to accommodate either adjacent property or heavy turning movements. The connection of the ramps from the freeway to the surface street still requires some form of traffic control, whether signed or signalized. As traffic volumes rise, congestion can occur on the ramps and the surface street. The interchange of US 17 and Sea Mountain Highway is a partial cloverleaf.

Full cloverleaf interchanges remove the need for traffic control by providing separate ramps for left-turning and right-turning movements. Traffic that would turn left at a stop-controlled intersection can simply use a loop ramp that merges with the desired direction of travel. The result is reduced delay for entering and exiting traffic. The most significant disadvantage of the cloverleaf interchange is weaving, in which traffic merging left and traffic merging right must cross paths. This situation becomes increasingly dangerous when volumes become higher than about 1,000 vehicles per hour. At these conditions, interference increases quickly and speeds drop on both the ramps and mainlines, increasing the likelihood of congestion.

Partial Cloverleaf Interchange

Full Cloverleaf Interchange

The **single point urban interchange (SPUI)** is a relatively new interchange treatment that merges the principles of a diamond interchange and a typical intersection to form a configuration that can handle greater capacities with less right-of-way needs. The first SPUI was constructed in Clearwater, Florida in 1974, and today there are more than 60 in place nationwide.

The SPUI configuration resembles a diamond interchange from afar. The main difference occurs at the junction of the entrance and exit ramps with the surface street. Where a diamond interchange would have two separate intersections to move traffic, the SPUI utilizes one intersection. In this regard, the configuration operates as a normal at-grade intersection with opposing left turns moving concurrently. All movements can be handled with a three-phase traffic signal – (1) through traffic, surface street; (2) left-turning exit traffic; and (3) left-turning entrance traffic.

The major advantages of the single point urban interchange configuration are its compact layout (requiring little right-of-way) and its ability to move left turns concurrently (increasing capacity). The disadvantages of this configuration include:

- Unfamiliar to drivers
- Multi-lane ramps and surface streets lead to large areas of pavement
- Larger overpasses and bridge structures can be very expensive
- Not pedestrian and bicycle friendly

Freeway-to-Freeway Connections

Freeway-to-freeway interchanges are intended to provide access between the intersecting facilities without interrupting flow on the mainline of the freeways. This is usually accomplished through a series of directional ramps and multiple grade separations. A freeway ending at another freeway requires four ramps, and two freeways crossing one another require eight ramps to create a complete interchange. The following configurations are the most common freeway-to-freeway connections found in the study area and the United States.

The **four-level-stack** interchange is the most common freeway-to-freeway interchange. Each freeway has a direct connection to the other roadway, with no looping or weaving required. The directional ramps cross one another in a four-level deck that can be seen for up to a mile in the approaching directions. With proper design speeds, drivers might not feel the need to decelerate when utilizing the ramps. The disadvantages of this configuration include the large footprint necessary, the high cost of construction, and local opposition. A **modified stack** – which includes two loops – can be found at the confluence of Carolina Bays Parkway and SC 22.

Full cloverleaf interchanges are also very effective at handling freeway-to-freeway connections. Unlike the stack interchange, the cloverleaf only requires two levels to accommodate all eight movements. However, as with the freeway-to-surface-street full cloverleaf connection, weaving is a consideration and can cause congestion and safety-related problems. To counter the effects of weaving, a collector-distributor system may be used.

Design Standards

Freeway design and operation is governed by the Federal Highway Administration (FHWA), and standards for both freeway and interchange design are provided by the American Association of State Highway and Transportation Officials (AASHTO). Published policies on design practices can be found in the AASHTO *Policy on Geometric Design of Highways and Streets*, 2004. The manual provides guidance and standards for many topics including interchange warrants, interchange designs, signing and marking, ramp design speeds, minimum ramp spacing, and minimum acceleration and deceleration distances on ramps.

Study Area Interchange Modifications

Seven interchanges are located in the vicinity of the transportation plan's study area. This figure includes the new Main Street Connector/Robert Edge Sr. Parkway interchange currently under construction. As part of the plan, the project team evaluated two existing interchanges – SC 9 at US 17 and US 17 at Sea Mountain Highway. The proposed reconfiguration of these interchanges is located in **Chapter 4**.

Single Point Urban Interchange

Modified Stack Interchange



Chapter 4 — Multimodal Recommendations

The challenges facing the transportation system in North Myrtle Beach and eastern Horry County are the collective result of sustained growth, continued reliance on the automobile for even short trips, and competing agendas for scarce transportation funds. As the recent high rate of growth quickens and more commuters rely on single-occupancy vehicles, the few projects with committed funding will do little to address deficiencies in the transportation network.

The *Northeast Area Transportation Plan* provides a multimodal approach to the congestion and safety problems that plague the transportation system, now and in the future. This chapter outlines the system (roadway), bicycle and pedestrian, and transit solutions that collectively will ensure the future transportation network operates safely and efficiently.

Systems Recommendations

The first step in determining the effectiveness of the proposed transportation network is to determine a baseline measure of the transportation system's performance at a given horizon year. For the *Northeast Area Transportation Plan*, the Grand Strand Area Transportation Study (GSATS) Transportation model revealed the travel conditions of the 2030 roadway network under two scenarios: no build (no future projects considered) and build (construction of all recommended projects). This section begins with an overview of the no build scenario, presents the systems recommendations, and describes future transportation conditions as shown in the build scenario.

No Build (Do Nothing) Conditions

The initial step in identifying potential projects for the region is to analyze how the existing transportation network will perform in 2030 given current growth patterns. The No Build scenario includes the existing roadway configuration plus the Main Street Connector/Robert Edge Sr. Parkway. No additional projects were included because they either do not appear on the Transportation Improvement Program (TIP) or lack funding. The result of the scenario is a snapshot of the traffic congestion local residents and tourists will face if no improvements to the transportation system are made. As shown in **Figure 4.1**, congestion will affect nearly all the study area's major corridors. In fact, only portions of SC 57, Sea Mountain Highway, and the Main Street Connector operate at acceptable levels in the scenario. Corridors with the worst levels of congestion include the Carolina Bays Parkway, SC 90, and SC 9.

It should be noted that transportation models such as the one used to develop this scenario are designed to forecast future transportation conditions on a regional scale. Model results shown for smaller areas such as the *Northeast Area Transportation Plan* study area can skew the results due to poor calibration of the model. The No Build Conditions are intended to inform policy makers of potential congestion. These results should be supplemented with engineering and planning judgment to determine preferred alternatives that will promote a safe and efficient transportation network.

Recommendations

As we evaluate the transportation network over the next 20 years, it is evident that increasing demands will be placed on the existing road network. With limitations to new construction including natural and man-made barriers, it will become even more important to protect the integrity of the existing system. The list of proposed improvements includes projects that emerged during discussions with area stakeholders, local officials, the Transportation Plan Advisory Group (TPAG), and the general public.

Systems recommendations are placed into three categories: Corridor Recommendations, Spot Recommendations, and Collector Street Recommendations. When possible, proposed projects emphasize protection of existing roadways through improved access management techniques. That is, if a corridor warrants widening or other capacity improvements, a median may be proposed to improve safety, control access, and enhance the corridor aesthetics. Spot recommendations include redesigns for two intersections and two interchanges as well as safety improvements at the priority crash intersections. The collector street recommendations aim to improve connectivity throughout the study area.





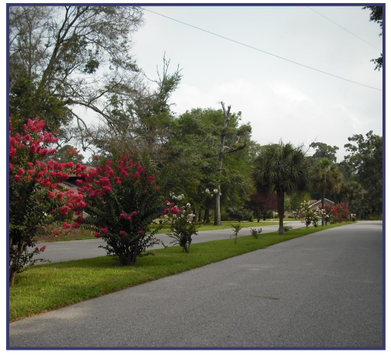


Figure 4.1 | **2030 No Build Congested Corridors** (results based on GSATS Travel Demand Model)

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

- US and State Routes
- Local Roads
- Study Area Boundary
- Bodies of Water
- State Line

Level of Service
- LOS A or B
- LOS C
- LOS D
- LOS E
- LOS F

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Corridor Recommendations

The corridor recommendations are based on information from a variety of channels, including modeling scenarios, corridor operations, traffic safety, and field data. These improvements include widening existing roadways, paving and widening dirt roads, improving two-lane roadways, and constructing roadways on new alignments. Some corridors are identified for access management improvements such as the construction of a landscaped median. **Table 4.1** details these recommendations.

Official Thoroughfare Plan

The Official Thoroughfare Plan displays existing and planned roadways according to their functional classification. The value of the map is two-fold — it can illustrate the vision of the transportation network expressed in a traditional hierarchy of intended roadway function and it can correspond with local land use ordinances to outline right-of-way requirements. The Official Thoroughfare Plan is shown in **Figure 4.2**.

Official Construction Map and Recommended Cross Sections

The Official Construction Map assigns each roadway a typical cross section. This information is organized by the functional classification shown in the Official Thoroughfare Plan. The Official Construction Plan is shown in **Figure 4.3,** and the cross sections follow on pages 4-5 and 4-6. These cross sections are shown in more detail (with plan view and descriptions) in the complete streets section that concludes this chapter.

Recommended Improvements

While the Thoroughfare Plan and Construction Plan show what the streets will look like and how they will function, it is important to identify the improvements necessary to upgrade current streets to the preferred vision. Likewise, it is important to easily identify the location of proposed streets on new location. The Proposed Transportation Improvements Map (**Figure 4.4**) shows the required improvements to the transportation system.

Table 4.1 – Proposed Corridor Recommendations

Route	Project Extents	Length (miles)	Recommendation			
			Improvement	Cross Section	Classification	Bike/Ped
SC 90 South	SC 22 to Main Street Extension	6.98	Widen	4-lane divided	Principal Arterial	Yes
SC 90 North	Main Street Extension to US 17	3.92	Widen	4-lane divided	Principal Arterial	Yes
SC 57	SC 90 to SC 9	2.98	Widen	4-lane divided	Principal Arterial	Yes
Water Tower Road	Parkway PUD to SC 90	5.76	Widen & Pave	4-lane divided	Principal Arterial	Yes
New Intracoastal Parkway	Long Bay Road to Sandridge Road	3.37	New Location	2-lane		Yes
Little River Neck Road	Sea Mountain Highway to End	2.55	Widen	4-lane divided	Minor Arterial	Yes
Hill Street	Sea Mountain Highway to Little River Neck Road	0.61	Widen	4-lane divided	Minor Arterial	Yes
Mount Zion Road	SC 57 to SC 90	1.36	Improve	2-lane	Minor Arterial	Yes
SC 9	SC 57 to US 17	2.11	Improve	4-lane divided	Principal Arterial	Yes
Sea Mountain Highway	SC 9 to Old Highway 17	1.23	Improve Access Control	2-lane	Minor Arterial	Yes
Long Bay Road	Intracoastal Waterway to SC 90	3.87	Widen & Pave	2-lane	Minor Arterial	Yes

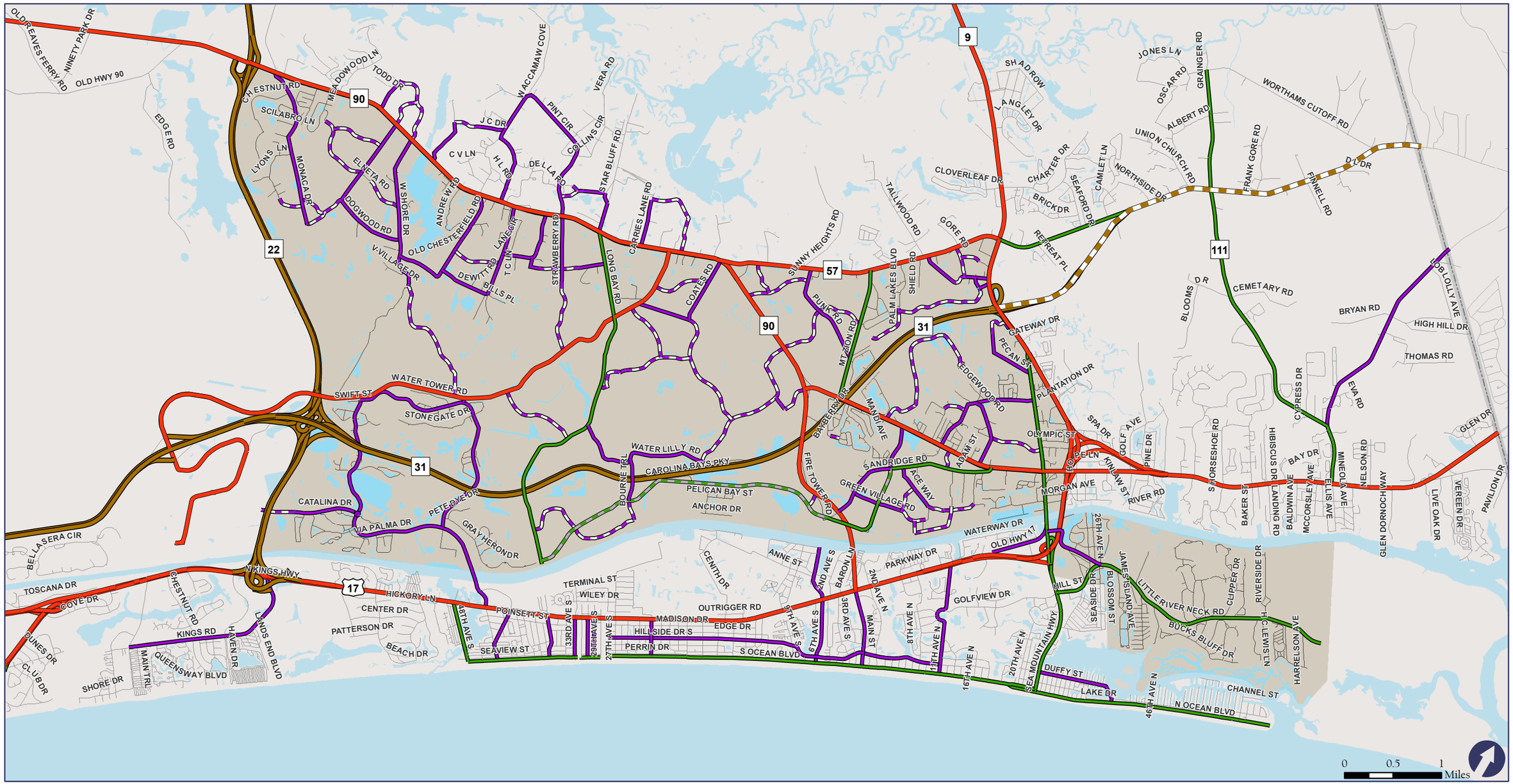

Figure 4.2 | Official Thoroughfare Plan

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

Study Area Boundary
Bodies of Water
State Line

Functional Classification

Freeway/Expressway
Freeway/Expressway (New Location)
Principal Arterial
Minor Arterial
Minor Arterial (New Location)
Collector
Collector (New Location)
Local

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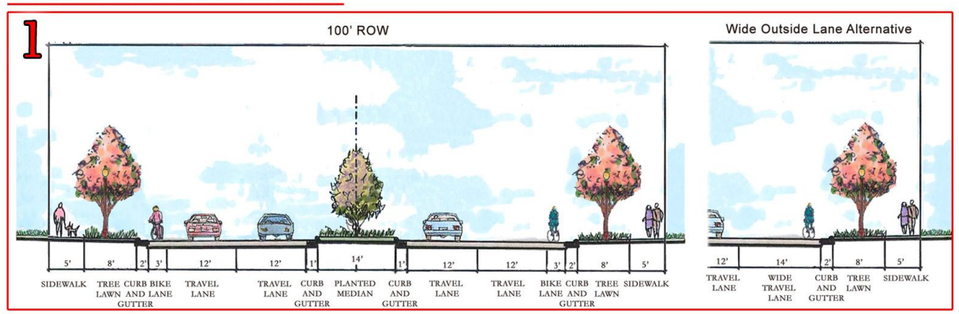
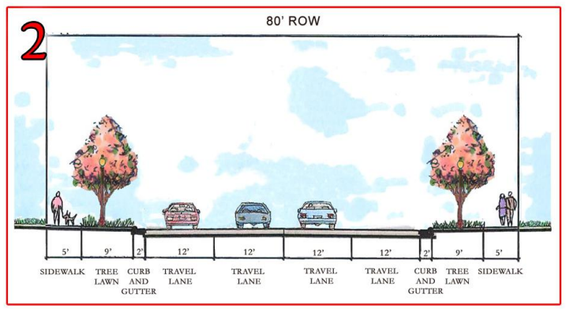
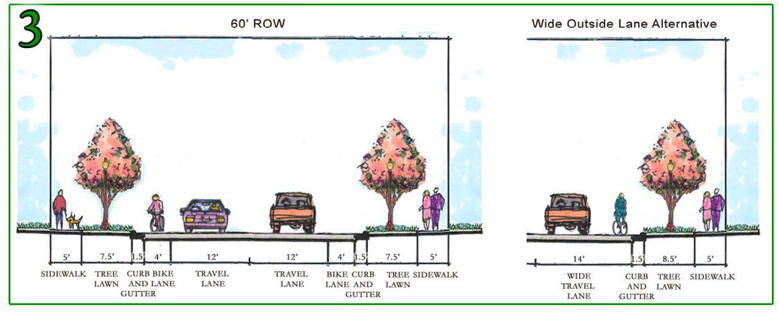
Construction Map Cross Sections

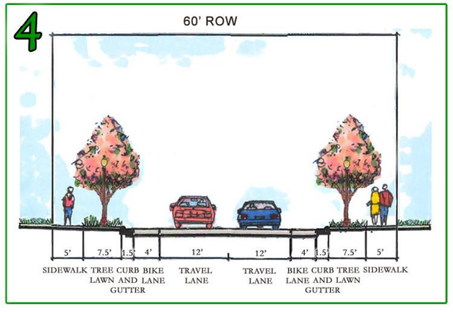
Principal Arterials

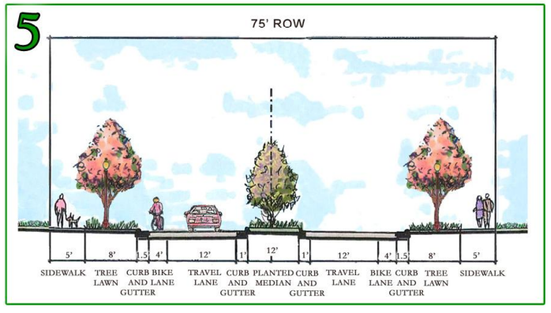


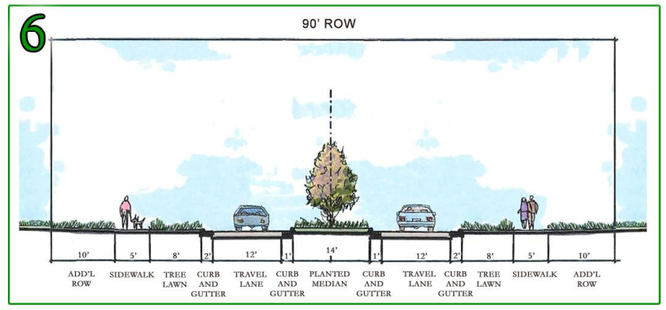


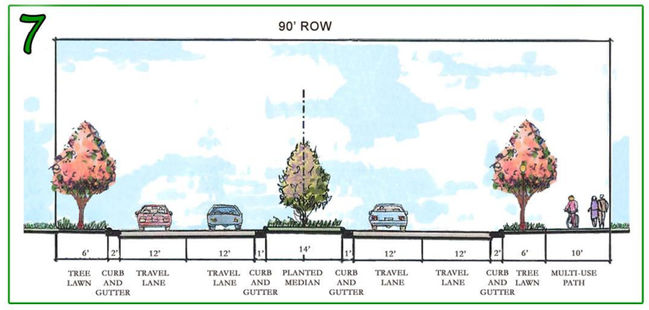
Minor Arterials









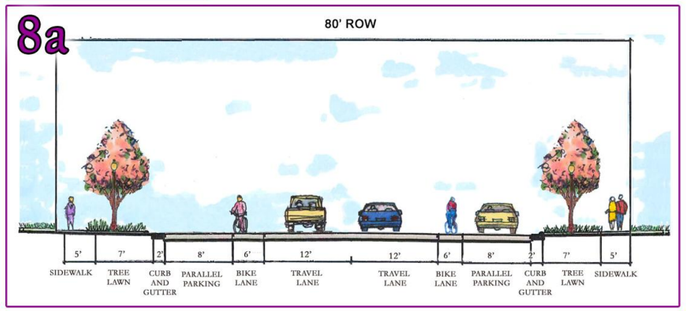


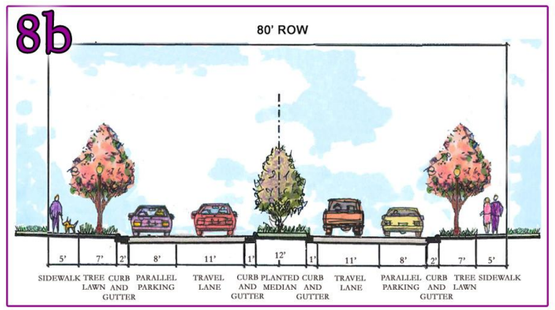
Note:

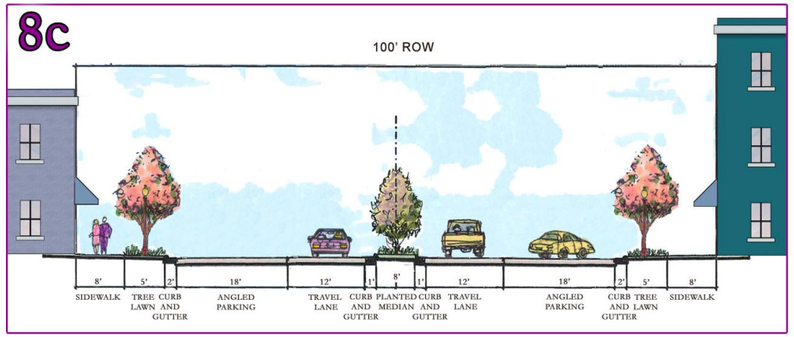
Each type of cross section (Principal Arterial, Minor Arterial, and Collector) corresponds to a color-coded line on **Figure 4.3**. For collector streets, the specific cross section will depend on the local environment and area land uses the roadway serves (i.e. residential, commercial, industrial, etc.).

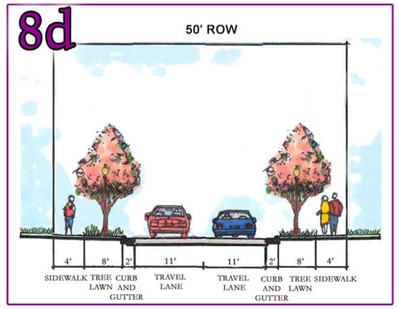
Construction Map Cross Sections

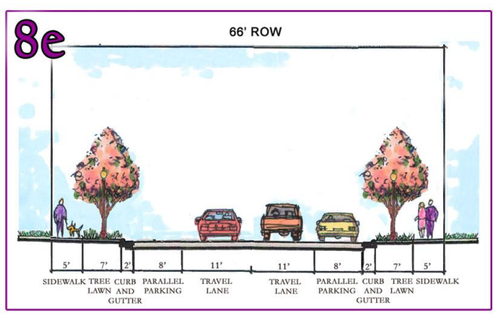
Collectors

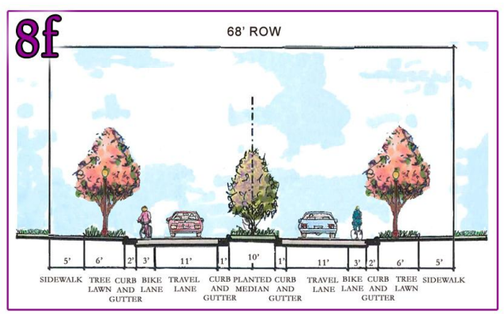












Note:

Each type of cross section (Principal Arterial, Minor Arterial, and Collector) corresponds to a color-coded line on **Figure 4.3**. For collector streets, the specific cross section will depend on the local environment and area land uses the roadway serves (i.e. residential, commercial, industrial, etc.).

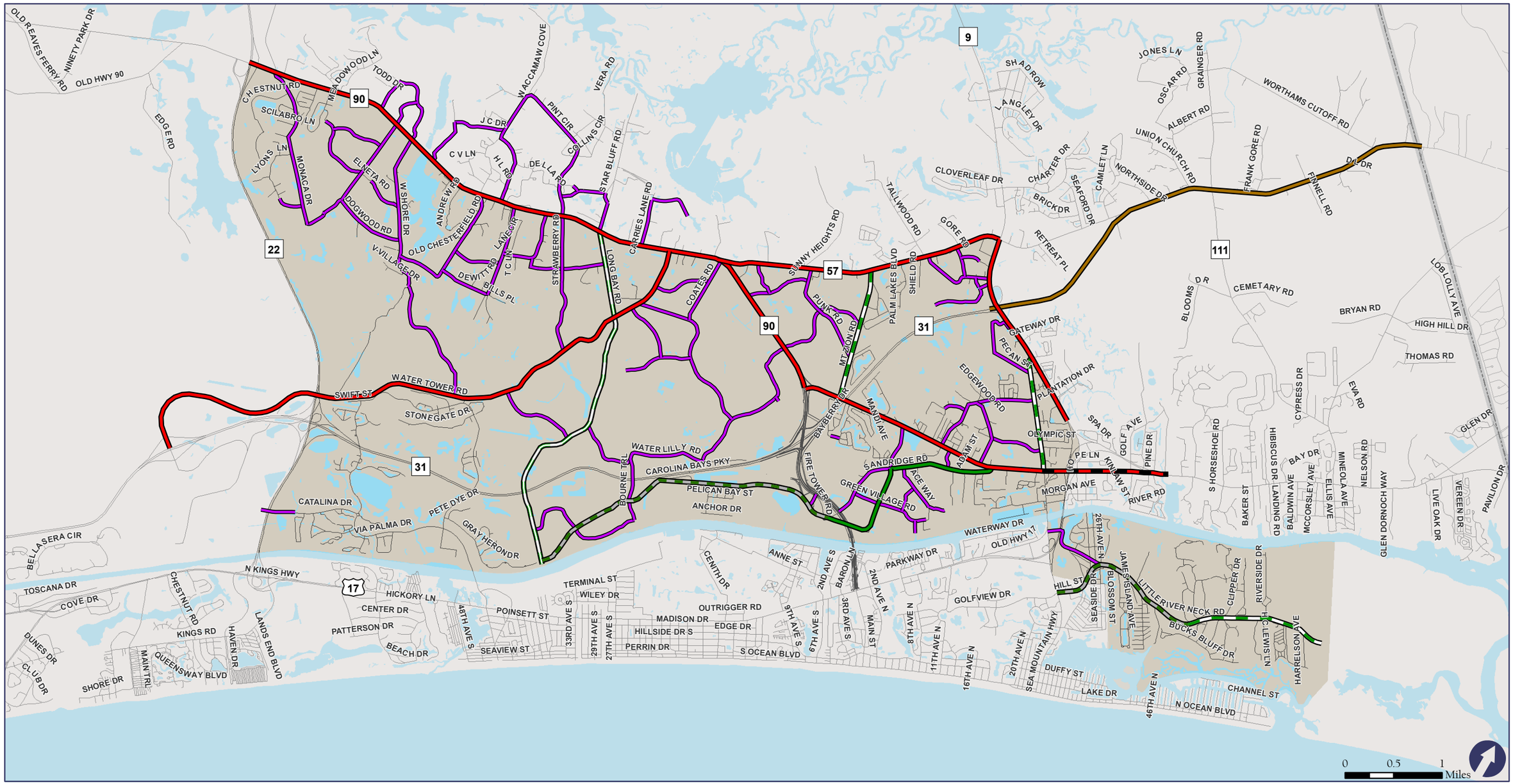


Figure 4.3 | Official Construction Map

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NORTHEAST AREA TRANSPORTATION PLAN

Study Area Boundary
Bodies of Water
State Line

Freeways
Freeway Section (Cross Section Not Shown)

Principal Arterials
1: 4 Lane Divided Principal Arterial
2: 4 Lane Undivided Principal Arterial

Minor Arterials
3: 2 Lane Undivided Minor Arterial
4: 2 Lane Undivided Minor Arterial with Turning Pockets
5: 2 Lane Divided Minor Arterial
6: 2 Lane Divided Minor Arterial on 4 Lane Divided ROW
7: 4 Lane Divided Minor Arterial

Collectors
8a to 8f: Collector Street (Cross Section Varies)
Local Road Section (Cross Section Not Shown)

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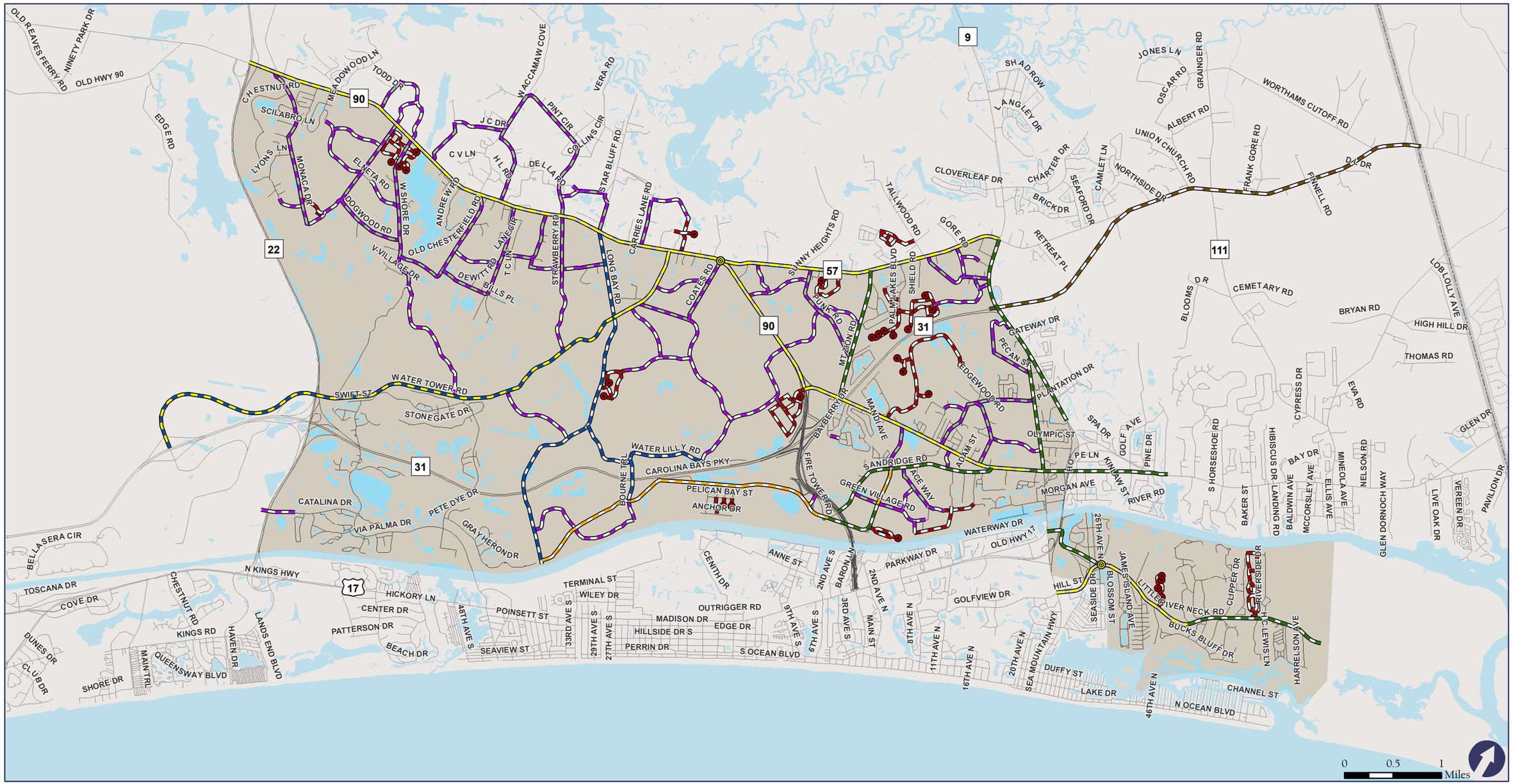

Figure 4.4 | Proposed Transportation Improvements

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

- Study Area Boundary
- Bodies of Water
- State Line
- Local

Corridor Improvements

- Pave and Widen Existing Dirt Road
- Upgrade Existing Alignment (Turn Lanes, Ped/Bike, median, etc.)
- Widen Existing Alignment
- Pave Existing Dirt Road
- Proposed New Location
- Proposed Location
- Upgrade Existing Cross Section
- Intersection Redesign

Proposed Development Street Network

- Streets
- Cul de sac

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Spot Recommendations

Like the corridor recommendations, the spot recommendations are based upon the analysis of existing conditions and anchored on the feedback received at the public meetings. The spot recommendations target critical congestion choke points and safety hazards in the study area. The recommendations include intersection redesigns, interchange reconfiguration, and countermeasures aimed at improving the priority crash locations.

Intersection Redesign

SC 90 and SC 57

The poor design for the existing intersection of SC 90 and SC 57 creates safety issues due to the skew and free-flow movements. The redesigned intersection should be signalized and realigned to match the proposed four-lane alignment and to improve visibility and safety. The SC 57 approach should be improved closer to a 90 degree skew. The free flow right turn from SC 57 will be removed to eliminate the weaving movement. The predominant movement of the signalization should be SC 90 due to the high volume of traffic expected upon completion of the Main Street Connector/Robert Edge Sr. Parkway.

Existing

Proposed

The redesign of SC 90 and SC 57 should be realigned and signalized, and the free flow right-turn from SC 57 will be removed.

Little River Neck Road and Hill Street

Little River Neck Road, Hill Street, 27th Avenue North, and Seaside Drive intersect at multiple angles. The recommended redesign includes a five-leg roundabout. In this configuration, 27th Avenue North will be realigned and Grove Lane will be converted to a cul-de-sac to eliminate the intersection at Little River Neck Road. The redesign assumes improved cross access within the surrounding neighborhoods. While the interim improvement to Little River Neck Road will be two lanes, sufficient right-of-way should be reserved for a future 4-lane divided cross section.

Proposed

Little River Neck Road and Hill Street should intersect at a five-leg roundabout.

Existing

Interchange Reconfiguration

As part of the *Northeast Area Transportation Plan*, the project evaluated two interchanges identified by the public as confusing and dangerous. The interchanges of SC 9 at US 17 and Sea Mountain Highway at US 17 were evaluated in terms of access, mobility, and safety. The following improvements are recommended.

<u>SC 9 and US 17</u>

Current Interchange Design: Combination of 2-level stack and partial diamond

Design Flaws: Does not provide connection from Sea Mountain Highway to westbound SC9 and northbound US 17

Potential Solution: Add two additional movements to the existing interchange through the construction of two new ramps

<u>Sea Mountain Highway and US 17</u>

Current Interchange Design: Partial cloverleaf

Design Flaws: Confusing ramp system with limited weaving distance creates safety issue

Potential Solution: Realign minor movements to and from Sea Mountain Highway to remove dangerous and confusing weave section

Priority Crash Locations and Recommended Countermeasures

A preliminary review of the crash history was performed for six intersections based on the crash rankings established in **Chapter 2**. The South Carolina Department of Public Safety provided detailed intersection data, including causational factors, overall severity, and top crash types for all of the analyzed intersections. Field investigations were performed to confirm existing conditions, identify design features, and observe driver behavior. Field observations provided insight to potential patterns and revealed conditions that could be enhanced through geometric changes or enhancements to traffic control. The six priority crash locations selected for detailed study included:

- SC 31 at SC 9 (interchange)
- SC 90 at Sea Mountain Highway
- SC 90 at Bombing Range Road
- SC 90 at St. Josephs Road
- SC 9 at Sea Mountain Highway
- SC 90 at Mt. Zion Highway

The countermeasures outlined in this section were developed based on data analysis and field observations. Further analysis of each location should be undertaken before determining which final countermeasure should be implemented. A detailed study of crash reports for each location will likely yield the most beneficial and cost-effective solution.

Ideally, countermeasures should be implemented based on the established priority rankings provided in **Table 2.2**. It is not uncommon, however, to select particular countermeasures based on their overall cost and timeframe for implementation. It also is not uncommon to address those locations that are most beneficial to the community, in a more public-guided approach. This mix-and-match approach should allow North Myrtle Beach and Horry County to allocate funding for safety treatments within budget and maximize the number of safety treatments addressed.

The most important aspect of this analysis is that the established safety problems are addressed. In addition, the priority rankings should be updated periodically to determine the effectiveness of the implemented countermeasures and to determine new locations that may need safety treatments.

SC 31 at SC 9

SC 31 and SC 9 intersect in a loop and semi-direct interchange configuration. The interchange experienced 40 total crashes between January 2005 and June 2008. The crashes resulted in 25 injuries and one fatality. The top contributing circumstances for this location include the weaving movements related to the interchange ramp, excessive speeding, and driver inattention. This intersection is listed on the SCDOT "hot spot" safety watch list.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended:

- Implement access management concepts to calm traffic and reduce weaving as outlined in the SC 9 strategic corridor diagram on page 4-19
- Signalize east of interchange to calm traffic and reduce risk of inattentive drivers
- Construct median along SC 9 to eliminate crashes due to two-way left turn lane

Westbound SC 9

SC 90 at Sea Mountain Highway

The signalized intersection of SC 90 and Sea Mountain Highway experienced 65 total crashes between January 2005 and June 2008. The crashes resulted in 23 injuries and no fatalities. Traffic to and from the school contributes to heavy congestion during peak hours and increases safety concerns. The top contributing circumstances for this location include speeding, driver inattention, and failure to yield to right-of-way.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended:

- Remove free flow right turn lanes
- Consolidate driveways
- Delineate turn lanes
- Implement general access management principles
- Re-evaluate signal phasing and timing

These countermeasures are detailed in the SC 90 (Main Street Connector/Robert Edge Sr. Parkway to SC 9) strategic corridor diagram on page 4-22.

Northbound SC 90

Crash Debris

SC 90 and Bombing Range Road

The stop sign-controlled intersection of SC 90 and Bombing Range Road experienced 17 total crashes between January 2005 and June 2008. The crashes resulted in 17 injuries and two fatalities. The top contributing circumstances for this location include failure to yield the right-of-way, primarily with left turning vehicles, and excessive speeds. These factors contributed to a pattern of very severe crashes.

Eastbound SC 90

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasure is recommended:

- Restrict left turns through the construction of a median on SC 90 (This treatment will require vehicles needing to turn left on SC 90 to turn right and then complete a u-turn at a downstream left-over or the proposed signal at Strawberry Road. See the strategic corridor diagram on page 4-18.)

SC 90 and St. Josephs Road

The stop sign-controlled intersection of SC 90 and St. Josephs Road experienced 21 total crashes between January 2005 and June 2008. The crashes resulted in 10 injuries and no fatalities. The top contributing circumstances for this location include speeding and failure to yield the right-of-way. Traffic at this intersection includes vehicles cutting through to large neighborhoods on Sandridge Road.

Westbound SC 90

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasure is recommended:

- Signalize the intersection to remove conflicting movements

SC 9 and Sea Mountain Highway

The signalized intersection of SC 9 and Sea Mountain Highway experienced 66 total crashes between January 2005 and June 2008. The crashes resulted in no injuries or fatalities. The top contributing circumstances for this location include failure to yield right-of-way, excessive speeding, and the roadway geometry. Design flaws include awkward skew, poor visibility for left-turning vehicles, and sharing of signal with a grocery store across SC 9.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasure is recommended:

- Realign Sea Mountain Highway to create a 90 degree approach to SC 9
- Align with Barber Street to maintain access to adjacent development
- Install median to remove conflicts

These countermeasures are detailed in the SC 9 strategic corridor diagram on page 4-20.

Northbound Sea Mountain Highway

SC 90 and Mt. Zion Road

The stop sign-controlled intersection of SC 90 and Mt. Zion Road experienced 30 total crashes between January 2005 and June 2008. The crashes resulted in 29 injuries and no fatalities. The top contributing circumstances for this location include failure to yield right-of-way and excessive speeding. Safety concerns could increase in the future as planned large developments along Mt. Zion Road funnel more traffic to this intersection.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasure is recommended:

- Signalize intersection
- Implement access management strategies along SC 90 as shown in the strategic corridor diagram on pages 4-21 and 4-22

Southbound Mt. Zion Road

Collector Street Recommendations

Expanding the North Myrtle Beach area transportation system with an increased number of collector streets will enhance travel between local streets and arterials. As discussed in **Chapters 2 and 3**, the primary purpose of the collector street system is to collect traffic from neighborhoods and distribute it to the system of major and minor thoroughfares throughout an area. In general, collector streets have two lanes and often have exclusive left-turn lanes at intersections with major and minor thoroughfares and less frequently at intersections with other collectors. Collector streets rarely are constructed and funded by the state. Responsibility for collector streets usually falls to the local government and developers for funding, design, and construction. A properly implemented system improves accessibility to higher intensity residential areas and activity centers while minimizing impacts to sensitive natural areas. As a result, local and through traffic will benefit from the reduced reliance on the area's network of thoroughfares.

Future Collector Street Network

The future collector street network is shown in the Official Thoroughfare Map and Official Construction Plan. The network includes more than 21 miles of collector streets on new location (to be constructed as development occurs). An additional 25 miles of existing roadways are recommended to be upgraded to collector street standard as development warrants. It should be noted the routes shown on the maps are not precise and more detailed planning will be required prior to construction. The purpose of the collector streets on the maps is to show critical connection points throughout the study area.

The network was developed using the policy considerations discussed in **Chapter 3**. Key goals of this network included improving accessibility to higher intensity residential areas and activity centers while avoiding or minimizing impacts to sensitive areas for the preservation of the natural environment. Although environmental and built constraints (such as creeks, wetlands, and limited-access highways) restricted the number of collector streets that could be identified, the general policy recommendations will provide local staff with the ability to encourage connectivity as future development occurs. Ultimately, the future collector street network will provide a greater level of connectivity and mobility to residents by reducing the travel time between local streets and arterial streets.

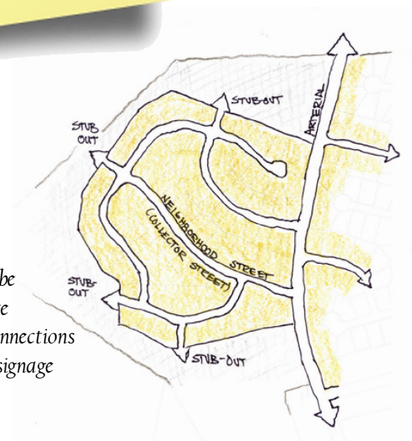
General Policy Recommendations

The following general policy recommendations are offered for consideration in an effort to increase the number of collector streets to better facilitate travel between local streets and arterials:

- Use the future collector street network as a tool to review proposed development projects and plans as they locate and design future collector streets
- Amend the collector street network to include new streets as they are identified during the development review process
- Work with the development and real estate community to increase public awareness of future collector street connections through enhanced signage
- Provide <u>temporary</u> turnaround accommodations for collector street stub-outs to allow access by maintenance and emergency vehicles if length exceeds 150'; right-of-way needed for these turnarounds would revert back to property owners once the connection is made
- Require new developments to reserve right-of-way for, and in some cases construct, future collector streets
- Consider adopting policies and dedicating funding to help construct traffic calming measures on existing collector streets that become connected to new collector streets
- Require all new development to provide connections or stub-out streets in each of the four cardinal directions (where applicable)

Build (Systems Recommendations) Conditions

With a limited number of transportation projects currently in the pipeline and growth pressures mounting, the study area transportation network will experience gridlock conditions on key corridors if no improvements are made. The systems recommendations were developed to mitigate these concerns. The Build (Systems Recommendations) condition scenario identifies congested corridors if all projects are constructed by 2030. As the map indicates, compared to the No Build scenario (**Figure 4.1**), congestion will improve throughout the study area, particularly on SC 22, SC 90, and portions of SC 9.



Stub-outs should be identified as future collector street connections though enhanced signage

Typical Collector Street

Figure 4.5 | **2030 Build Congested Corridors (with Recommendations)** (results based on GSATS Travel Demand Model)

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

US and State Routes
Local Roads
Study Area Boundary
Bodies of Water
State Line

Level of Service
LOS A or B
LOS C
LOS D
LOS E
LOS F

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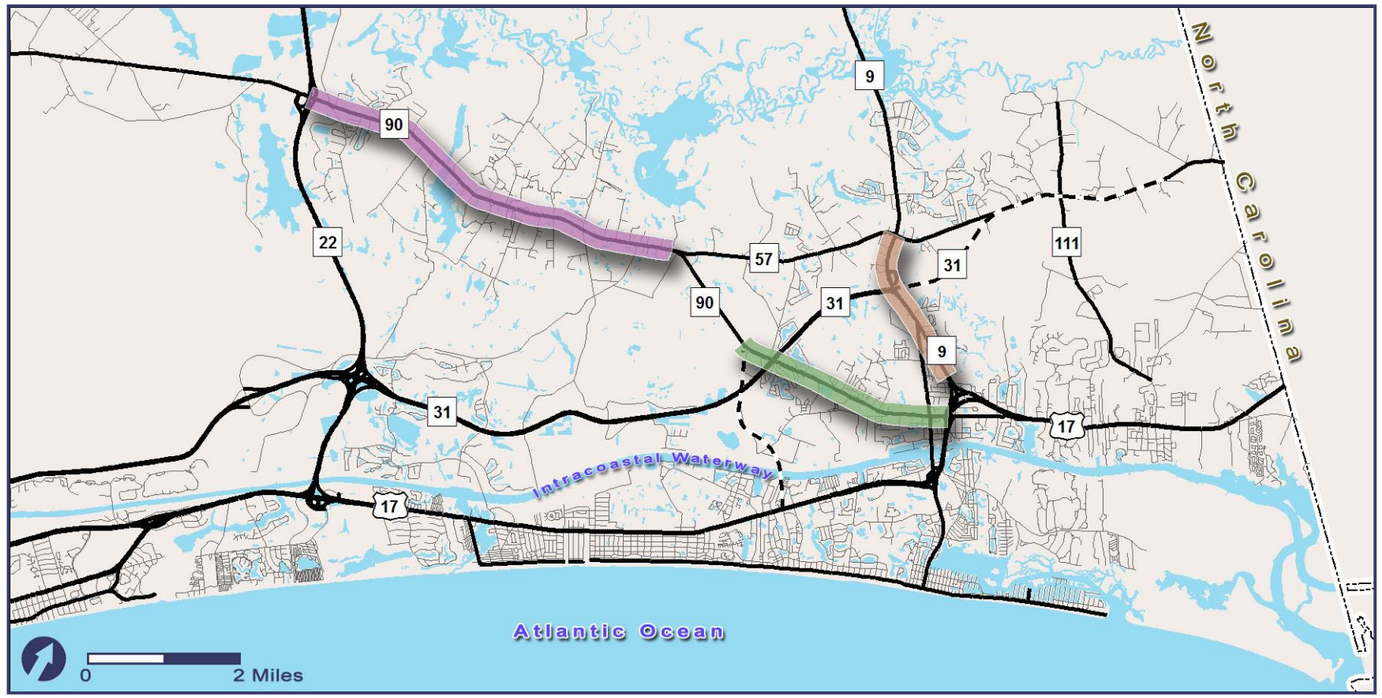
Strategic Corridors

In addition to the system recommendations described previously, the following corridor descriptions identify potential recommendations for those roadways identified as community strategic corridors. These corridors were selected after discussions with the Advisory Committee, general public, and staff. The recommendations represent potential solutions that ease congestion, increase safety, and reflect the vision and goals identified by the community. These recommendations are reflected on the corridor recommendations maps (**Figures 4.2 to 4.4**).

Three corridors were selected for detailed study as part of the *Northeast Area Transportation Plan*. These corridors provide a sampling of conditions found throughout the area. These conditions include typical cross sections, heavy traffic congestion particularly during peak hours, and commercial development adjacent to the roadway.

- **SC 90 from SC 22 to SC 57** – 5.4 miles – Ultimate cross section should be 4-lane divided principal arterial (additional right-of-way will be required)
- **SC 90 from Main Street Connector/Robert Edge Sr. Parkway to US 17** – 3.9 miles – Ultimate cross section should be 4-lane divided principal arterial (additional right-of-way will be required)
- **SC 9 from SC 57 to US 17** –2.1 miles – Ultimate cross section should be 4-lane divided principal arterial (within existing right-of-way)

These corridors were selected for detailed study because the conditions and issues of these corridors are representative of other roads throughout the study area. As such, the recommendations and access management solutions can be applied to other corridors. By taking the proper steps now, strategic corridors can promote new growth, accommodate increases in traffic, and contribute to the success of the overall transportation system. Detailed illustrative examples for each corridor follow.



Access Management Notes:

Spacing Standards - "Rules of Thumb"

- Median Opening Spacing: 1,500' to 2,000'
- Intersection Spacing: 1/4 mile to 1/2 mile

Design Consideration

Median left-over access is subject to change based on development/redevelopment along the corridor. Locations shown are approximate and should be re-evaluatied at the time of full design.

Left-Over Example



NORTHEAST AREA TRANSPORTATION PLAN

SC 90 (SC 22 to SC 57)

Strategic Corridor

Proposed Corridor Improvements
- Pave and Widen Existing Dirt Road
- Upgrade Existing Alignment
- Widen Existing Alignment
- Pave Existing Dirt Road
- Proposed New Location

Proposed Collector Street Network
- Proposed Location
- Upgrade Existing Cross Section

Proposed Development Street Network
- Streets
- Cul de sac

Access Management
- Proposed Plantable Median
- Full Median Access
- Median Left-Over Access
- New Roadway Connection
- Access Closure
- Potential Cross Access Opportunity
- Curb Installation
- Proposed Pedestrian Improvement

0 300 600 900 Feet

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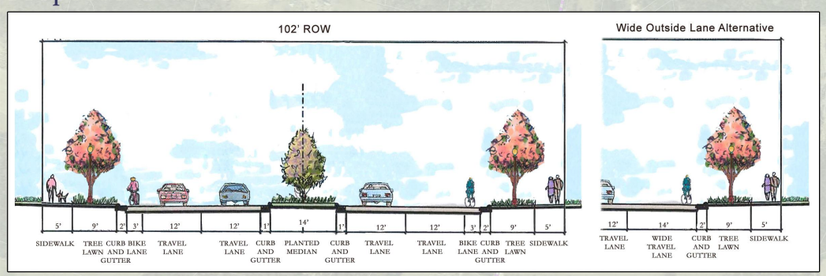
Red Bluff Rd
90
Monaca Dr
Whispering Oaks Dr
Junco Cir
Meadowood Ln
Pint Ridge Rd
West Shore Dr
Chestnut Rd
22
Veterans Hwy

Proposed Cross Section



Uninterrupted planted median extends east to Pint Circle (shown on following page)

NORTHEAST AREA
TRANSPORTATION PLAN

SC 90 (SC 22 to SC 57) - continued

Strategic Corridor

Proposed Corridor Improvements
- Pave and Widen Existing Dirt Road
- Upgrade Existing Alignment
- Widen Existing Alignment
- Pave Existing Dirt Road
- Proposed New Location

Proposed Collector Street Network
- Proposed Location
- Upgrade Existing Cross Section

Proposed Development Street Network
- Streets
- Cul de sac

Access Management
- Proposed Plantable Median
- Full Median Access
- Median Left-Over Access
- New Roadway Connection
- Access Closure
- Potential Cross Access Opportunity
- Curb Installation
- Proposed Pedestrian Improvement

0 300 600 900 Feet

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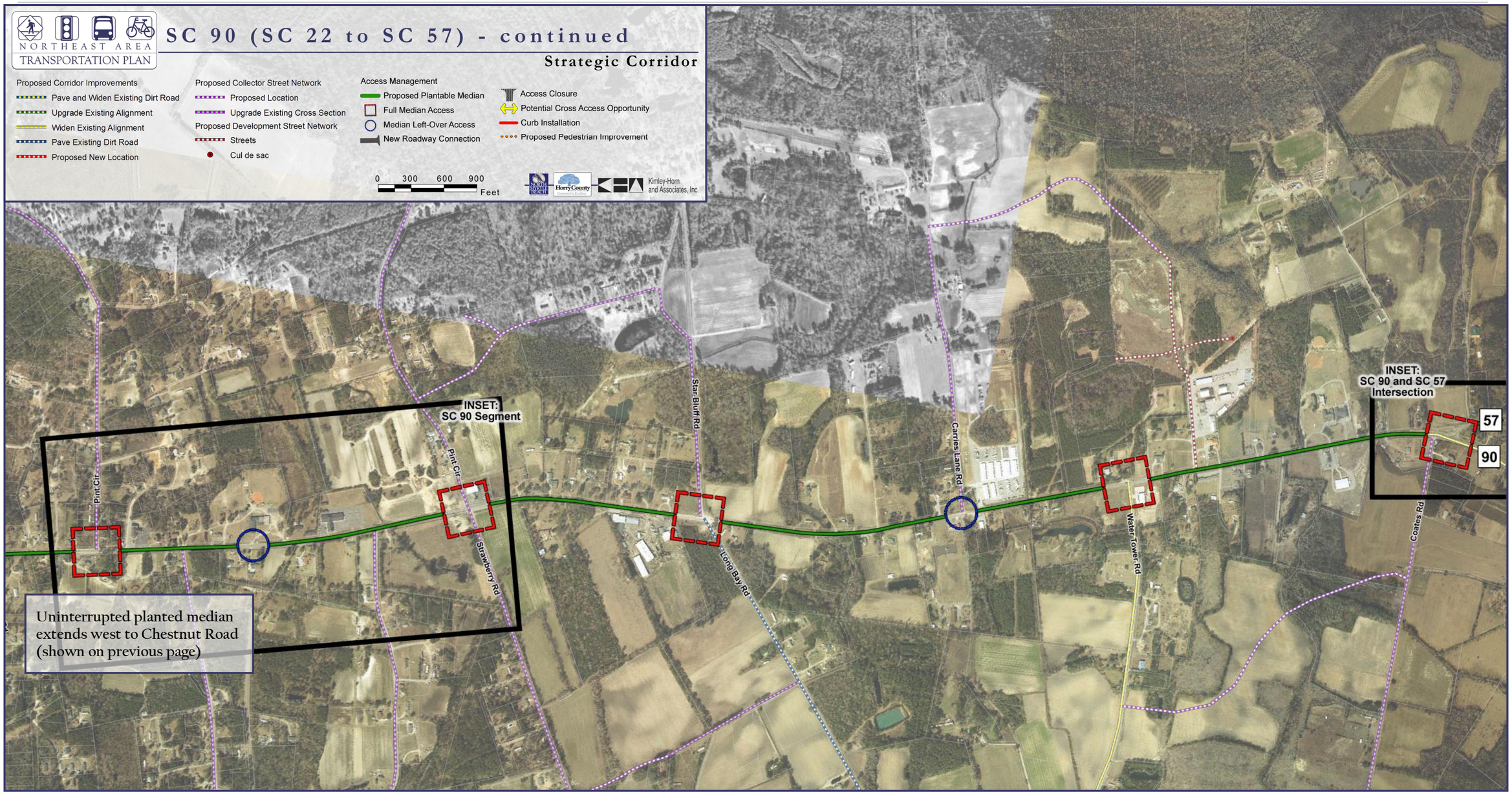
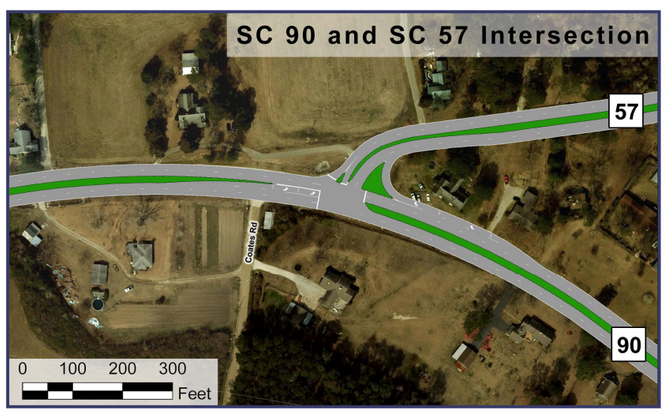


SC 90 — SC 22 to SC 57 — Strategic Corridor Insets



Cross Section Improvements

- Upgrade existing 2-lane roadway to 4-lane divided with landscaped median

Intersection Improvements

- Redesign intersection of SC 90 and SC 57

Bicycle and Pedestrian Improvements

- Construct wide outside lanes for experienced cyclists
- Construct sidewalks on both sides

Full Median Access Locations (Signalized)

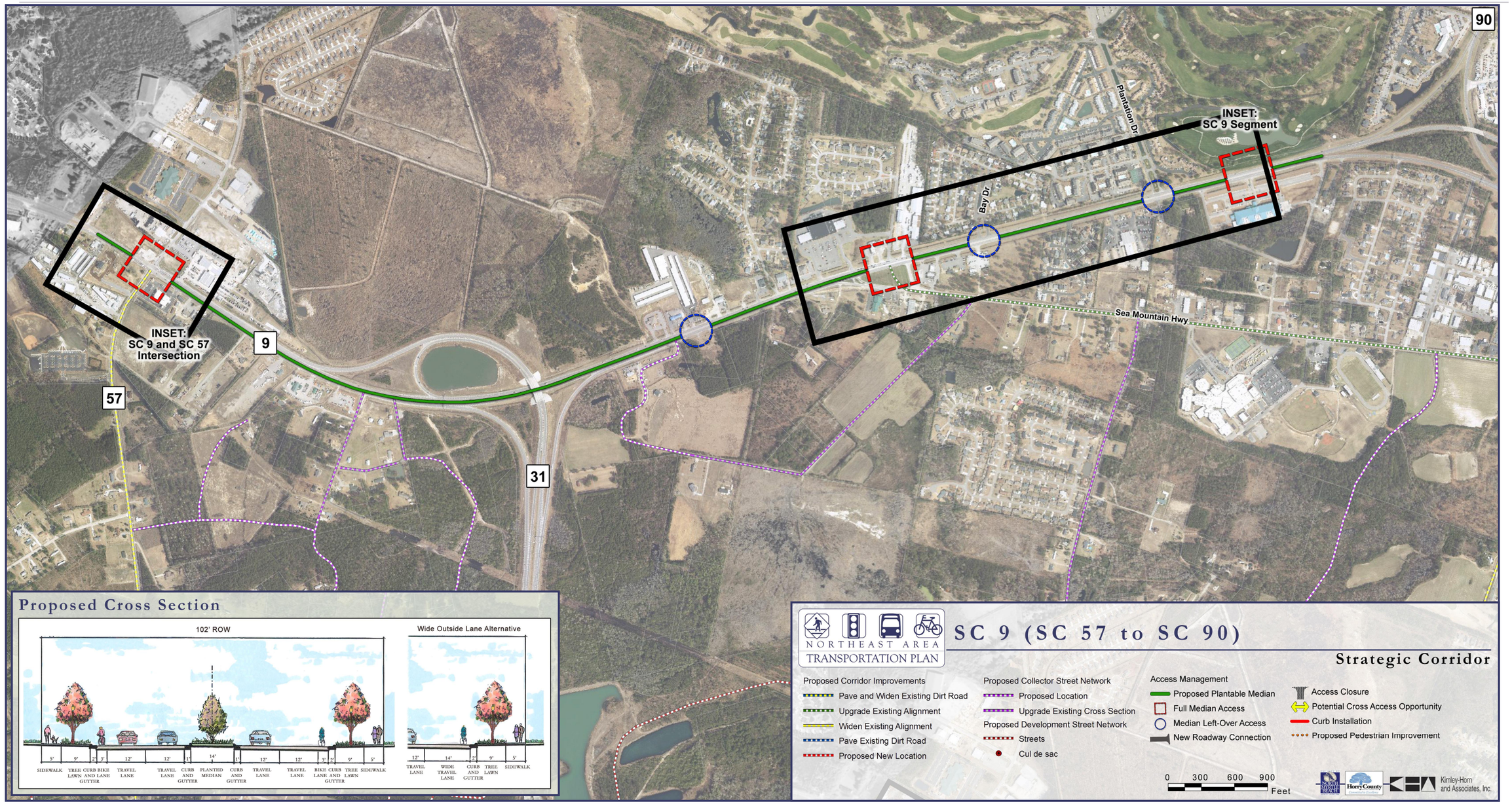
- SC 22 interchange
- Red Bluff Road/Monaca Drive
- Whispering Oaks Drive
- West Shore Drive
- Pint Circle
- Pint Circle/Strawberry Road
- Star Bluff Road/Long Bay Road
- Water Tower Road
- SC 57

Median Left-Over Access Locations*

- Meadowood Lane
- Vaught Ridge Road
- Mill Swamp Road
- Chestnut Road
- 1,400' east of Pint Circle (western intersection)
- Carries Lane Road

* Locations are approximate and subject to change based on development/redevelopment along the corridor.





Proposed Cross Section

NORTHEAST AREA TRANSPORTATION PLAN

SC 9 (SC 57 to SC 90)

Strategic Corridor

Proposed Corridor Improvements
- Pave and Widen Existing Dirt Road
- Upgrade Existing Alignment
- Widen Existing Alignment
- Pave Existing Dirt Road
- Proposed New Location

Proposed Collector Street Network
- Proposed Location
- Upgrade Existing Cross Section

Proposed Development Street Network
- Streets
- Cul de sac

Access Management
- Proposed Plantable Median
- Full Median Access
- Median Left-Over Access
- New Roadway Connection
- Access Closure
- Potential Cross Access Opportunity
- Curb Installation
- Proposed Pedestrian Improvement

0 300 600 900 Feet

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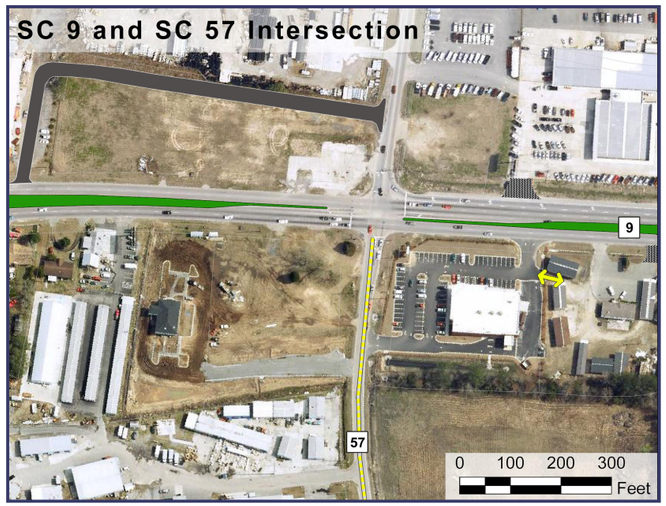
SC 9 — SC 57 to SC 90 — Strategic Corridor Insets



Cross Section Improvements

- Upgrade existing 2-lane roadway to 4-lane divided with landscaped median

Intersection Improvements

- Realign intersection of SC 9 and Sea Mountain Highway

Bicycle and Pedestrian Improvements

- Construct wide outside lanes for experienced cyclists
- Construct sidewalks on both sides

Full Median Access Locations (Signalized)

- SC 57
- Sea Mountain Highway
- 900' east of Plantation Drive (Seacoast Medical Center)

Median Left-Over Access Locations*

- 1,800' west of realigned intersection of Sea Mountain Highway
- Bay Drive
- Plantation Drive

* Locations are approximate and subject to change based on development/redevelopment along the corridor.



SC 90 (Main Street Connector to SC 9)

Strategic Corridor

NORTHEAST AREA TRANSPORTATION PLAN

Proposed Corridor Improvements
- Pave and Widen Existing Dirt Road
- Upgrade Existing Alignment
- Widen Existing Alignment
- Pave Existing Dirt Road
- Proposed New Location

Proposed Collector Street Network
- Proposed Location
- Upgrade Existing Cross Section

Proposed Development Street Network
- Streets
- Cul de sac

Access Management
- Proposed Plantable Median
- Full Median Access
- Median Left-Over Access
- New Roadway Connection
- Access Closure
- Potential Cross Access Opportunity
- Curb Installation
- Proposed Pedestrian Improvement

0 300 600 900 Feet

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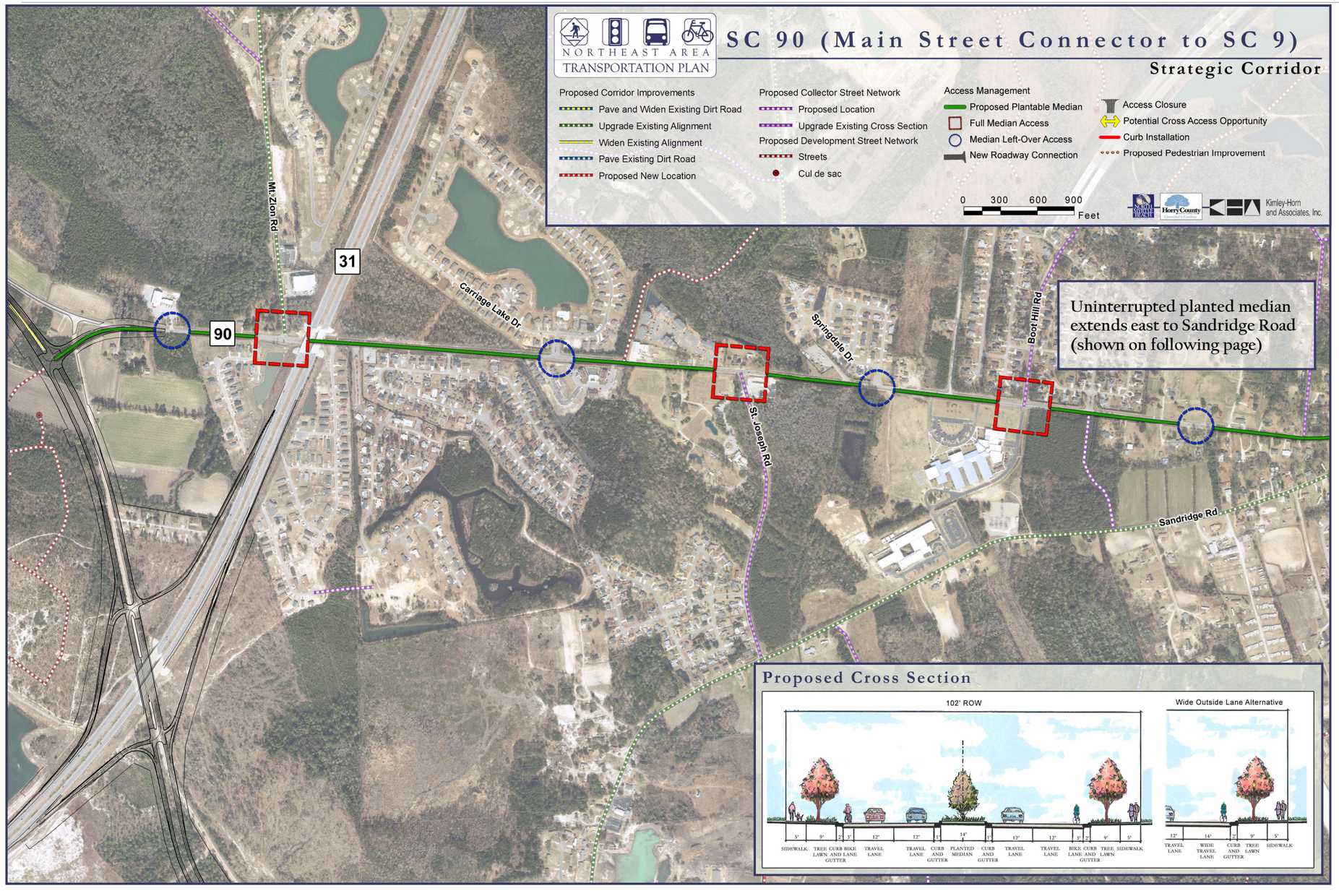
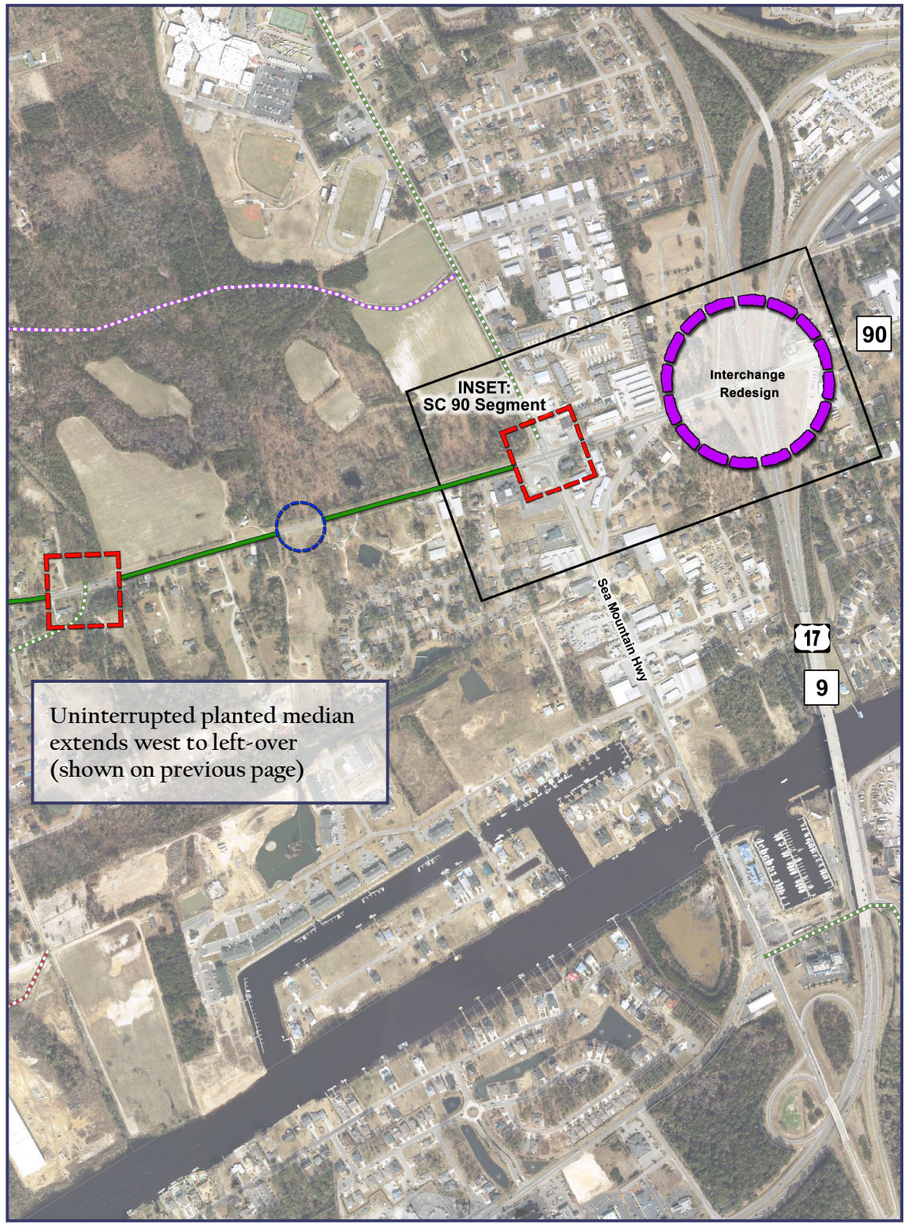


Uninterrupted planted median extends east to Sandridge Road (shown on following page)

Proposed Cross Section



SC 90 — Main Street Connector to US 17 — Strategic Corridor Insets

Cross Section Improvements

- Upgrade existing 2-lane roadway to 4-lane divided with landscaped median

Intersection Improvements

- Reconfigure interchange at US 17/SC9
- Redesign intersection of Sea Mountain Highway/SC 90

Bicycle and Pedestrian Improvements

- Construct wide outside lanes for experienced cyclists
- Construct sidewalks on both sides

Full Median Access Locations (Signalized)

- Mt. Zion Road
- St. Joseph Road
- Boot Hill Road

Median Left-Over Access Locations*

- 900' west of Mt. Zion Road
- Carriage Lake Drive
- Springdale Drive
- 1,400' east of Boot Hill Road
- 1,300' east of Sandridge Road

* Locations are approximate and subject to change based on development/redevelopment along the corridor.

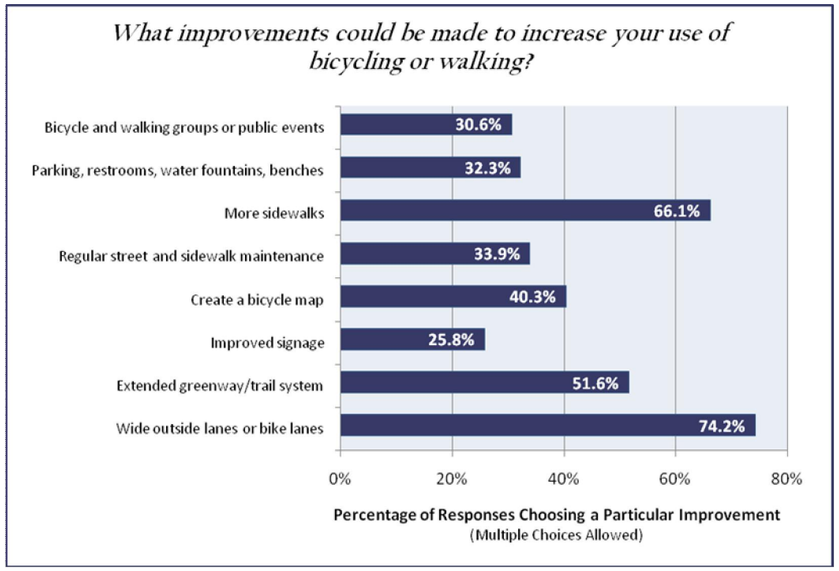
Bicycle and Pedestrian Element

Both the review of existing bicycle and pedestrian facilities and development of proposed facilities relied heavily upon feedback provided during the *Northeast Area Transportation Plan*'s public outreach process. During public outreach, bicycle and pedestrian enthusiasts expressed their concern for the existing state of biking and walking in the study area and outlined their collective vision for a more livable community. In most cases, their concerns about gaps in the network and unsafe conditions were validated by previous planning efforts and a review of existing conditions.

The public survey asked participants to rate the bicycle and pedestrian facilities in the region. The bicycle facilities were rated "fair" or "poor" by 94% of respondents. Sidewalks/crosswalks were rated as "fair" or "poor" by 90% of respondents. Furthermore, no one rated sidewalks/crosswalks as excellent. Another survey question asked which improvements would increase bicycling and walking. As shown in the chart, the most important improvements are on-street bicycle facilities, more sidewalks, and an expanded greenway/trail system. This information coupled with comments received from the public at the first workshop was used to formulate the bicycle and pedestrian recommendations.

The construction of on-street bicycle facilities and sidewalks can occur as stand-alone enhancement projects or can be incorporated into public and private infrastructure projects. The second option, which is more time- and cost-effective, is the preferred method for the *Northeast Area Transportation Plan*. Most of the recommended roadway improvements described earlier in this chapter include bicycle and/or pedestrian enhancements. These improvements have been supplemented with a series of signed bicycle routes that build upon the proposed East Coast Greenway. These routes are detailed in **Table 4.2** and illustrated in **Figure 4.6**.

The signed bicycle routes can be used on roadways with different types of bicycle facilities, including bicycle lanes, wide outside lanes, paved shoulders, and multi-use paths. The development of the signed route network considers existing and anticipated traffic as well as the geometry of a road and the intended function of the route.



The vision of the East Coast Greenway is a 3,000-mile continuous trail stretching from Canadian border in Maine to Key West, Florida. Along the way, the trail will connect 25 major cities and will travel through Horry County and North Myrtle Beach. The trail will allow residents to travel short distances from their homes to local destinations and will encourage tourists to travel longer distances. The greenway will link with other trails and on-street facilities. The East Coast Greenway provides the backbone for the bicycle and pedestrian recommendations of the *Northeast Area Transportation Plan*.

Table 4.2 – Proposed Bicycle Routes

Route	Roadways Utilized	Bicycle Facility	Length (miles)	Experience Level	Connections
Barefoot Neighborhood Loop	Barefoot Resort Bridge Road; Marsh Glen Drive, Club Course Drive	Signed bike route	1.03	Beginner Route	East Coast Greenway
Carolina Bays Loop	Water Tower Road; Various collector streets southeast of SC 90	Wide outside lane or paved shoulder	3.26	Intermediate Route	East Coast Greenway
City Connector	SC 90	Wide outside lane	2.75	Experienced Route	East Coast Greenway; Carolina Bays Loop
Intracoastal Connector	New Intracoastal Parkway	Bike lane	1.04	Intermediate Route	North Myrtle Beach Loop; Carolina Bays Loop
Little River Neck Spur	Little River Neck Road; Hill Street	Bike lane	0.96	Intermediate Route	East Coast Greenway
Main Street Spur	Main Street Extension	Bike Lane	0.53	Intermediate Route	North Myrtle Beach Loop
North Myrtle Beach School Loop	Sandridge Road; Lincoln Heights Road; Bonaire Lane	Multi-Use Path	1.76	Beginner Route	East Coast Greenway; Intracoastal Loop

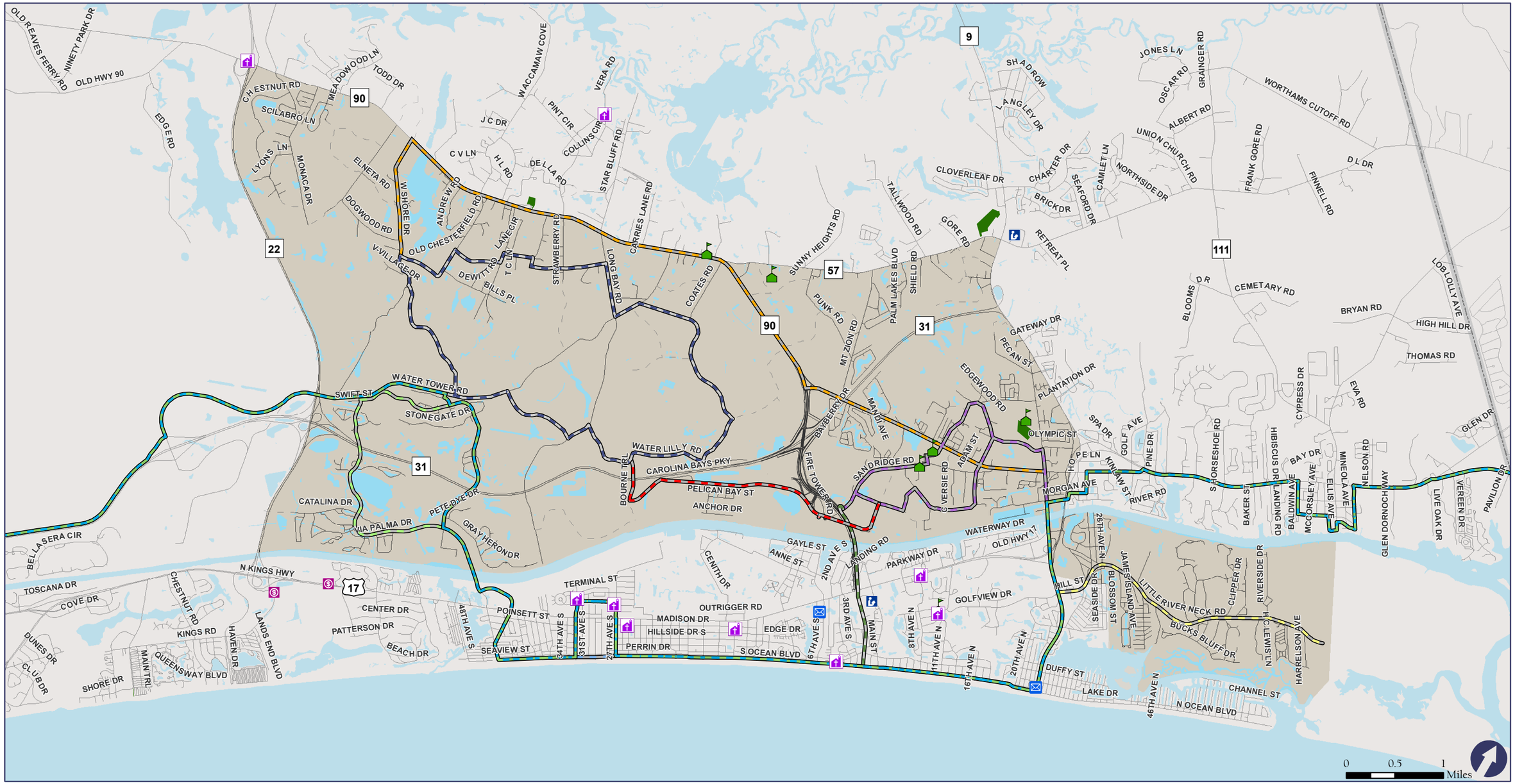


Figure 4.6 | Proposed Bicycle Routes/Loops

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

- Study Area Boundary
- Bodies of Water
- Parks
- State Line
- Shopping Center
- Library
- Post Office
- House of Worship
- Schools
- Proposed New Roadways

Bicyle Routes

- Proposed East Coast Greenway Route
- Alternate East Coast Greenway Route
- Barefoot Neighborhood Loop (Signed Bike Route)
- Carolina Bays Loop (Wide Outside Lane or Paved Shoulder)
- City Connector (Wide Outside Lane)
- Intracoastal Connector (Dedicated Bike Lane)
- Little River Neck Spur (Dedicated Bike Lane)
- Main Street Spur (Dedicated Bike Lane)
- NMB School Loop (Dedicated Bike Lane)

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Transit Element

Transit riders typically fall into one of two categories – choice or captive. Choice transit riders choose to leave their vehicle at home to save time and money or for other reasons, while captive riders use transit because they have no other option. This may be because they lack access to a personal vehicle or because they have a physical impediment. Captive riders also include those too young to drive, the elderly, persons with disabilities, and those without the financial means to own and operate a personal vehicle.

Attendees at the workshop and respondents to the survey expressed a desire for new transit service. One question on the survey asked, "How likely would you be to increase your use of transit if the following improvements were made?" Responses indicated a preference for new routes, clean buses, and better route information. This is expressed in the chart to the right.

To meet the demand of potential choice and captive transit riders in the study area in the long-term, the *Northeast Area Transportation Plan* recommends a coordinated system of shuttle circulator routes. These loops are detailed in **Table 4.3** and illustrated in **Figure 4.7**. The loops are designed to connect existing and emerging activity centers and have been designated as short-, mid-, or long-term priorities.

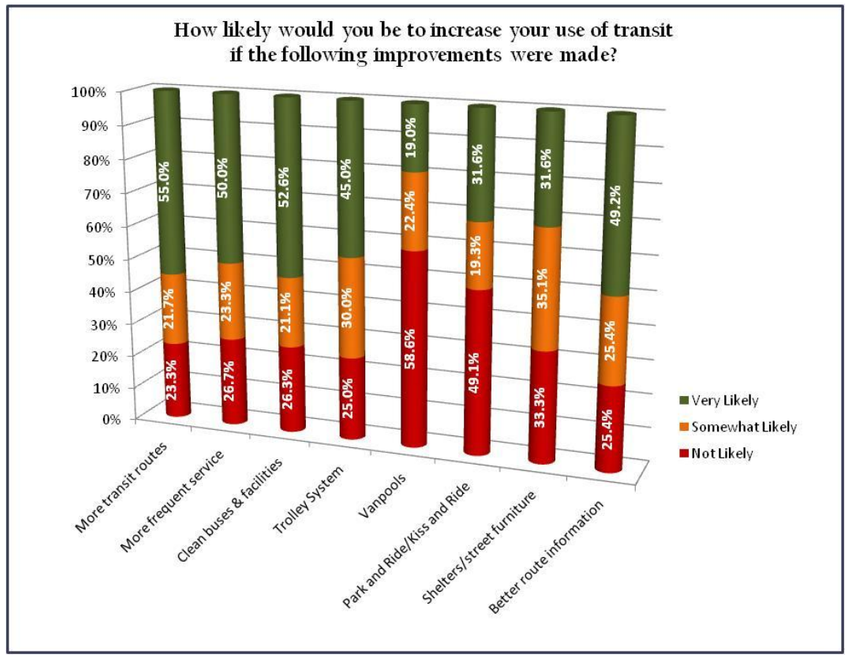

Table 4.3 – Proposed Transit Routes

Route	Roadways Utilized	Length (miles)	Phasing
Ocean Front Loop	US 17; Main Street; Ocean Boulevard	3.66	Short-Term
Cherry Grove/Little River Neck Loop	Main Street, Sea Mountain Highway; Hill Street; Little River Neck Road; US 17	2.16	Mid-Term
Main Street Extension Loop	Main Street Extension; SC 90; Sea Mountain Highway; US 17	2.32	Mid-Term
Barefoot Resort/Parkway PUD Loop	Club Course Drive; Water Tower Road; Carolina Bays Parkway; SC 22; US 17	4.20	Long-Term
SC 90 Loop	SC 90; Water Tower Road; Shore Drive	2.66	Long-Term
Stephens Crossroads Loop	SC 90; SC 57; Carolina Bays Parkway; Main Street Extension	2.55	Long-Term

Figure 4.7 | Proposed Transit Routes

January 2009

NORTHEAST AREA TRANSPORTATION PLAN

- Study Area Boundary
- Bodies of Water
- Parks
- State Line
- Shopping Center
- Library
- Post Office
- House of Worship
- Schools
- Proposed New Roadways

Transit Route

- Ocean Front Loop (Short Term)
- Cherry Grove/Little River Neck Loop (Medium Term)
- Main Street Extension Loop (Medium Term)
- Barefoot Resort/Parkway PUD Loop (Long Term)
- Highway 90 Loop (Long Term)
- Stephens Crossroad Loop (Long Term)

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Complete Street Concepts

As mentioned in **Chapter 3**, a complete street is a community-oriented street that safely and conveniently accommodates all modes of travel. The public has expressed their vision for the region's transportation network to be composed of these balanced streets. The following pages illustrate typical cross-sections and plan views for streets in the study area. The cross sections are consistent with and reinforce the principles of the presented in *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities*, a joint effort between ITE and the Congress for the New Urbanism. The cross-sections reflect this concept of community-oriented streets. To create a transportation network that respects the needs of pedestrians, bicyclists, and motorists, certain elements may require designs different from the current norm. **Table 4.4** describes the elements of street typology, which is the multimodal building blocks, that form the complete streets illustrated on the following pages.

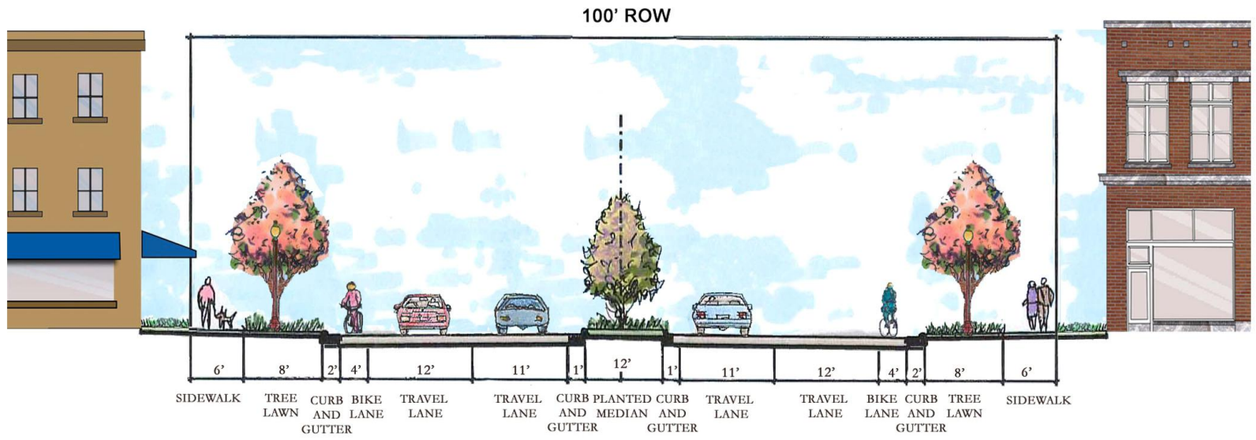
Table 4.4 – Complete Street Typology

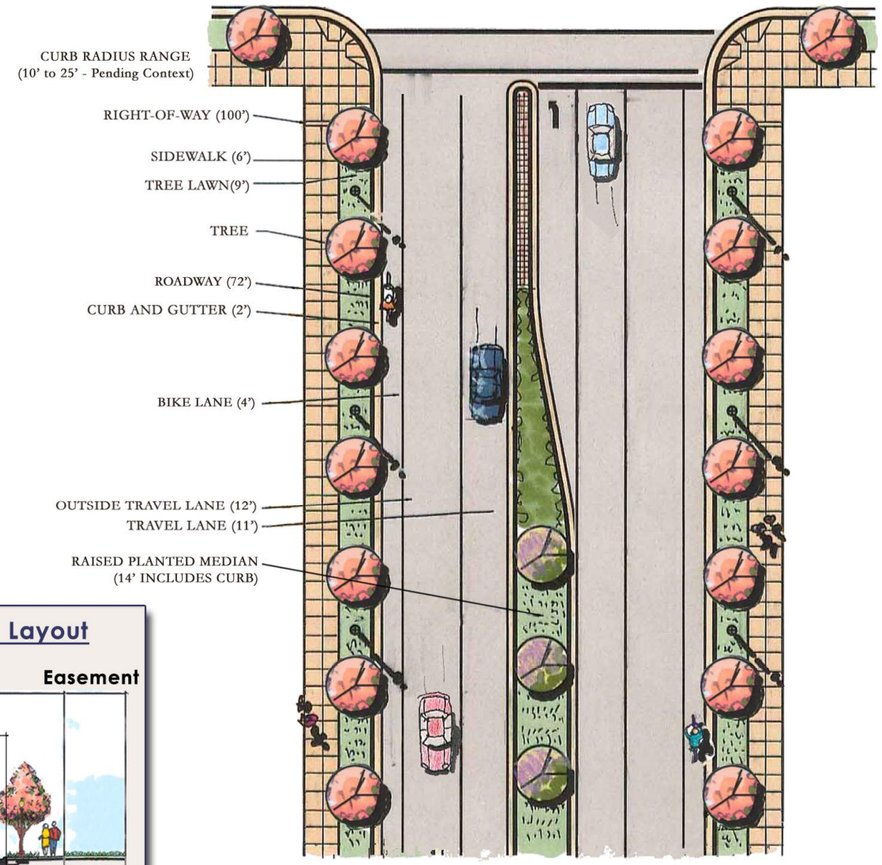
	Right-of-Way	Travel Lanes	Lane Widths	Median Treatment	Tree Lawn	On-Street Parking	Pedestrian Facilities	Bicycle Facilities	Golf Cart Usage
Principal Arterial									
Urban Boulevard	100'	4	11', 12'	12' planted with 1' curb & gutter	8'	None	6' sidewalks, both sides	4' bike lanes, both sides	Cross roadway
Parkway	100'	4	12'	14' planted with 1' curb & gutter	8'	None	5' sidewalks, both sides	3' bike lanes, both sides OR wide outside lanes	None
Principal Arterial	80'	4	12'	None	9'	None	5' sidewalks, both sides	None	Cross roadway
Minor Arterial									
Minor Arterial A	60'	2	12'	None	7.5'	None	5' sidewalks, both sides	4' bike lanes, both sides OR wide outside lanes	Cross roadway
Minor Arterial B	60'	2	12'	None	7.5'	None	5' sidewalks, both sides	4' bike lanes, both sides	Cross roadway
Minor Arterial C	75'	2	12'	12' planted with 1' curb & gutter	8'	None	5' sidewalks, both sides	4' bike lanes, both sides	Cross roadway
Minor Arterial D	90'	4	12'	14' planted with 1' curb & gutter	6'	None	10' multi-use path, one side	10' multi-use path, one side	Cross roadway
Local Transitional Street	90'	2	12'	14' planted with 1' curb & gutter	8'	None	5' sidewalks, both sides	None	Cross roadway
Collector									
Avenue – 2-Lane	80'	2	12'	None	7'	8' parallel, both sides	5' sidewalks, both sides	6' bike lanes, both sides	Cross roadway
Avenue – 2-Lane Divided	80'	2	11'	12' planted with 1' curb & gutter	7'	8' parallel, both sides	5' sidewalks, both sides	None	Cross or share roadway
Main Street	100'	2	12'	8' planted with 1' curb & gutter	5'	18' angled, both sides	8' sidewalks, both sides	None	Cross or share roadway
Local Collector Street A	66'	2	11'	None	7'	8' parallel, both sides	5' sidewalks, both sides	None	Cross or share roadway
Local Collector Street B	68'	2	11'	10' planted with 1' curb & gutter	6'	None	5' sidewalks, both sides	3' bike lanes, both sides	Cross or share roadway
Local Collector Street C	50'	2	11'	None	8'	None	4' sidewalks, both sides	None	Cross or share roadway
Local									
Rural Local Street	62' to 72'	2	11'	None	None	None	10' multi-use path, one side	10' multi-use path, one side	None
Local Street	40'	2	10'	None	4.5'	None	4' sidewalks, both sides	None	Cross or share roadway
Alley									
Residential Alley	20'	1	10'	None	None	None	None	None	Cross or share roadway
Commercial Alley	20'	1	12'	None	None	None	None	None	Cross or share roadway

Principal Arterial

Urban Boulevard: 4-Lane Divided

(4-Lane Divided with Raised Median, Bike Lanes, Sidewalks, Landscaping)





Plan
NOT TO SCALE

Design Features

Roadway Width
72' including 4 travel lanes, bike lanes, planted median, and curb and gutter

On-Street Parking
None

Tree Lawn
8'

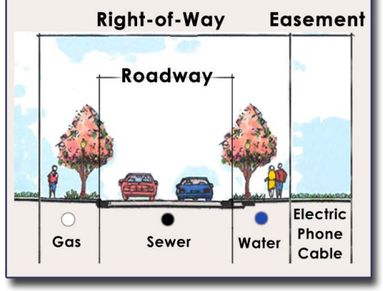
Median
12' planted with 1' curb and gutter

Pedestrian Facilities
6' sidewalks, both sides

Bicycle Facilities
4' bike lanes, both sides

Golf Cart Usage
May cross roadway

Typical Utility Layout



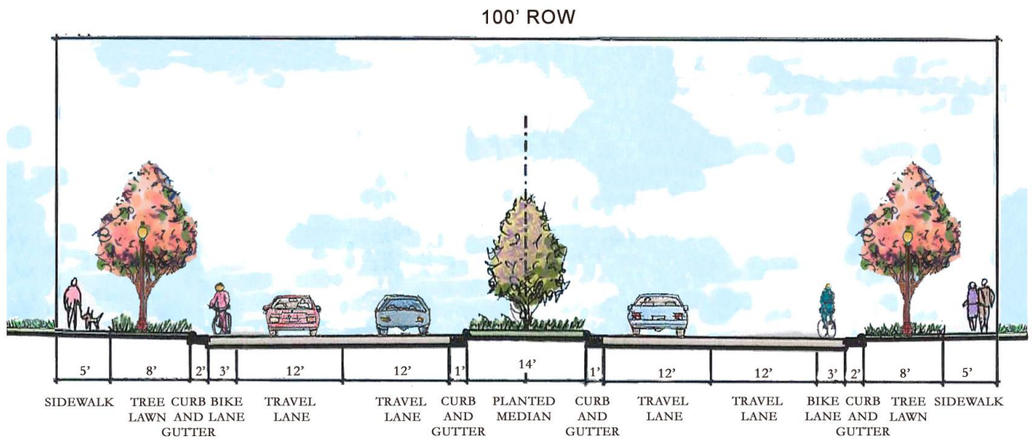
Roadway Capacity

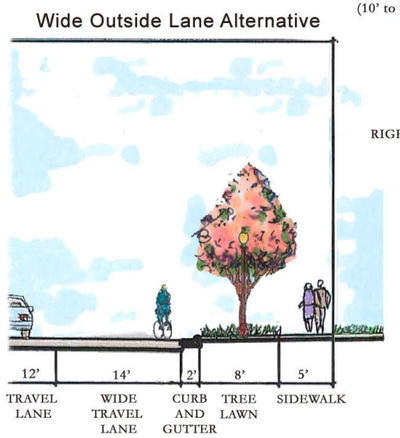
24,000 to 33,000 vehicles per day

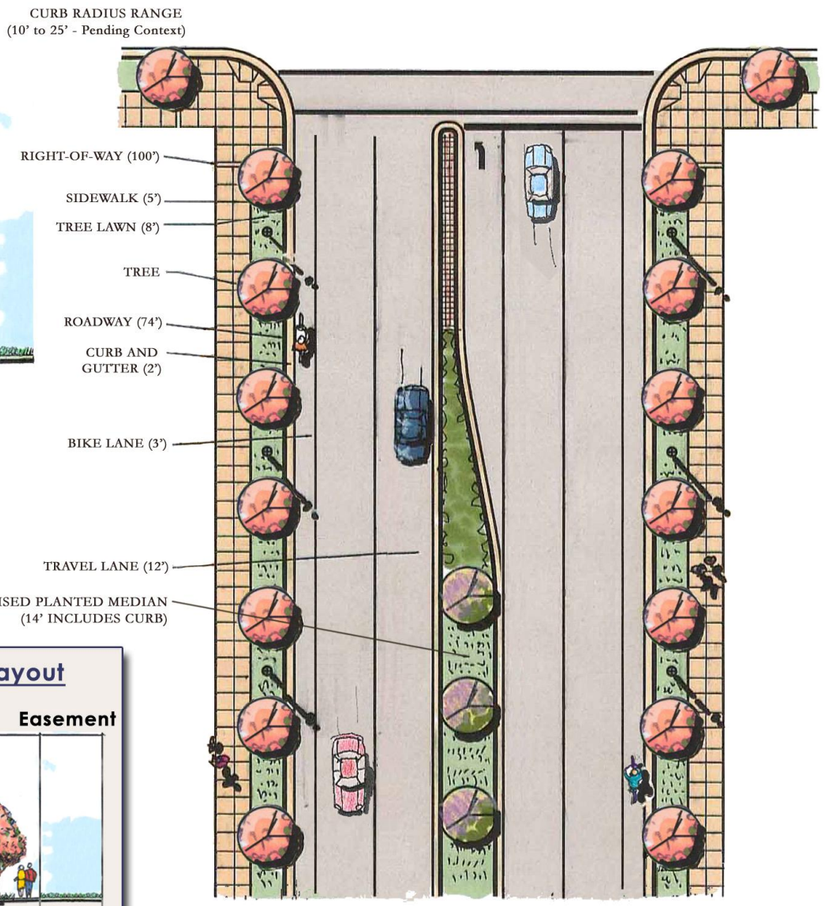
Principal Arterial

Parkway: 4-Lane Divided with 16’ Median

(4-Lane Divided with Raised Median, Bike Lanes, Sidewalks, Landscaping)







Plan
NOT TO SCALE

Design Features

Roadway Width
74’ including 4 travel lanes, bike lanes, planted median, and curb and gutter

On-Street Parking
None

Tree Lawn
8’

Median
14’ planted with 1’ curb and gutter

Pedestrian Facilities
5’ sidewalks, both sides

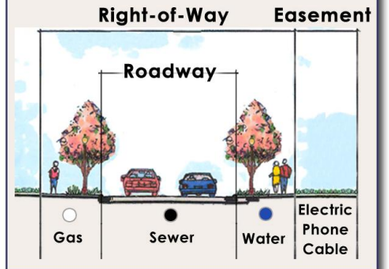
Bicycle Facilities
3’ bike lanes, both sides

Golf Cart Usage
None

Roadway Capacity

28,000 to 40,000 vehicles per day

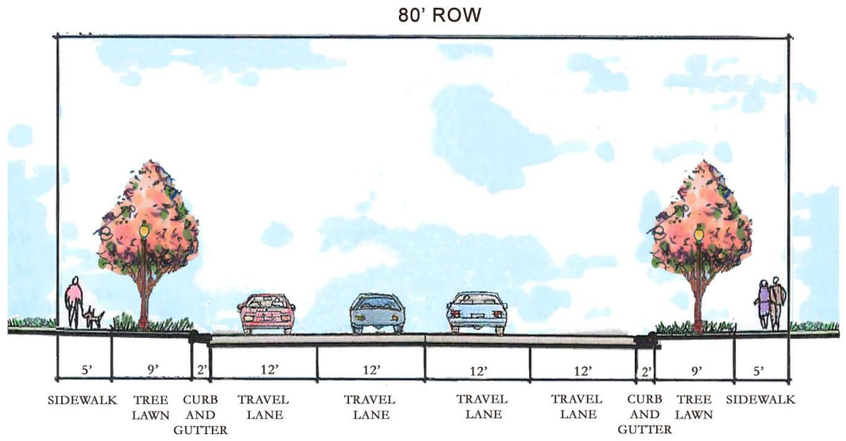
Typical Utility Layout



Principal Arterial

Principal Arterial: 4-Lane Undivided

(4-Lane, Sidewalks, Landscaping)



Design Features

Roadway Width
52' including 4 travel lanes and curb and gutter

On-Street Parking
None

Tree Lawn
9'

Median
None

Pedestrian Facilities
5' sidewalks, both sides

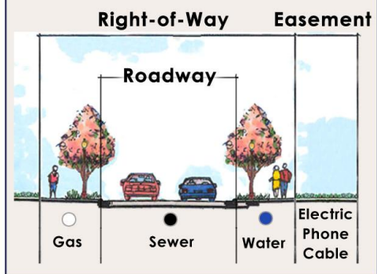
Bicycle Facilities
None

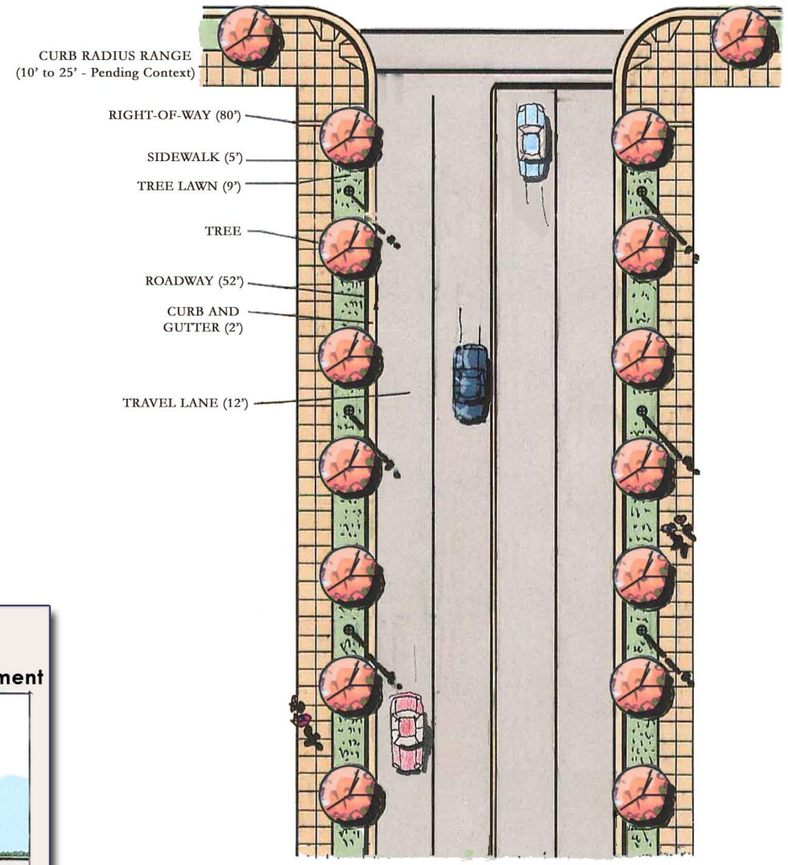
Golf Cart Usage
May cross roadway

Roadway Capacity

19,000 to 29,000 vehicles per day

Typical Utility Layout





Plan
NOT TO SCALE

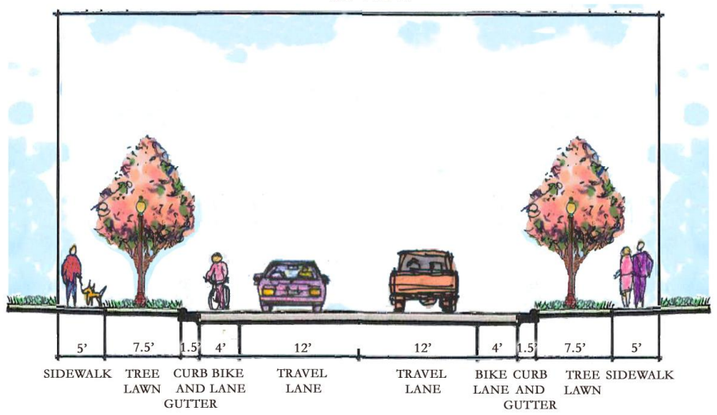


Minor Arterial

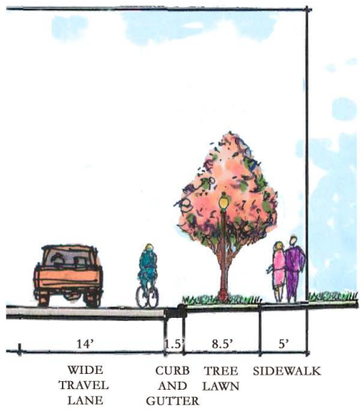
Minor Arterial A: 2-Lane with Bicycle Facilities

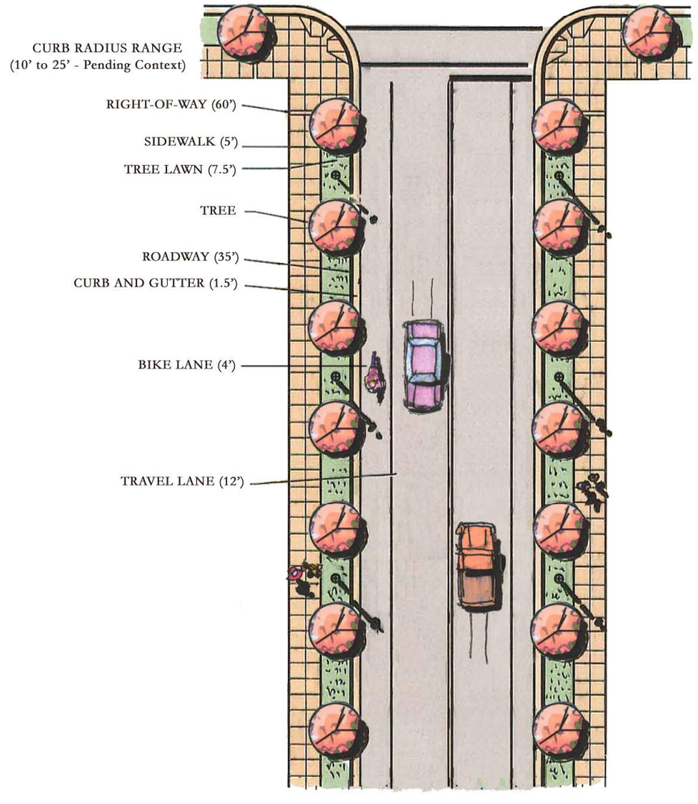
(2-Lane, Sidewalks, Landscaping)

60' ROW



Wide Outside Lane Alternative





Plan
NOT TO SCALE

Design Features

Roadway Width
35' including 2 travel lanes, bike lanes, and curb and gutter

On-Street Parking
None

Tree Lawn
7.5'

Median
None

Pedestrian Facilities
5' sidewalks, both sides

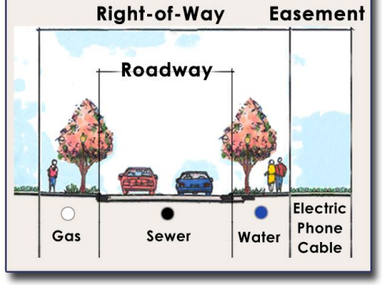
Bicycle Facilities
4' bike lanes, both sides

Golf Cart Usage
May cross roadway

Roadway Capacity

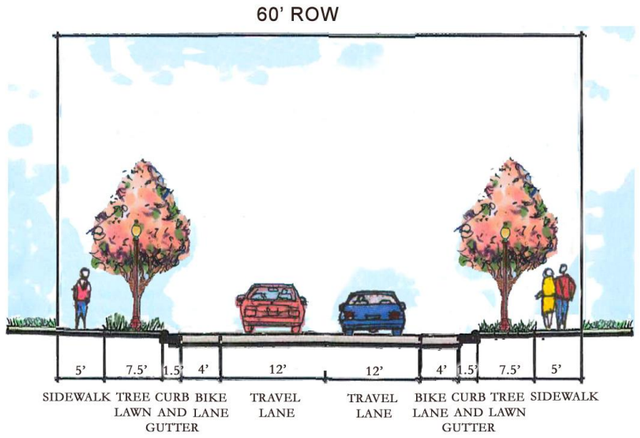
9,000 to 14,000 vehicles per day

Typical Utility Layout



Minor Arterial B: 2-Lane with Turn Pockets

(2-Lane, Turn Pockets at Major Intersections Sidewalks, Landscaping)



Design Features

Roadway Width
35' including 2 travel lanes, bike lanes, and curb and gutter

On-Street Parking
None

Tree Lawn
7.5'

Median
None

Pedestrian Facilities
5' sidewalks, both sides

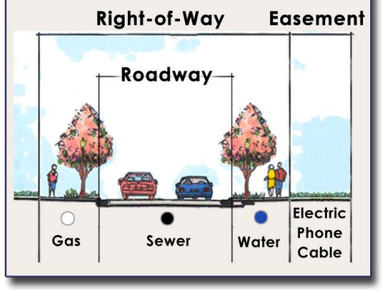
Bicycle Facilities
4', bike lanes, both sides

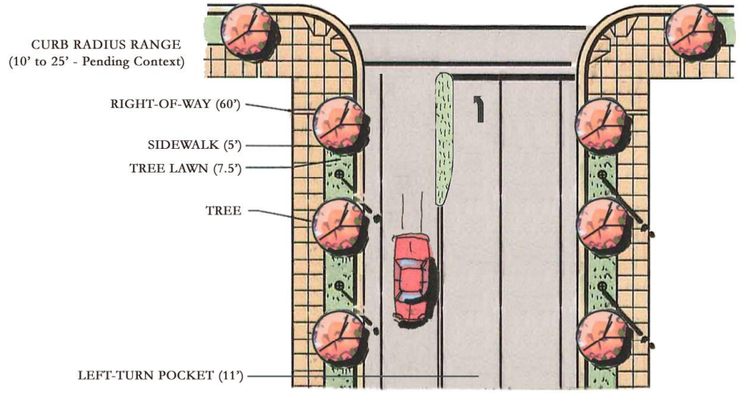
Golf Cart Usage
May cross roadway

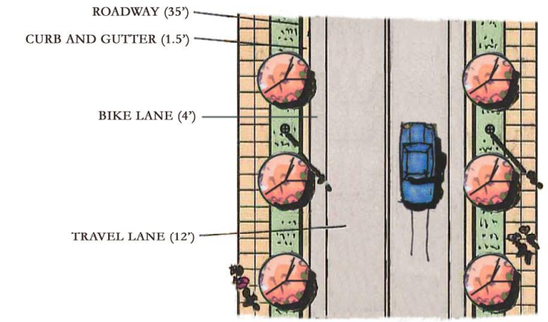
Roadway Capacity

10,000 to 20,000 vehicles per day

Typical Utility Layout





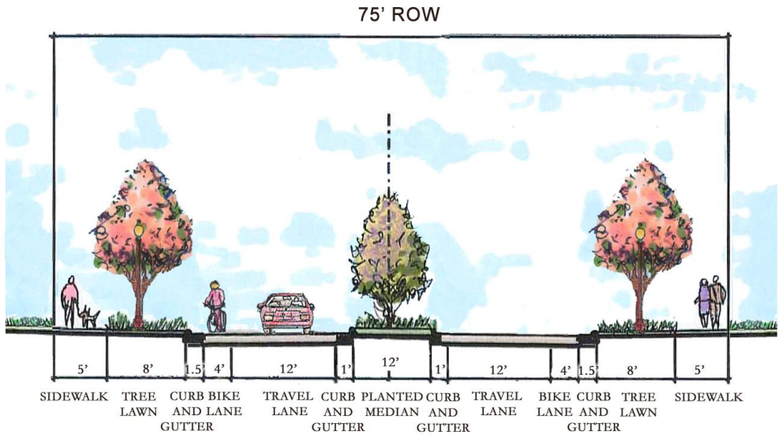


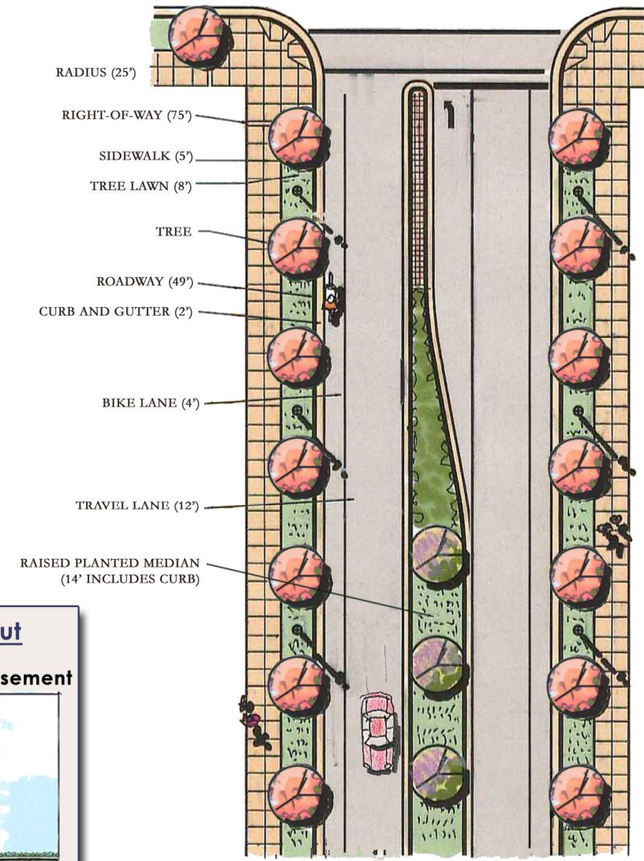
Plan
NOT TO SCALE

Minor Arterial

Minor Arterial C: 2-Lane Divided with Bike Lanes (14' Median)

(4-Lane Divided with Raised Median, Bike Lanes, Sidewalks, Landscaping)





Plan
NOT TO SCALE

Design Features

Roadway Width
49' including 2 travel lanes, bike lanes, planted median, and curb and gutter

On-Street Parking
None

Tree Lawn
8'

Median
12' planted with 1' curb and gutter

Pedestrian Facilities
5' sidewalks, both sides

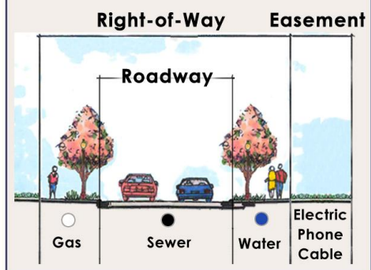
Bicycle Facilities
4' bike lanes, both sides

Golf Cart Usage
May cross roadway

Roadway Capacity

12,000 to 20,000 vehicles per day

Typical Utility Layout

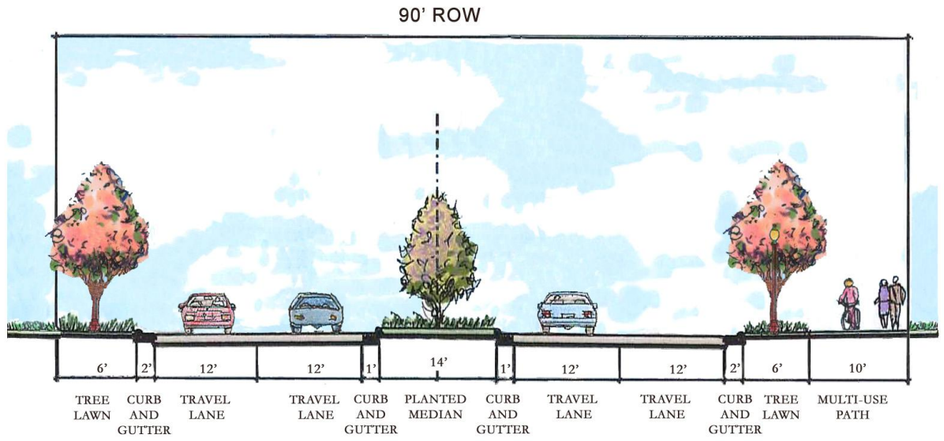




Minor Arterial

Minor Arterial D: 4-Lane Divided with 16' Median

(4-Lane Divided with Raised Median, Multi-Use Path, Landscaping)



Design Features

Roadway Width
68' including 4 travel lanes, planted median, and curb and gutter

On-Street Parking
None

Tree Lawn
6'

Median
14' planted with 1' curb and gutter

Pedestrian Facilities
10' multi-use path, one side

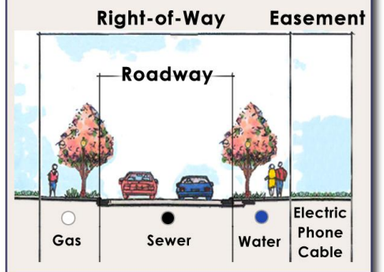
Bicycle Facilities
10' multi-use path, one side

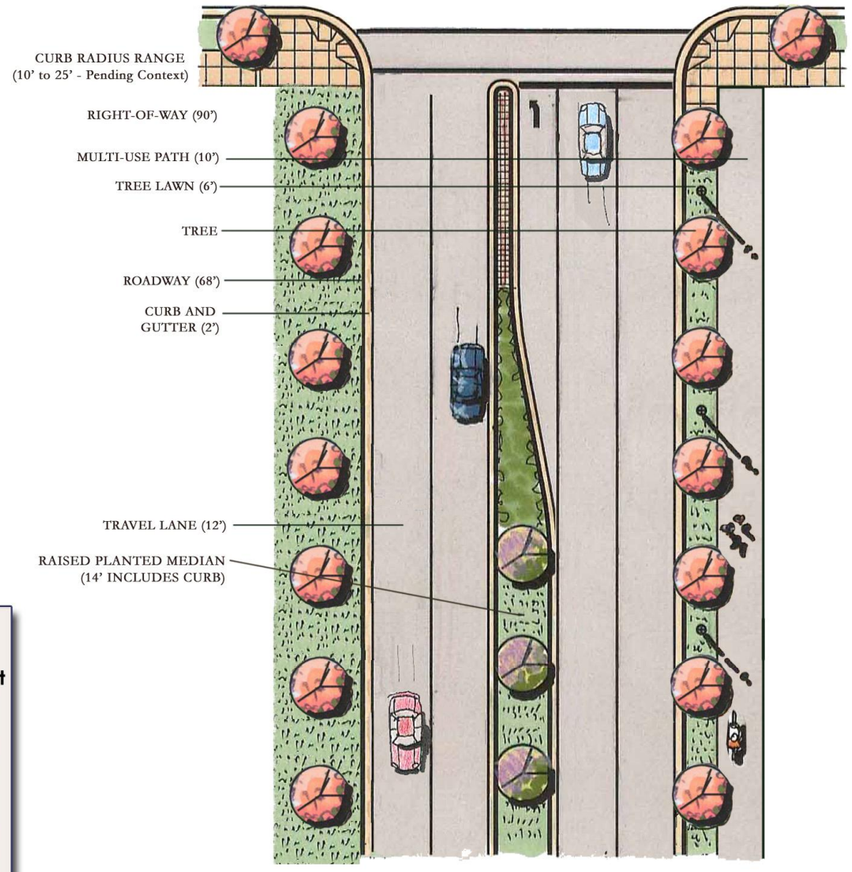
Golf Cart Usage
May cross roadway

Roadway Capacity

28,000 to 40,000 vehicles per day

Typical Utility Layout



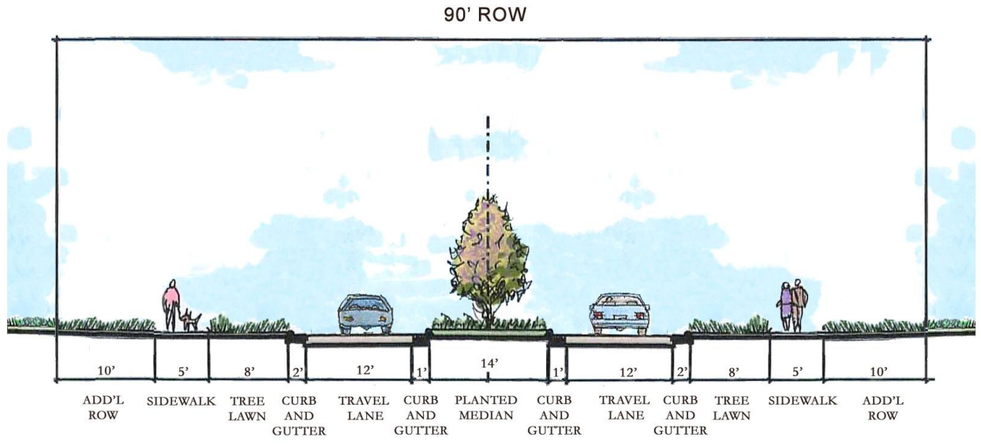


Plan
NOT TO SCALE

Minor Arterial

Local Transitional Street: 2-Lane Divided on 4-Lane Divided Right-of-Way

(2-Lane Divided with Raised Median, Sidewalks, Landscaping)



Design Features

Roadway Width
44' including 2 travel lanes, planted median, and curb and gutter

On-Street Parking
None

Tree Lawn
8'

Median
14' planted with 1' curb and gutter

Pedestrian Facilities
5' sidewalks, both sides

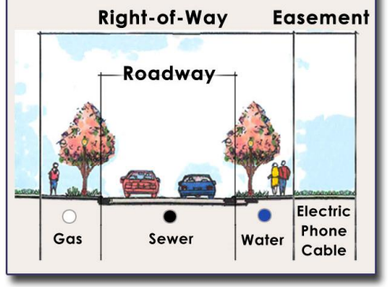
Bicycle Facilities
None

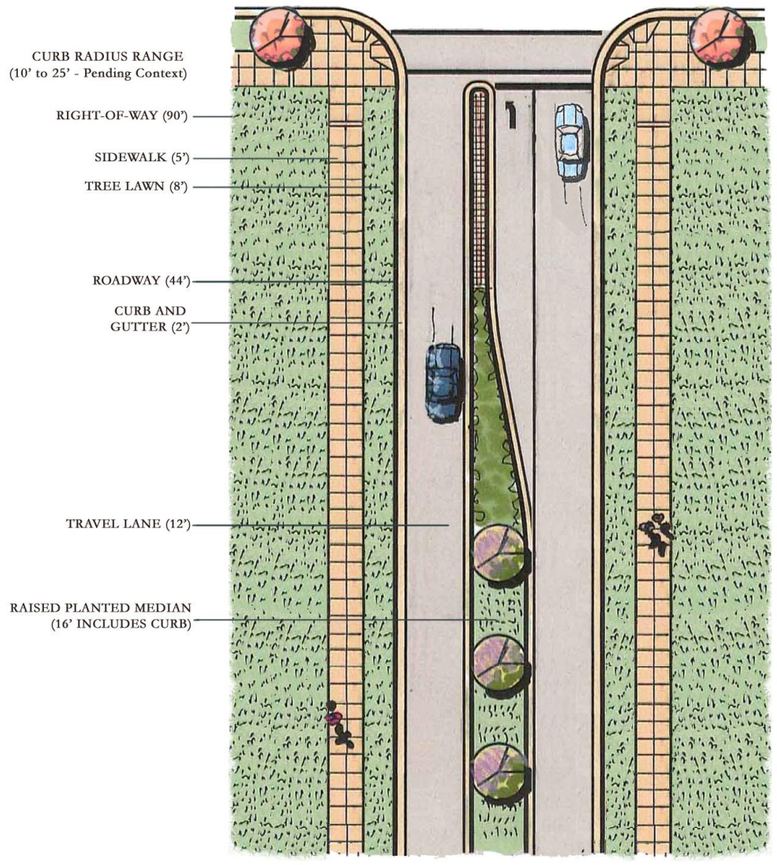
Golf Cart Usage
May cross roadway

Roadway Capacity

12,000 to 20,000 vehicles per day

Typical Utility Layout



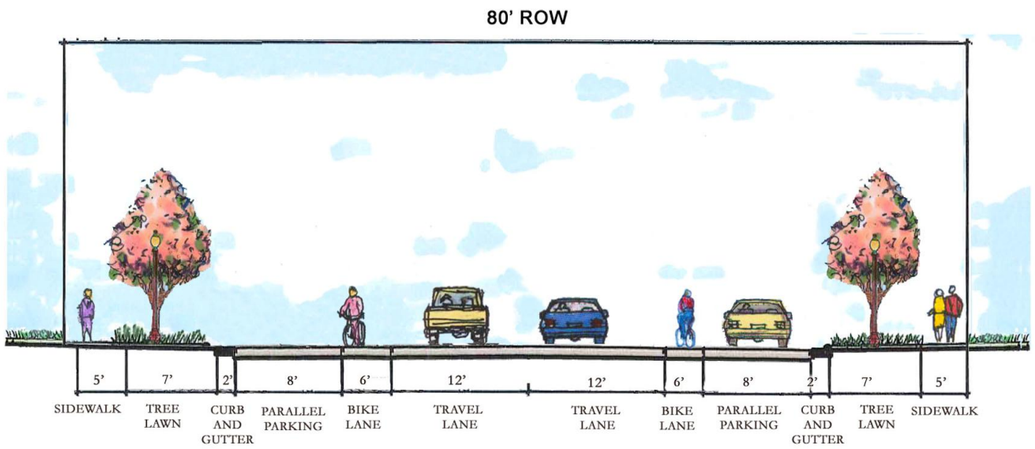


Plan
NOT TO SCALE

Collector

Avenue: 2-Lane Undivided with Parking

(2-Lane, Bike Lanes, Parallel Parking, Sidewalks, Landscaping)



Design Features

Roadway Width
50' including 2 travel lanes, bike lanes, parallel parking, and curb and gutter

On-Street Parking
8' parallel, both sides

Tree Lawn
7'

Median
None

Pedestrian Facilities
5' sidewalks, both sides

Bicycle Facilities
6' bike lanes, both sides

Golf Cart Usage
May cross roadway

Roadway Capacity

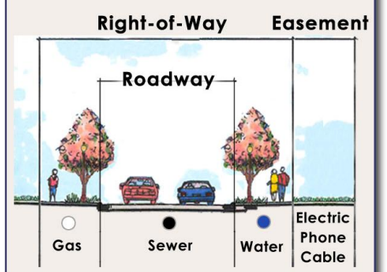
6,000 to 14,000 vehicles per day

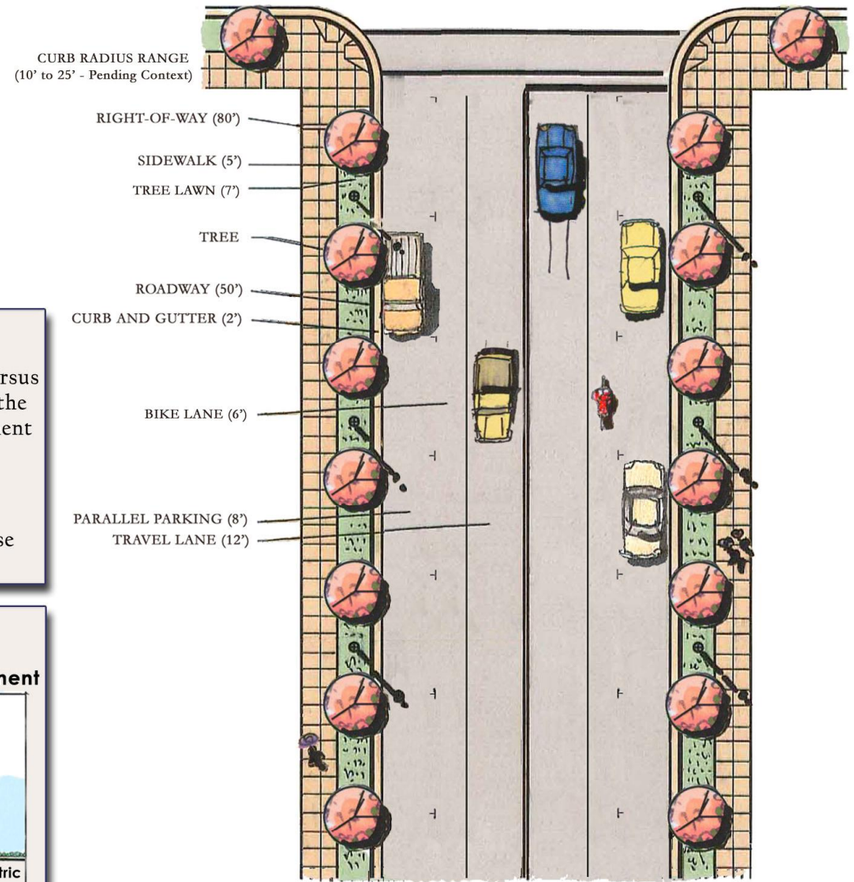
Notes

› The use of curb and gutter versus swale ditch will depend upon the street's proximity to development and the natural environment.

› The type (i.e. residential, commercial, rural, etc.) will depend on the adjacent land use served.

Typical Utility Layout



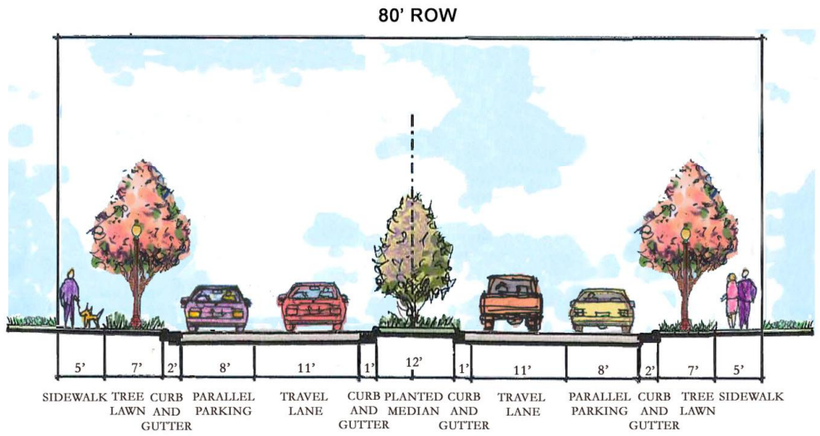


Plan
NOT TO SCALE

Collector

Avenue: 2-Lane Divided with Parking

(2-Lane Divided with Raised Median, Parallel Parking, Sidewalks, Landscaping)



Notes

› The use of curb and gutter versus swale ditch will depend upon the street's proximity to development and the natural environment.

› The type (i.e. residential, commercial, rural, etc.) will depend on the adjacent land use served.

Design Features

Roadway Width
56' including 2 travel lanes, parallel parking, planted median, and curb and gutter

On-Street Parking
8' parallel, both sides

Tree Lawn
7'

Median
12' planted with 1' curb and gutter

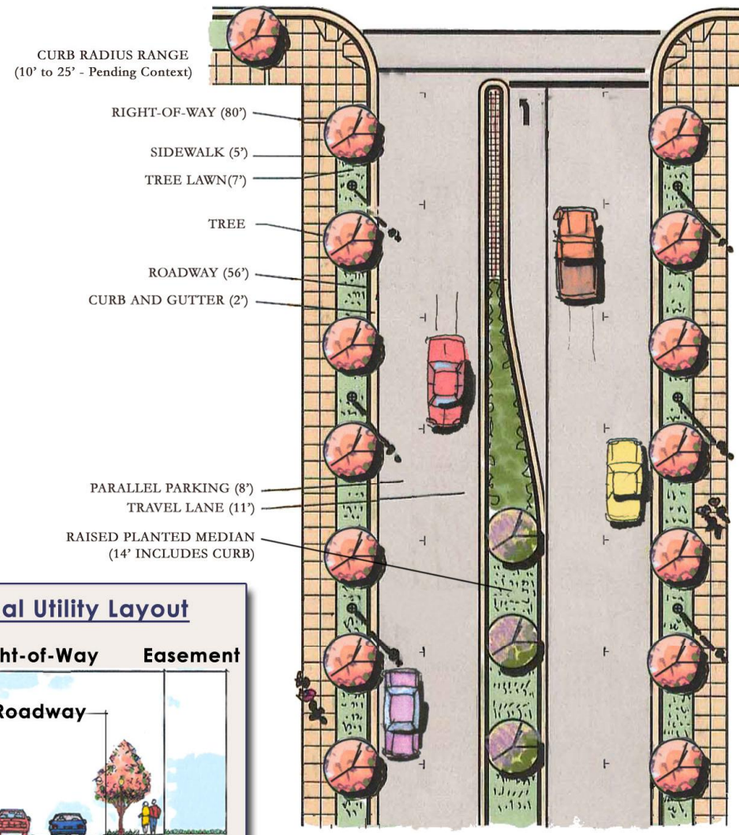
Pedestrian Facilities
5' sidewalks, both sides

Bicycle Facilities
None

Golf Cart Usage
May cross roadway
May share lane with other vehicles

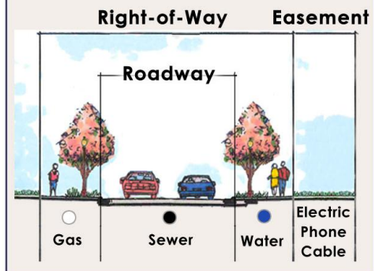
Roadway Capacity

12,000 to 20,000 vehicles per day



Plan
NOT TO SCALE

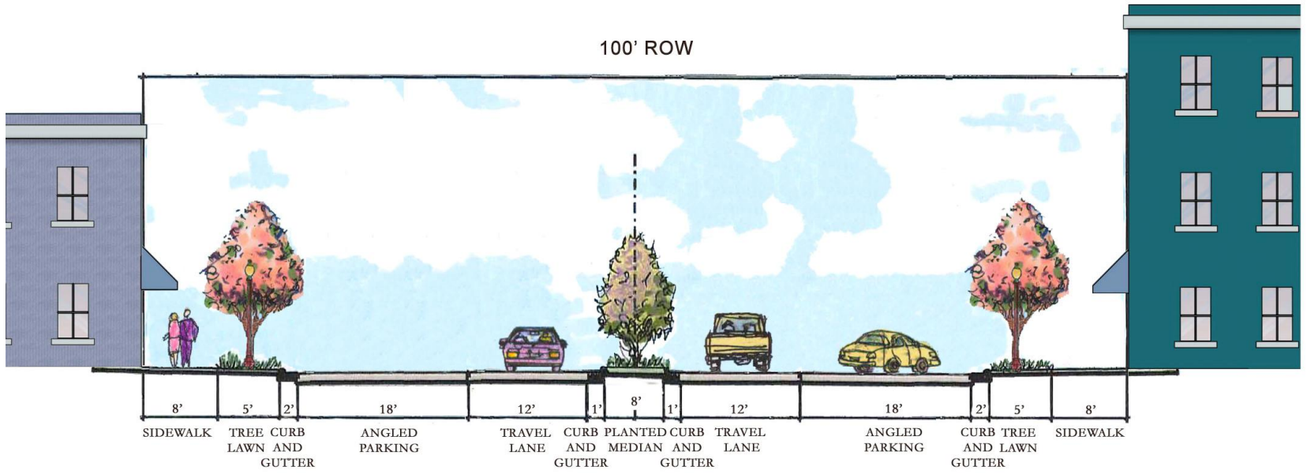
Typical Utility Layout



Collector

Main Street: 2-Lane Divided with Angled Parking

(2-Lane Divided with Raised Median, Angled Parking, Sidewalks, Landscaping)



Design Features

Roadway Width
74' including 2 travel lanes, angled parking, planted median, and curb and gutter

On-Street Parking
18' angled; both sides

Tree Lawn
5'

Median
8' planted with 1' curb and gutter

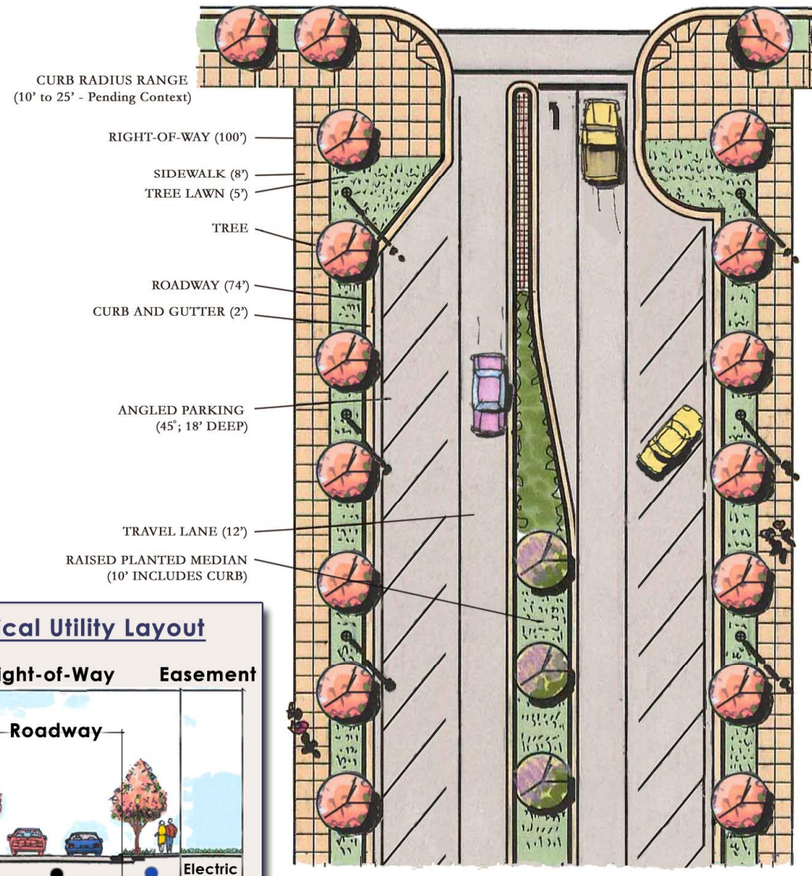
Pedestrian Facilities
8' sidewalks, both sides

Bicycle Facilities
None

Golf Cart Usage
May cross roadway
May share lane with other vehicles

Roadway Capacity

9,500 to 19,000 vehicles per day



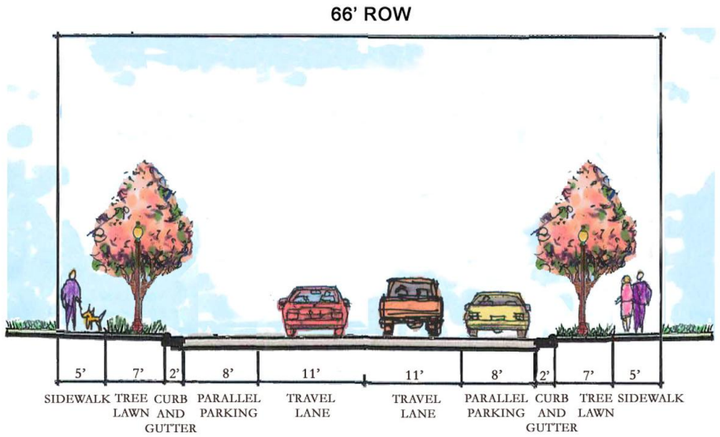
Plan
NOT TO SCALE

Typical Utility Layout

Collector

Local Collector Street: 2-Lane with Parallel Parking

(2-Lane, Parallel Parking, Sidewalks, Landscaping)



Design Features

Roadway Width
42' including 2 travel lanes, parallel parking, and curb and gutter

On-Street Parking
8' parallel, both sides

Tree Lawn
7'

Median
None

Pedestrian Facilities
5' sidewalks, both sides

Bicycle Facilities
None

Golf Cart Usage
May cross roadway
May share lane with other vehicles

Roadway Capacity

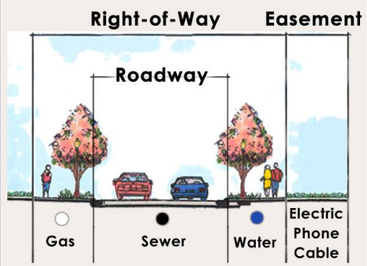
9,000 to 14,000 vehicles per day

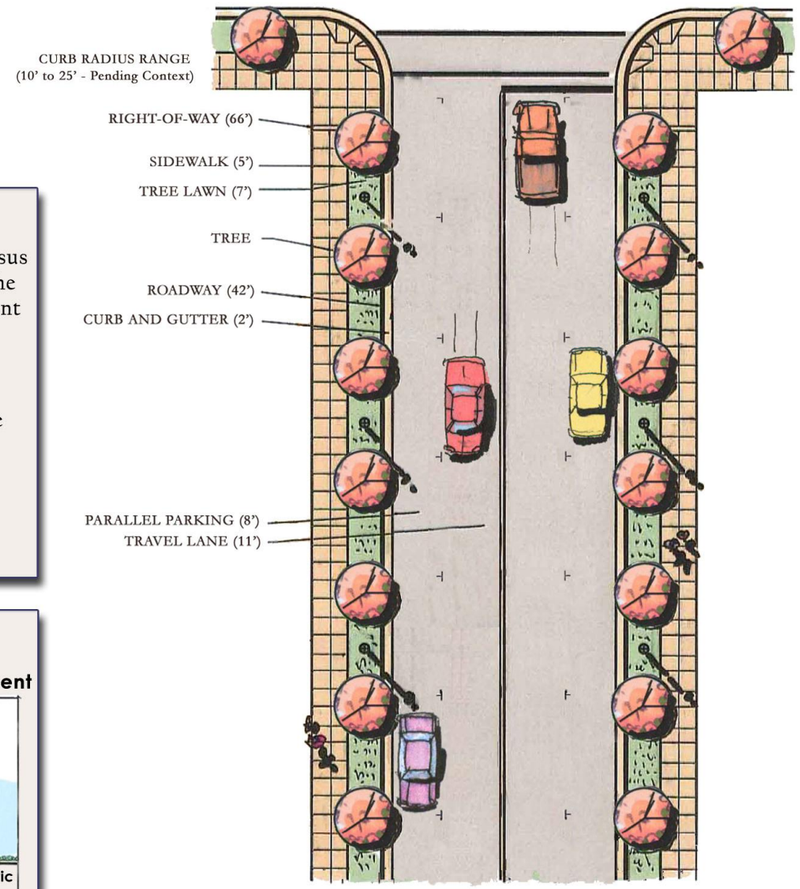
Notes

› The use of curb and gutter versus swale ditch will depend upon the street's proximity to development and the natural environment.

› The type (i.e. residential, commercial, rural, etc.) will depend on the adjacent land use served.

Typical Utility Layout

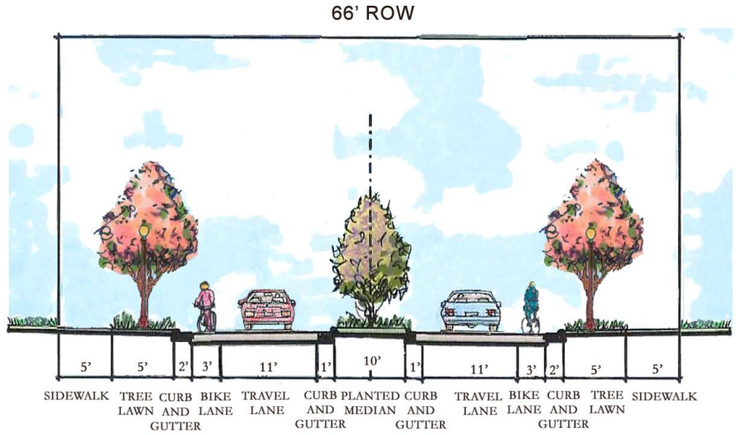




Plan
NOT TO SCALE

Local Collector Street: 2-Lane Divided

(2-Lane Divided with Raised Median, Bike Lanes, Sidewalks, Landscaping)



Notes

› The use of curb and gutter versus swale ditch will depend upon the street's proximity to development and the natural environment.

› The type (i.e. residential, commercial, rural, etc.) will depend on the adjacent land use served.

Design Features

Roadway Width
44' including 2 travel lanes, bike lanes, planted median, and curb and gutter

On-Street Parking
None

Tree Lawn
5'

Median
10' planted with 1' curb and gutter

Pedestrian Facilities
5' sidewalks, both sides

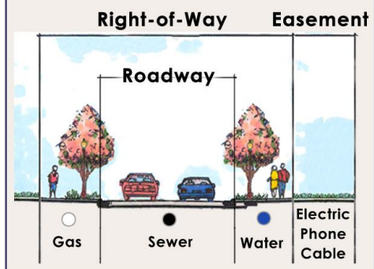
Bicycle Facilities
3' bike lanes, both sides

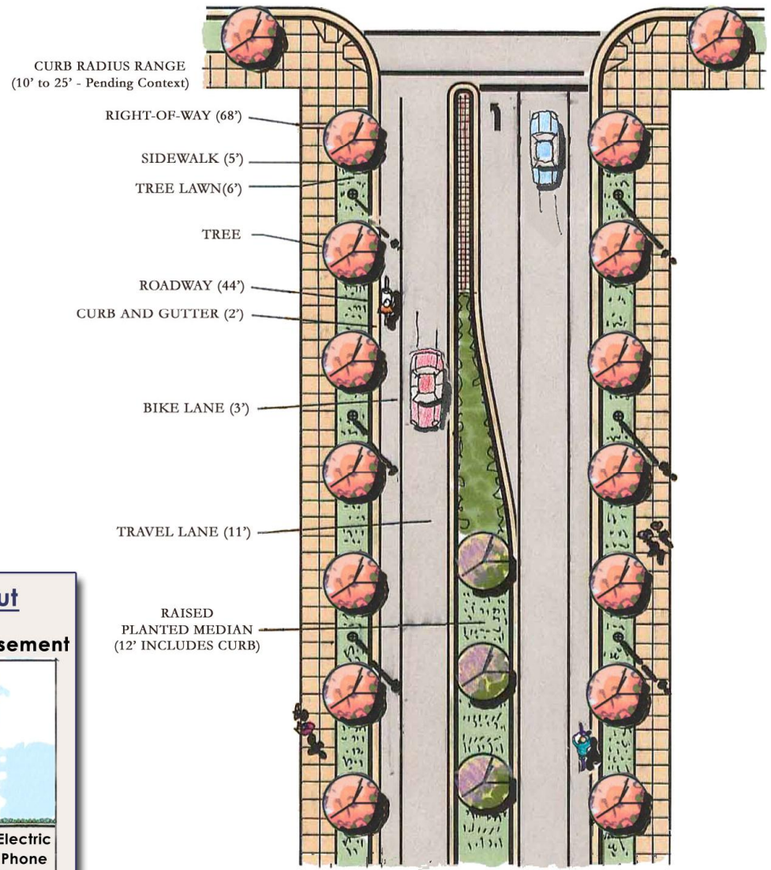
Golf Cart Usage
May cross roadway
May share lane with other vehicles

Roadway Capacity

8,000 to 12,000 vehicles per day

Typical Utility Layout

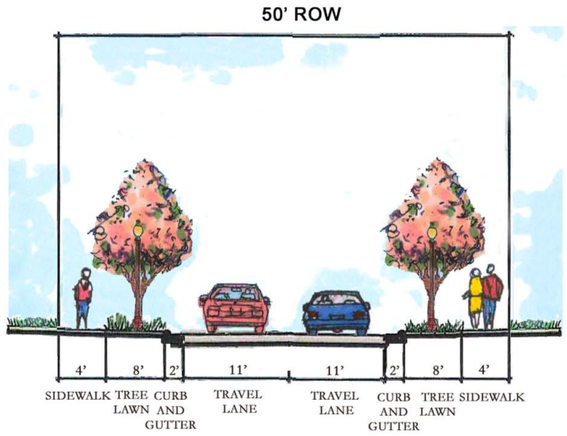




Plan
NOT TO SCALE

Local Collector Street: 2-Lane

(2-Lane, Sidewalks, Landscaping)



Design Features

Roadway Width
26' including 2 travel lanes and curb and gutter

On-Street Parking
None

Tree Lawn
8'

Median
None

Pedestrian Facilities
4' sidewalks, both sides

Bicycle Facilities
None

Golf Cart Usage
May cross roadway
May share lane with other vehicles

Roadway Capacity

9,000 to 14,000 vehicles per day

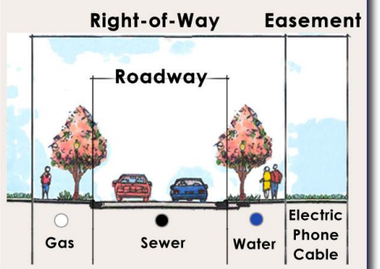
Notes

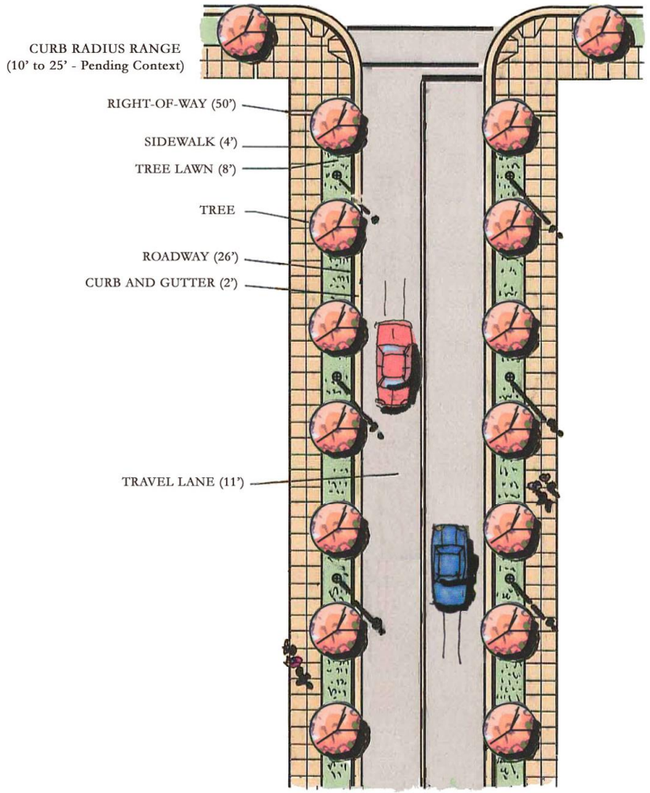
› An alternative to this cross section could include two 14' travel lanes with a 5' sidewalk on one side.

› The use of curb and gutter versus swale ditch will depend upon the street's proximity to development and the natural environment.

› The type (i.e. residential, commercial, rural, etc.) will depend on the adjacent land use served.

Typical Utility Layout





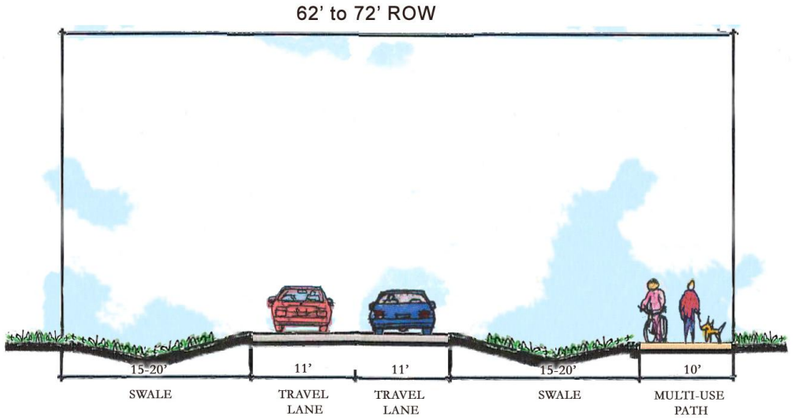
Plan
NOT TO SCALE

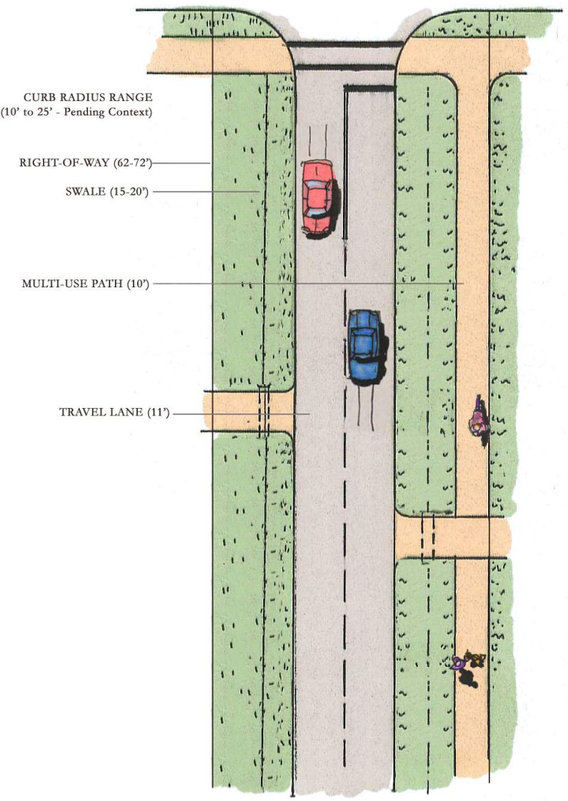


Local Street

Rural Local Street: 2-Lane with Multi-Use Paths

(2-Lane, Multi-Use Paths, Swale)





Plan
NOT TO SCALE

Design Features

Roadway Width
22' including 2 travel lanes

Median
None

On-Street Parking
None

Pedestrian Facilities
10' multi-use path, one side

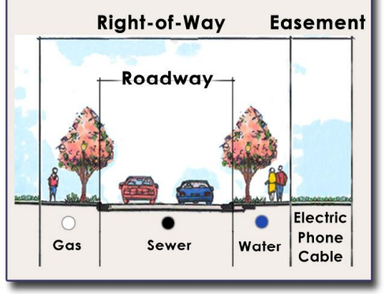
Tree Lawn
None

Bicycle Facilities
10' multi-use path, one side

Roadway Capacity

9,000 to 14,000 vehicles per day

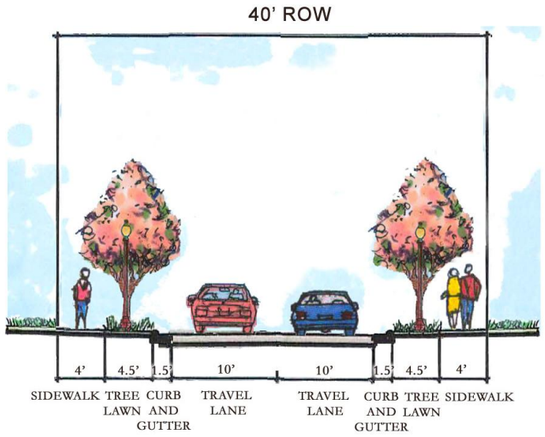
Typical Utility Layout





Local Street: 2-Lane

(2-Lane, Sidewalks, Landscaping)



Design Features

Roadway Width
23' including 2 travel lanes and curb and gutter

On-Street Parking
None

Tree Lawn
4.5'

Median
None

Pedestrian Facilities
4' sidewalks, both sides

Bicycle Facilities
None

Golf Cart Usage
May cross roadway
May share lane with other vehicles

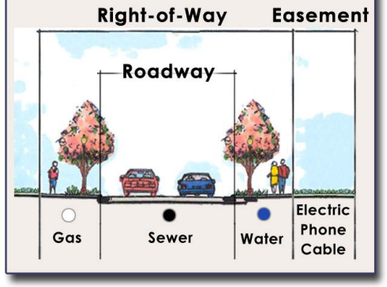
Roadway Capacity

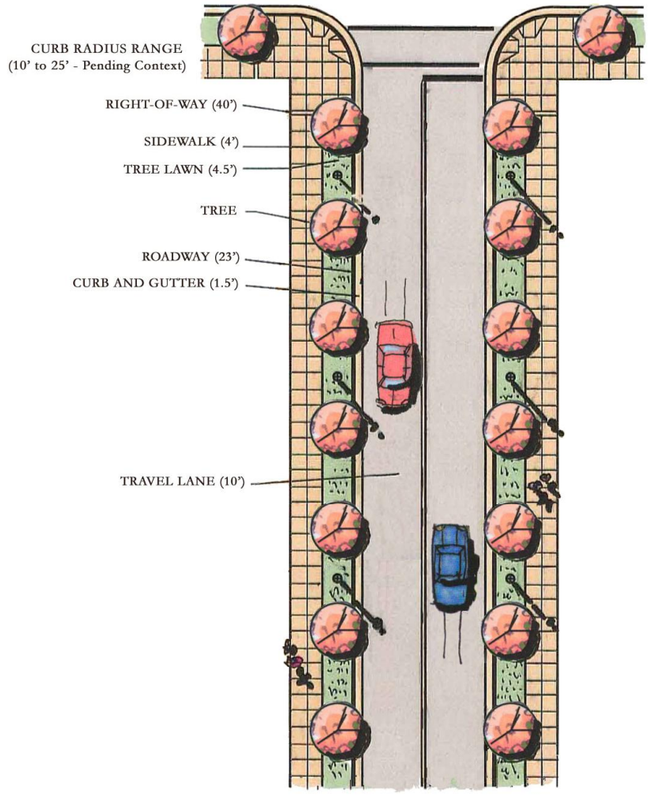
7,000 to 9,000 vehicles per day

Notes

› An alternative cross section could include two 14' travel lanes with a 5' sidewalk on one side.

Typical Utility Layout





Plan
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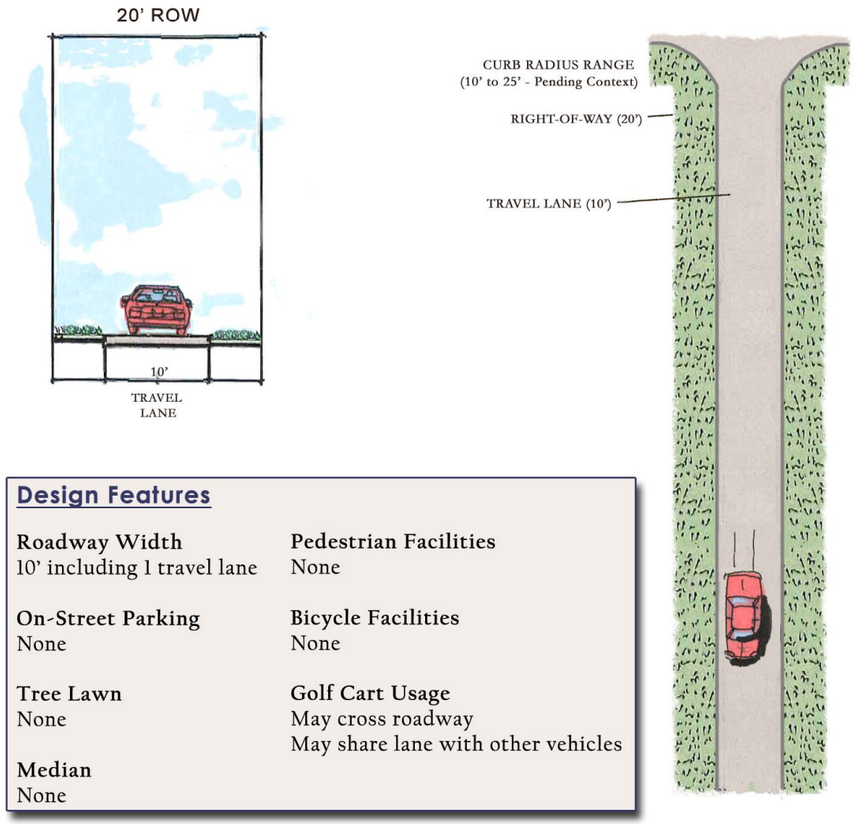
Alley

Residential Alley: 1-Lane

(1-Lane)



Design Features

Roadway Width
10' including 1 travel lane

Pedestrian Facilities
None

On-Street Parking
None

Bicycle Facilities
None

Tree Lawn
None

Golf Cart Usage
May cross roadway
May share lane with other vehicles

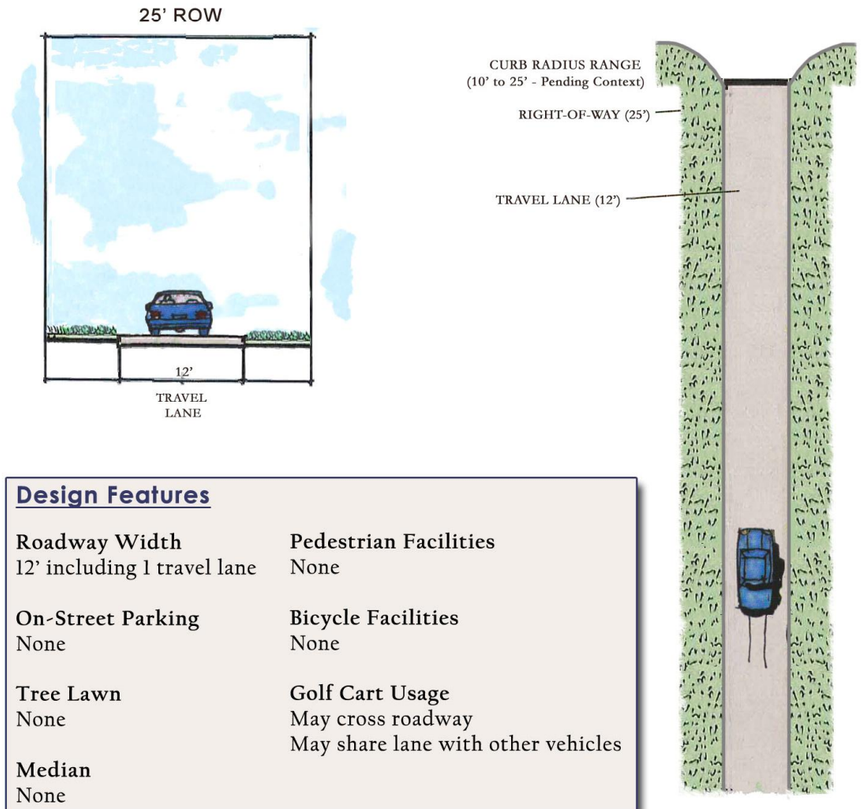
Median
None

Roadway Capacity

3,500 to 5,500 vehicles per day

Commercial Alley: 1-Lane

(1-Lane)



Plan
NOT TO SCALE

Design Features

Roadway Width
12' including 1 travel lane

Pedestrian Facilities
None

On-Street Parking
None

Bicycle Facilities
None

Tree Lawn
None

Golf Cart Usage
May cross roadway
May share lane with other vehicles

Median
None

Roadway Capacity

3,500 to 5,500 vehicles per day

Chapter 5 —Land Use Considerations

In recent years, planners and community leaders across the country have observed increased public interest in reversing the trend of urban sprawl and its consequences. Their efforts largely are motivated by the impacts of suburban development patterns: consumption of sensitive land for development, costly expansion of public infrastructure, and increasing traffic congestion. In cities like North Myrtle Beach and surrounding Horry County, the distance between complementary land uses (e.g., home and work, home and school, or home and shopping) and a lack of overall street connectivity leads to unintended consequences for the regional transportation system — increased vehicle miles traveled and energy consumption, longer commute times, increased air pollution, heightened infrastructure and public service costs, and decreased resource lands critical to coastal communities. Recent public and private development within the study area has begun to strain existing infrastructure. Unintended consequences will result if changes are not made to better integrate land use, urban form, and transportation decision-making.

Linking these three areas cannot be successful with a one-size-fits-all approach. The *Northeast Area Transportation Plan* respects the variety of local smart growth planning initiatives underway — such as the Main Street Revitalization program, increase of capital investment in North Myrtle Beach, wetland preservation, and development along the Intracoastal Waterway — and promotes transportation improvements sensitive to the overall goals of these initiatives within the context of the surrounding transportation system.

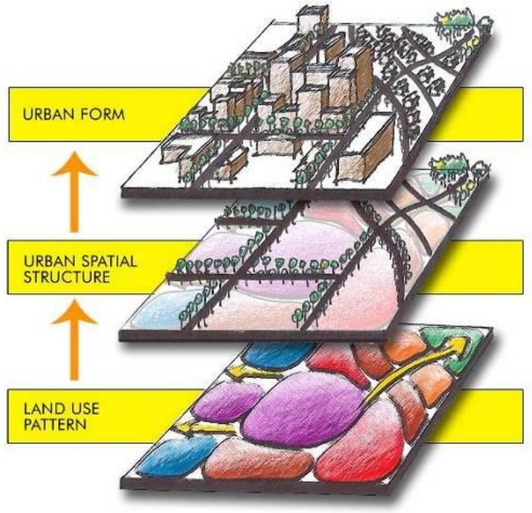
Land use and urban form considerations of the *Transportation Plan* focus on the inherent relationship between land use (demand), urban form (design), and transportation (supply). The underlying motive is to improve the efficiency of the regional transportation system while promoting livability within local communities. These relationships were analyzed in detail for three focus areas that represent the opportunities to better integrate land use, urban form, and transportation decision-making processes. Recommendations from these focus areas can be applied to other areas within North Myrtle Beach and Horry County. Communities with similar vision, development patterns, and supporting infrastructure may consider the best development practices generated from these models when implementing their own community plans to better integrate land use, urban form, and transportation decision-making.

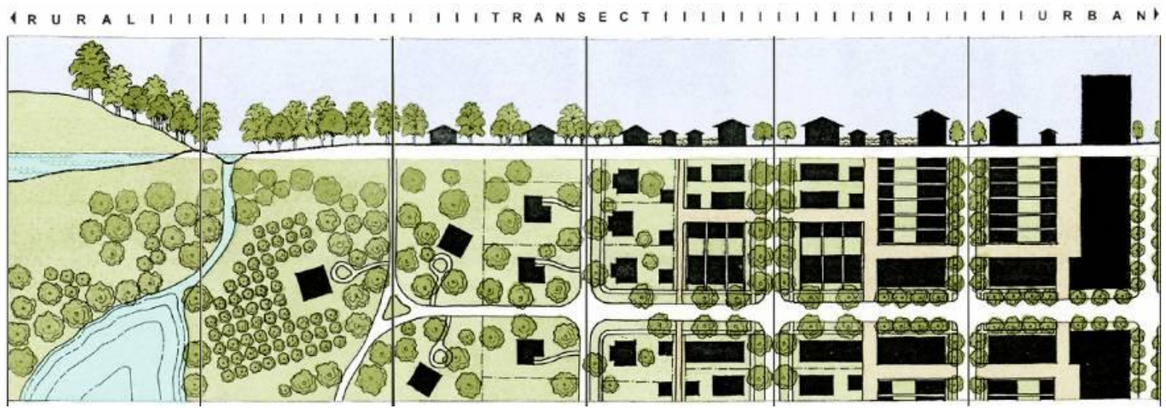
Land Use and Urban Form

Land use serves as the foundation of the built environment. It defines the type, mix, and general location of uses within communities and ultimately defines the boundaries for neighborhoods, commercial nodes, and employment centers. Communities try to influence patterns of land use when they develop a future land use map within a comprehensive plan. Typically, a comprehensive plan represents the community's vision for how to promote local growth and prosperity.

Urban form is the land use vision as it becomes reality in the physical world. It is commonly measured by street patterns, block lengths, building heights, building setbacks, average residential density, and average non-residential intensity. Putting these design elements in categories allows the region's consistency to be measured and identifies the typically natural progression from rural to suburban to urban. The components of urban form traditionally are regulated through the community's zoning ordinance, subdivision ordinance, engineering specifications, or architectural design standards.

The transect, popularized most recently by town-planner Andres Duany, provides a framework for organizing design elements that characterize urban form observed in the human environment. It is based on a continuum from natural environment to urban core. Different categories are used for specific urban form types, which vary in intensity and urban character (see diagram below). The number of urban form categories in a transect varies by community based on the complexity of their built environment.



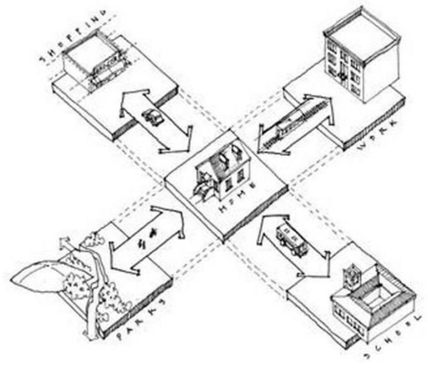


This plan illustrates how the transect classifies elements of the human environment from rural to urban, in a left-to-right sequence. (Source: Duany, Plater-Zyberk, 2007)

By using the transect, communities can better organize and understand their built environment. As new development and redevelopment are planned, communities can combine design elements described in one of the specific urban form categories to create more desirable environments — places with a cohesive presence that reinforces a sense of place. At the boundaries between urban form categories, an overlap of defining elements allows them to fit together smoothly.

This chapter of the *Transportation Plan* evaluates the relationship between land use, urban design, and transportation using the principles of urban form. The three focus areas generalize land use categories and describe regulatory tolls that can be implemented in future land development regulations. The chapter concludes with a description of the land use scenario planning exercise conducted for the study. In this process, a spatial data planning model was developed to evaluate impact of land use decisions on surrounding public facilities and services.

Urban Form and Travel Behavior



As explained above, urban form represents physical elements of the built environment. These physical elements can influence the comfort, speed, cost, convenience, attractiveness, and safety of movement between complementary land uses. Elements of the transportation system — including road, pedestrian, bicycle, and transit facilities — impact how land is developed in terms of size, shape, density, and mix of land uses. Where land uses fall and how they are designed can favor one mode of travel over others and may influence overall travel behavior. For example, if low-density development is spread out, residents of these areas must rely almost entirely on automobiles to get from one location or land use to another. On the other hand, denser urban centers that combine complementary land uses near each other enable greater choice in transportation.

Evaluating the relationship between land use, urban form, and travel behavior produces several benefits. When considered together, decisions and investments regarding all elements have a significant bearing on the future development patterns in North Myrtle Beach and Horry County.

- The impacts to sensitive land uses (such as Carolina Bays) can be minimized when facilities identified for transportation investments are located *after* considering appropriate land use patterns and development intensities for the area.
- Prime locations for development can be stimulated if transportation investments consider available capacity or appropriate mobility options.
- Complementary activities can be placed next to existing or planned transportation infrastructure, making the most of land use opportunities and dedicated transportation investments.
- The quantity and location of travel demand can be influenced by land use decisions, highlighting the factors (i.e., trip generation, trip length, and travel mode) that influence the efficiency of a proposed transportation system.
- Combining specific streetscape design elements can transform transportation corridors from vehicle-dominated thoroughfares into community-oriented streets that safely and conveniently accommodate all modes of travel.

Reorganizing Urban Form — The 4D Analysis

Reorganizing urban form in the region for a more efficient transportation system requires community leaders to evaluate the "Four Ds" commonly associated with the relationship between urban form and transportation — density, diversity, design, and (travel) distance. By evaluating these issues, North Myrtle Beach and communities within Horry County will be able to shorten the commuting distance between complementary land uses, provide more travel choices, and create a more efficient transportation system.

A brief summary of the four Ds associated with better integrating urban form and travel behavior follows.

Density

While some people cringe at references to residential density and non-residential intensity because they envision problems associated with traffic congestion or unattractive buildings, others view the benefits associated with the availability of housing options. Those who promote residential density and non-residential intensity likely view the diverse housing and travel options as beneficial to the community because of the variety offered.

Research shows perceived density usually is not related to actual density and the same density or intensity can look and feel quite different based on the building or neighborhood's scale and design. Good planning and design match an environment while naturally incorporating the benefits of a variety of transportation modes.

In general, residential density refers to the number of housing units per area of land. It is commonly reported in dwelling units per acre but also can be reported in persons per acre using household size characteristics. Dense urban projects sometimes measure residential density in floor-area-ratio (FAR), which is the ratio of gross building floor area to the total lot area. Non-residential intensity (e.g., commercial, office, or industrial uses) is commonly reported in floor-area-ratio for both suburban and urban conditions.

In North Myrtle Beach and Horry County alike, location often is the main factor in determining density and intensity. The farther away the area is from the coast, the more likely it is to have lower density and intensity. Exceptions to this pattern exist, particularly with the high-density multifamily housing (e.g., Barefoot Resort community) located along the Intracoastal Waterway rather than the coast.

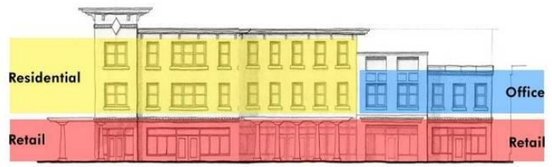
Managing the location and magnitude of new density or intensity within the built environment helps planners determine infrastructure needs and implementation costs, and it shifts impacts away from environmentally-sensitive areas.

Diversity

One type of development gaining popularity is mixed-use development. By creating places where people live, play, work, and shop in one general area, these developments combine various public amenities with compatible land uses in a centralized location. Successful mixed-use developments around the country generally include residential uses and one or more of the following: commercial, office, light industrial, civic, hotel, public parks or plazas, and dedicated open space. Promoting a mix of land uses in new development often is associated with the initiatives of smart growth, new urbanism, transit-oriented development, and Traditional Neighborhood Development.

While mixed-use developments come in a variety of forms, they typically are categorized as either vertical mixed-use buildings or horizontal mixed-use sites. As described in *Planning and Urban Design Standards* published for the American Planning Association (APA), "Vertical mixed-use buildings combine different uses in the same building. The lower floors generally have more public uses, with private uses on the upper levels. Examples include residential space over commercial establishments, street-level retail with an office tower above, residential and hotel uses in the same building, and retail wrapped around a parking structure with multiple uses above. Vertical mixed-use development may have any number of revenue-producing and mutually supportive uses in the same building."

"Independent of other factors, increased residential density and non-residential intensity create higher travel demand for a geographic area, but they also encourage shorter trip lengths and more mobility options (i.e., transit, bicycle, and walking) that more efficiently link complementary land uses within a concentrated area."



Vertical mixed-use buildings can occur at different scales in the built environment. The image above represents less intense vertical mixed-use buildings typical of an urban town center.

The *Planning and Urban Design Standards* also describes how "Horizontal mixed-use development combines single-use buildings on distinct parcels in one planned development project with a range of uses. Examples include residential neighborhoods surrounding commercial or office development adjacent to a major highway or a medical campus with surrounding professional offices. This approach avoids the financing and code complexities of vertical mixed-use buildings while achieving the goals of place-making made possible by conveniently bringing together complementary uses in one place."

Both vertical and horizontal mixed-use developments help create places that enliven urban districts while meeting the everyday needs of the community. They offer advantages over single-use developments by fostering a more efficient, livable transportation system characterized by shorter trip lengths, modal choice, convenient access, and internal trip capture.

In some communities, hurdles remain to building mixed-use development because of the local government's continued adherence to Euclidean zoning, which generally isolates residential, commercial, office, and industrial uses to separate zoning districts. The North Myrtle Beach Future Land Use Plan has begun to identify mixed-use zoning areas. However Horry County and North Myrtle Beach can work together to consider establishing flexible, performance-based standards for appropriate locations in the community (e.g., main street, neighborhood centers, other core areas) in order to support emerging urban centers through policy.

Design

Urban design is the essence of city-building. It shapes the blocks, neighborhoods, and districts that give our cities identity and provides overall organization to the built environment. Various elements of urban design provide a three-dimensional physical form to the requirements for density and diversity established in locally adopted comprehensive plans or zoning ordinances.

The emphasis for urban design is the public realm, which is created by public space (e.g., streets, plazas, open space) and the buildings that define them. Urban design looks at the various elements that influence these spaces and uses design elements to provide connections between people, places, and buildings.

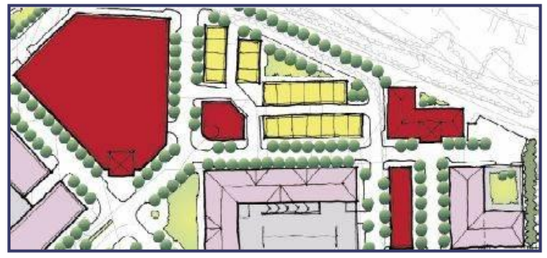
Specific elements of urban design — street pattern, streetscape design, block size, building scale and massing, parking, and landscaping — directly influence travel mode choice and travel behavior when supported by appropriate minimum densities and diversity of land uses. These design elements provide context to the transportation system and celebrate the street network as the centerpiece to the public realm.

Combining design elements (e.g., bicycle lanes, sidewalks, bus stops, street trees, and on-street parking) in the streetscape can transform transportation corridors from vehicle-dominated thoroughfares to community-oriented streets that safely and conveniently accommodate all modes of travel. The type, placement, and scale of design elements included in the streetscape for transportation corridors generally vary with the context of the surrounding environment. Programming improvements need to be tailored to rural, suburban, and urban environments.

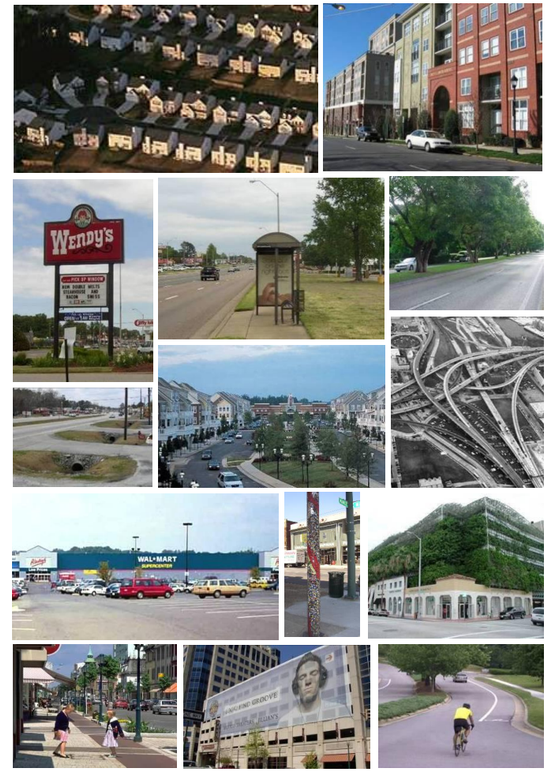
The orientation, scale, and massing of buildings on a site relative to the adjacent transportation corridor can reinforce those design elements that support a "complete street". Literature from around the country cites safe, predictable connections between adjacent properties, orientation of buildings and elimination of excessive parking requirements as ways to promote a more balanced transportation system that favors walking between nearby destinations once arriving to the site by automobile or transit.

Distance

The travel distance between origin and destination is a primary factor (along with travel mode choice) for influencing travel behavior. The physical distance between complementary land uses in rural or suburban settings tends to promote automobile travel, particularly since safe, convenient facilities usually are not available for pedestrians and bicyclists. Denser mixed-use areas decrease the travel distance between complementary land uses and support transit, bicycle, and walking as viable alternatives to the automobile.



An illustrative example of horizontal mixed-use development.



Urban design looks at various elements in the public realm that provide three-dimensional physical form for the built environment.

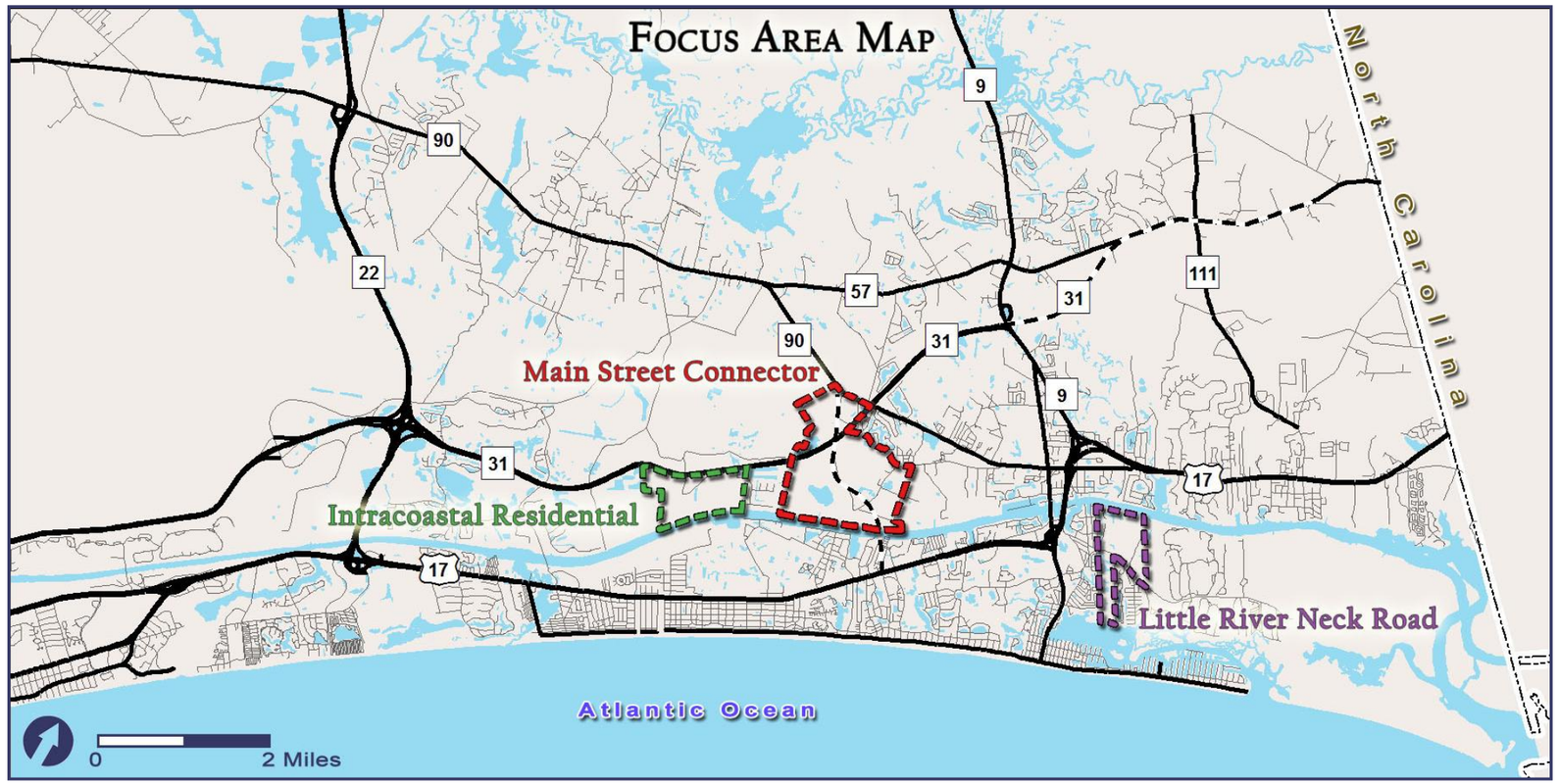


Focus Area Studies

The planning jurisdiction includes quickly developing and redeveloping areas of North Myrtle Beach and Horry County. Selection of smaller focus areas within the planning jurisdiction allows detailed study of the local relationships between land use, urban form, and travel behavior. Planning initiatives being studied that have been represented in three focus areas include Traditional Neighborhood Development; Conservation Development; and Marina Mixed-Use Development.

Both Horry County and North Myrtle Beach have adopted comprehensive plans that reflect these planning initiatives. These plans are being translated into land development regulations that support development sensitive to transportation. Planning staff from Horry County and North Myrtle Beach helped identify the three focus areas: Main Street Corridor (Mixed Use/Traditional Neighborhood Development), Intracoastal Residential (Traditional Neighborhood Development), and Little River Neck Residential (Conservation Development/Marina Mixed-Use). Development prototypes considered for these focus areas reflect the comprehensive plans' emerging planning initiatives. These locations were presented to the Advisory Committee on October 23, 2008 and approved for inclusion in the *Northeast Area Transportation Plan*.

Recommendations from the three focus areas can be applied to other areas of the City and County. New development and redevelopment with similar vision, development patterns, and supporting infrastructure can consider the best development practices generated from these models when implementing their own community plans that better integrate land use, urban form, and transportation decision-making.





Planning Process

A detailed study of the relationships between land use, urban form, and travel behavior in each of the focus areas followed the same four-step planning process:

1. Inventory existing conditions
2. Evaluate existing development controls
3. Formulate development scenarios
4. Identify development scenario trade-offs

A brief summary of the four-step planning process used for evaluating the focus areas follows.

Step One: Inventory Existing Conditions

An inventory of existing conditions was completed for each of the focus areas using geographic information system (GIS) data, aerial photography, field photos, and windshield surveys. This information was used to characterize the study area based on existing land use patterns and development conditions. Particular attention was paid to physical features in the focus area in the context of the surrounding environment. For example, the following conditions were noted: distribution of open space, size and character of existing buildings, land use mix, size and character of streets, available travel modes, internal and external connections, location of parking and interface of properties versus the public street.

Step Two: Evaluate Existing Development Controls

A review was conducted of locally adopted plans, programs, and policies administered by North Myrtle Beach and Horry County. This information was used to inventory existing development controls for preparing a "business-as-usual" development scenario as well as potential barriers for implementing alternative development scenarios. This step included the review of local comprehensive plans, zoning ordinances, subdivision ordinances, small area plans (if applicable) and architectural design standards (if applicable).

Step Three: Development Scenarios

Two development scenarios were prepared for each focus area. The first development scenario represented continuation of existing plans, programs, and policies administered by the local government under the current zoning designation (i.e., business-as-usual). The second development scenario represented a shift in planning philosophy toward one or more of the four previously identified planning initiatives gaining popularity in the region for better linking land use, urban form, and transportation planning — conservation community, Traditional Neighborhood Development, or marina mixed-use.

Both development scenarios for each focus area included a preferred development pattern, significant transportation infrastructure needs, and recommended circulation strategies. Development plans were kept as consistent as possible for optimal comparison between the two. Also included were best development practices for parking, building placement and arrangement, site access, circulation, and connectivity based on the desired urban form category and prescribed regulatory framework.

The draft development scenarios were presented to planning staff for each of the three focus areas. Their comments were incorporated into the final development scenarios presented in this document.

Step Four: Development Scenario Trade-Offs

Trade-offs between the two development scenarios prepared for each of the focus areas were identified using a set of elasticity factors developed for the U.S. Environmental Protection Agency. These factors relate physical features of the built environment — density, diversity, and design — to the percentage change in vehicle trips and vehicle miles traveled resulting from the two development scenarios. A technical memorandum describing in detail the methodology for estimating travel demand impacts from land use and urban design changes is included in the *Smart Growth Index Indicator Dictionary, Appendix A* prepared for the U.S. Environmental Protection Agency by Criterion, Inc. in October 2002.

Focus Area 1 — Little River Neck Road

With neighborhoods occupying most of the land along Little River Neck Road, the remaining parcels not incorporated into North Myrtle Beach are prime locations for development due to their proximity to the Intracoastal Waterway and beaches. The intensity of land use combined with a lack of cross connectivity as land develops incrementally over time has burdened Little River Neck Road as the only access road. Future development that focuses not only on good development practices but also on transportation patterns could connect neighborhoods and create better access for residents.

The Little River Neck Road focus area is bounded by natural and manmade features — the Intracoastal Waterway to the north and Cherry Grove Marsh on the south. Little River Neck Road bisects the study area east to west; to the north, 27th Avenue N. forms the eastern boundary, and Tidewater Golf Resort forms the western. On the south side, the focus area includes a strip of undeveloped land between an existing neighborhood and Charleston Landing, a community currently being developed.

Step One: Inventory Existing Conditions

A physical assessment of the focus area highlighted strengths, weaknesses, and opportunities for better integrating land use, urban form, and transportation decision-making. A summary of existing conditions for the focus area is organized using the 4D planning framework.

Density

The focus area is generally undeveloped with the exception of some buildings along Little River Neck Road, plus a few single-family residences and a vacant day care facility north of Little River Neck Road.

Diversity

Existing land uses in the focus area are predominantly residential, with a small church located along Little River Neck Road.

Design

Given the proximity to the coast and marsh areas, the focus area is flat and wooded with a few water bodies in low lying areas. Little River Neck Road provides access to the site. As discussed in **Chapter 4**, Little River Neck Road is recommended to be widened to two lanes divided on four-lane divided right-of-way.

Distance

The distance from the focus area to employment and shopping centers necessitates travel by automobile due to the lack of connectivity between neighborhoods. Likewise, the lack of connection creates longer trips by these vehicles. Little River Neck Road currently does not provide safe or efficient pedestrian, bicycle, or transit amenities. Access to the site currently is limited to one point at the intersection of Little River Neck Road and Hill Road. (The current design of this intersection is unsafe and inefficient due to its skew. **Chapter 4** recommends the construction of a five-leg roundabout at this location.)

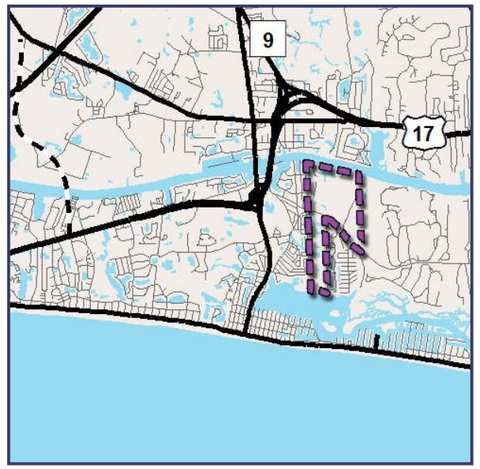
Step Two: Evaluate Existing Development Controls

The following documents were reviewed for the focus area to identify supporting policies and/or potential barriers in preparing development scenarios for the Little River Neck Road focus area:

- Horry County Code of Ordinances, Appendix B
- North Myrtle Beach Code of Ordinances, Chapter 23 (Zoning)

The (Horry County) Commercial Forest Agricultural (CFA) zoning district promotes agriculture, residential, commercial and forestry uses as well as social, cultural, recreational, and religious uses. The minimum lot size for commercial is 1 acre with setbacks of 60 feet (front yard), 25 feet (side yard) and 40 feet (rear yard). The minimum residential lot size is 1/2 acre with setbacks of 25 feet (front yard), 10 feet (side yard) and 15 feet (rear yard). CFA allows site built, modular, and manufactured housing (mobile homes). Maximum building height is 35 feet.

Single-family residential homes and retail/commercial establishments are permitted in the CFA zoning district.. Parcels within the focus area currently are outside North Myrtle Beach City Limits. However, the North Myrtle Beach Comprehensive Plan identifies these large undeveloped parcels for potential annexation. Thus, the zoning and future land use plans from North Myrtle Beach were taken into consideration when creating the development scenarios. The future land use plan for North Myrtle Beach designates the focus area as Low Density Residential suitable for single-family residential including patio homes, parks, and religious uses. The recommended density for the Low Density Residential is 4 dwelling units per acre.



Little River Neck Road
Focus Area Map



Step Three: Development Scenarios

Two development scenarios were created for the 260-acre Little River Neck Road focus area: business-as-usual and a conservation development with a marina mixed-use component given the site's access to the Intracoastal Waterway. These scenarios are summarized below and illustrated on the following pages.

Business-as-Usual Scenario

The business-as-usual development scenario assumes the continued construction of gated residential neighborhoods on existing tracts of land, one of which is currently for sale. As this trend continues, access to these developments would be limited to one access point from Little River Neck Road. The business-as-usual scenario assumes that provisions for conservation developments included in both the Envision 2025 (Horry County) and the North Myrtle Beach Comprehensive Plan have not been implemented, and the plan conforms to the existing Horry County Code of Ordinances Commercial Forest/Agricultural District standards.

The Business-as-Usual Scenario includes:

- 380 single-family residential dwelling units
- 3-acre community marina area
- 2.5 acres of civic use
- 30 acres of preserved open space, including a 16-acre park (30 acres of open space exceeds the requirement of 500 square feet per dwelling unit)

The business-as-usual site plan provides only one type of use (residential) accessed by one road (Little River Neck Road). Minimum lot size (as indicated in the Horry County Code of Ordinances) for residential development is ½ acre. In keeping with the current development patterns, residences along the Intracoastal Waterway would prevail allowing only a limited amount of public access. The only greenway provided in this development scenario is a ¾-mile loop in the community park and a ½-mile trail encompassing a small lake for the subdivision north of Little River Neck Road.

Conservation Community Scenario

Conservation communities are growing in popularity as more communities and residents recognize the importance of preserving greenfield sites and creating community open space. Conservation communities are characterized by "pod" development patterns that condense development and promote a sense of community while providing a comprehensive greenway system throughout the undisturbed open space accessible to most or all residents. The non-gated conservation community along Little River Neck Road includes:

- 340 single-family lots between 1/8 and 1/2-acre in size, most with direct access to open space.
- 50 townhomes and 100 multi-story multi-family units in the marina mixed-use development north of Little River Neck Road; The multi-family units stack away from the water to take advantage of Intracoastal Waterway views.
- 20,000 square feet of retail commercial space and 15,000 square feet of live/work space within the mixed-use area; These public areas along the Intracoastal Waterway provide a nearly continuous water edge with public access.

Nearly 2.5 miles of greenway meander through the interconnected open space linking the Intracoastal Waterway to the Cherry Grove Marsh. A 12-acre community park is located between these two features. A small parking area is provided along the Cherry Grove Marsh for a possible non-motorized boat dock. All of these features are included in the 45 acres of conserved open space for this conservation, marina mixed use plan.

Step Four: Development Scenario Trade-Offs

General development characteristics summarized in the previous section were used as input data for formulas to estimate travel demand impacts from land use and urban design changes. Comparative statistics calculated for the two development scenarios confirm that implementing the vision for conservation and mixed-use developments established in Envision 2025 and the North Myrtle Beach Comprehensive Plan would have a positive impact on reducing the amount of vehicular travel generated inside the focus area. It is estimated that the increased density and specific urban design elements prescribed in the alternative development scenario would reduce both the number of vehicle trips (-4.30%) and vehicle miles traveled (-3.30%) compared to the business-as-usual scenario. Additional discussion of scenario planning can be found later in this chapter, beginning on page 4-23.




Little River Neck Road

Business-as-Usual

Conservation Community with Marina Mixed-Use

The business-as-usual development scenario (above left) assumes continuation of existing land use patterns and development intensities observed in the focus area with winding roads, cul-de-sacs, and almost full residential build-out. In comparison, the conservation community (above right) provides interconnected open spaces by offering more dense residential options as the development moves towards the Intracoastal.

LEGEND

- Single-Family Residential
- Townhouse
- Multi-Family Residential
- Retail
- Live-Work Mixed Use

Development Characteristics Comparison		
	Business-As-Usual	Conservation Community
Average Residential Density	1-2 d.u. / acre	2-4 d.u. / acre
Average Non-Residential Intensity (FAR)	NA	0.15 – 0.20
Typical Street Pattern	Curvilinear	Grid
Typical Block Length	300-600- lf	200-600 lf
General Land Use Pattern	Separation of Uses	Mixed Uses
Prevailing Building Height (stories)	2 stories	2 stories
Street Network Density	Low	Medium
Street Network Connectivity	Medium	High
Pedestrian Infrastructure	Low	High
Bicycle Infrastructure	Low	Medium
Vehicle Infrastructure	Medium	Medium
Public Transit Infrastructure	Low	Low
Preserved/Public Open Space	9%	17%

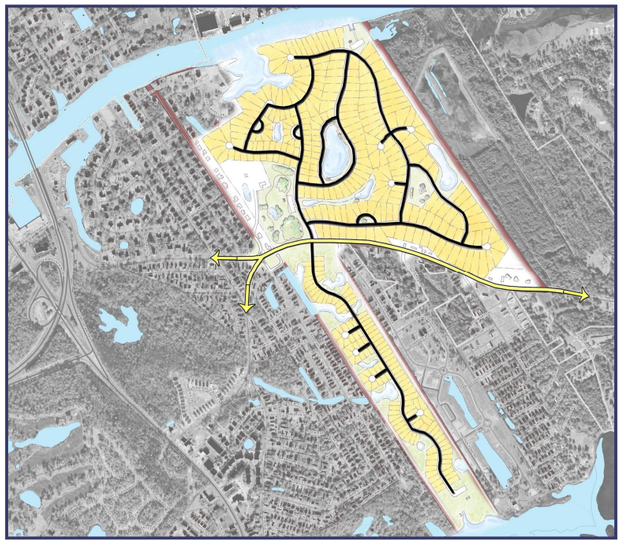
This artist's rendering as viewed from above the Intracoastal Waterway displays how the waterfront is activated by retail and live/work opportunities, while the residential density decreases as it moves away from the water.



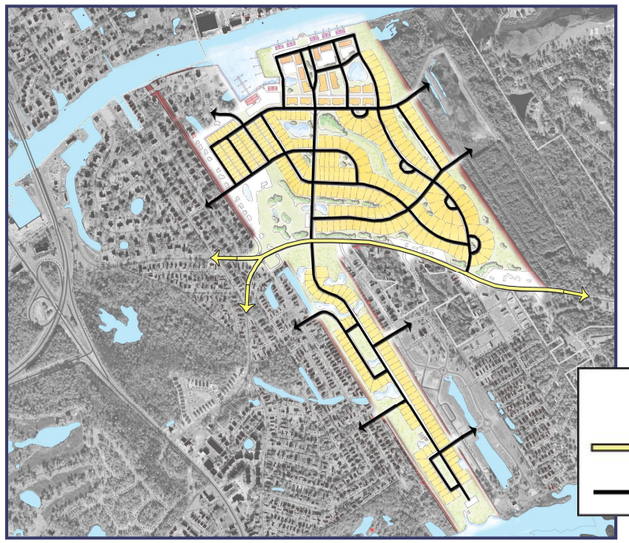
Street Network

By creating a network map of streets, it is clear how different the pattern of streets is between the two plans. The business-as-usual road network provides one access point to either side of the main road. In contrast, the conservation community has an efficient, connected road network that provides numerous opportunities to connect with surrounding neighborhoods.

Business-as-Usual

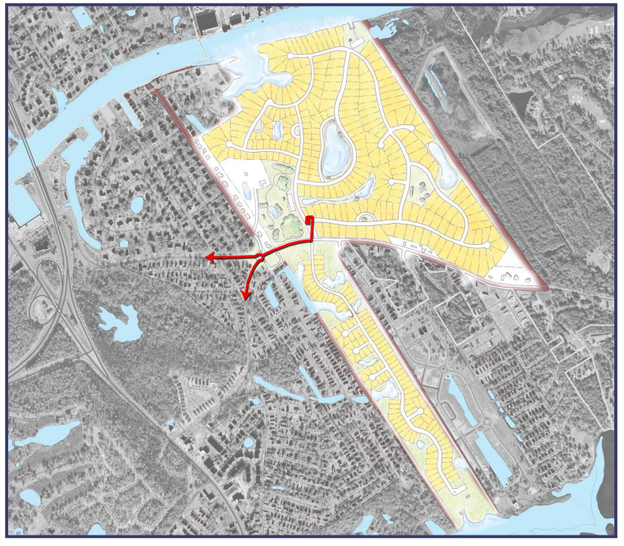


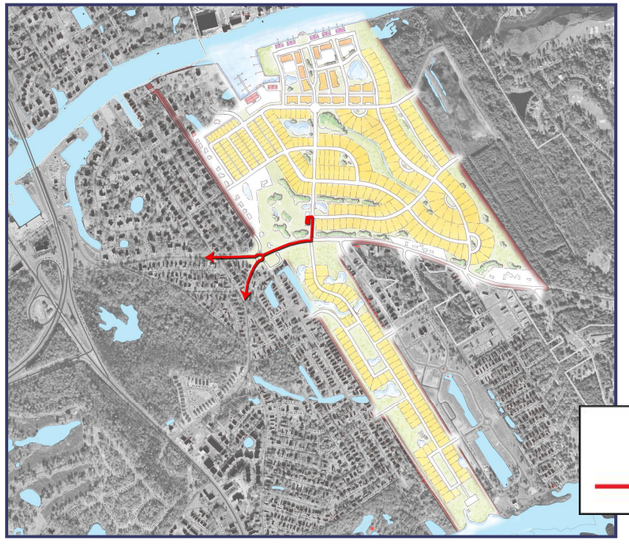
Conservation Community



Transit Network

The low-density development patterns of the Little River Neck Area combined with the dead end of Little River Neck Road a few miles beyond Hill Road, limits the viability of a bus transit network beyond the Community Park provided in the same location for each development scenario.



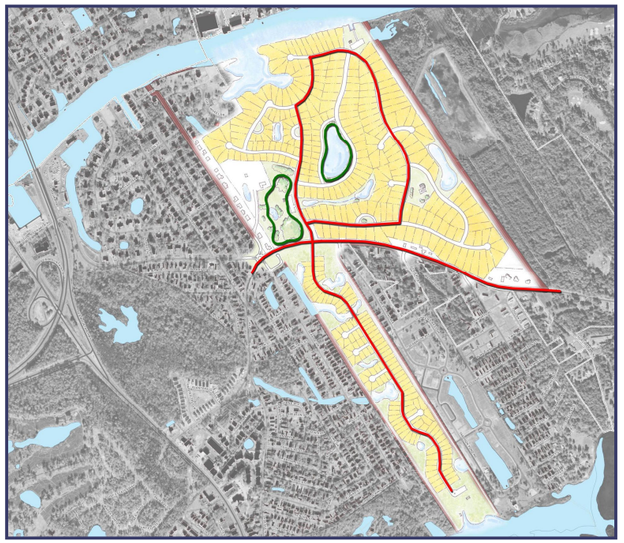




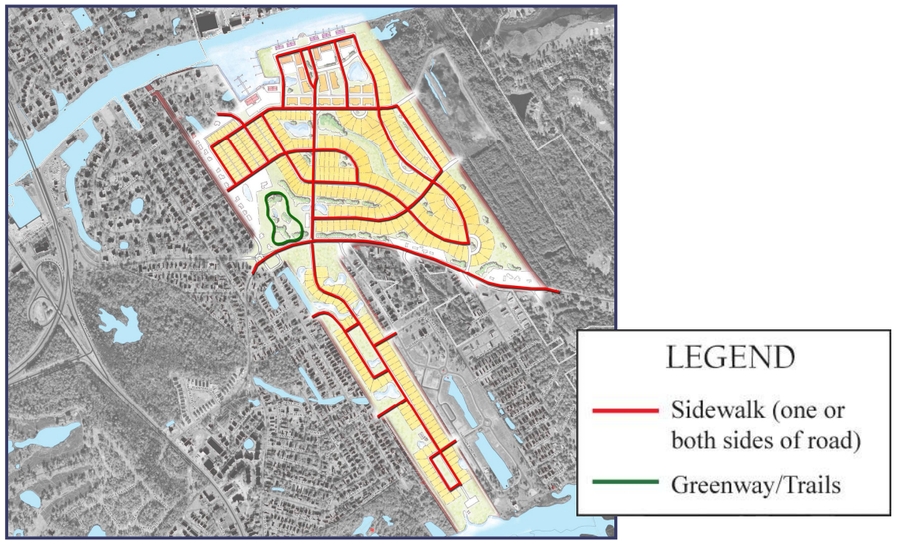
Pedestrian Network

The completeness of the sidewalks in each scenario directly relates to the connectivity of the street network. A complete sidewalk network promotes walkability, thus reducing vehicle trips. Nearly 2.5 miles of greenway are offered in the Conservation Community's connected open space.

Business-as-Usual

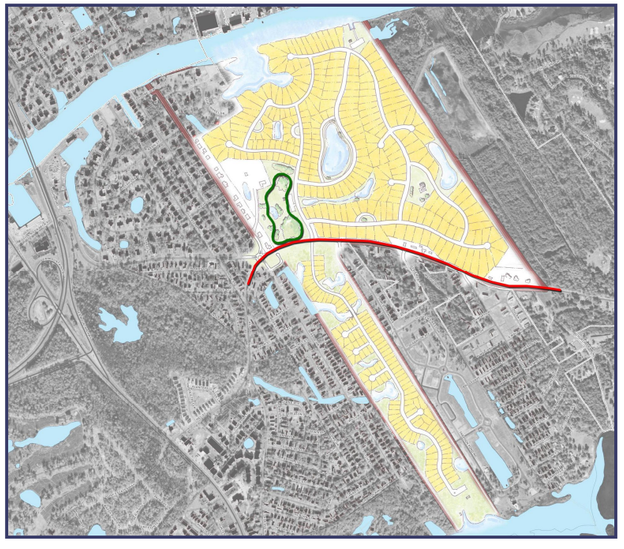


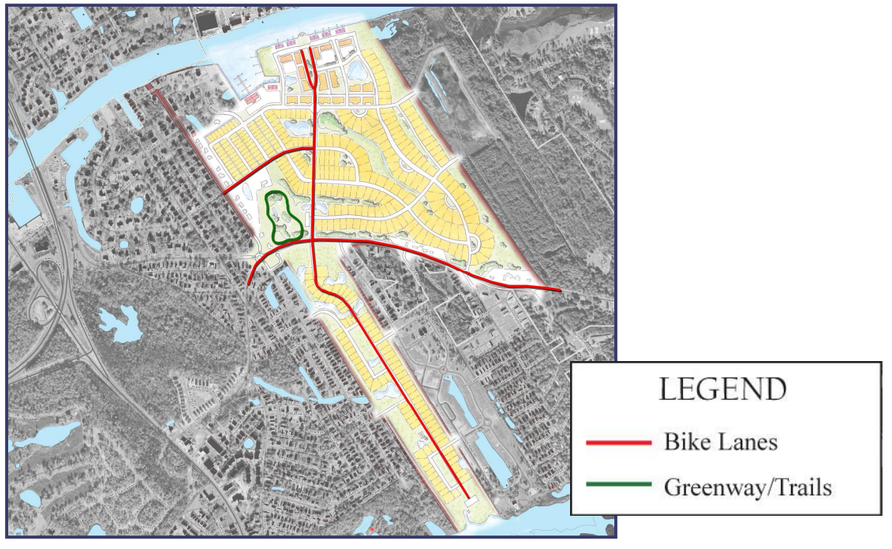
Conservation Community



Bicycle Network

Additional provisions are made in the Conservation Community design to provide facilities for safe biking routes along designated roads in addition to the bicycle facilities provided with the Little River Neck Road improvements.





Focus Area 2 — Intracoastal Residential

Once complete, the Main Street Connector/Robert Edge Sr. Parkway will provide a much-needed connection across the Intracoastal Waterway and open up access to previously inaccessible areas prime for development. Much of these areas are currently designated as "commercial forest agriculture" areas in local zoning codes. New infrastructure will foster new residential development and additional streets between the Main Street Connector and Intracoastal Waterway. The Intracoastal Residential focus area is bounded by SC 31 (Carolina Bays Parkway) to the northwest, the Intracoastal Waterway to the southeast, and Pelican Bay (a residential neighborhood) to the west.

Step One: Inventory Existing Conditions

A physical assessment of the focus area highlighted strengths, weaknesses, and opportunities for better integrating land use, urban form, and transportation decision-making. A summary of existing conditions for the focus area is organized using the 4D planning framework.

Density

The focus area is generally undeveloped with the exception of one or two buildings located along the Intracoastal Waterway. The area is wooded and has been used by the timber industry.

Diversity

Existing land uses in the focus area are undeveloped and agricultural.

Design

Given the proximity to the coast, the focus area generally is flat with the only topographical feature being the manmade bridge structure (Bourne Trail) that provides access to the site. The *Northeast Area Transportation Plan* recommends two roads that would travel across the site parallel to SC 31, one being a minor arterial and the other a collector street (see **Chapter 4**).

Distance

The distance from the focus area to employment and shopping centers necessitates travel by automobile. Existing dirt roads do not provide safe or efficient pedestrian, bicycle, or transit amenities. Access to the site currently is limited to one point at the Bourne Trail Bridge. Bourne Trail is the only paved road in the focus area.

Step Two: Evaluate Existing Development Controls

The following documents were reviewed for the focus area to identify supporting policies and/or potential barriers in preparing development scenarios for the Intracoastal Residential focus area:

- Horry County Code of Ordinances, Appendix B
- North Myrtle Beach Code of Ordinances, Chapter 23 (Zoning)

The (Horry County) Commercial Forest Agricultural (CFA) zoning district promotes agriculture, residential, commercial and forestry uses as well as social, cultural, recreational, and religious uses. The minimum lot size for commercial is 1 acre with setbacks of 60 feet (front yard), 25 feet (side yard) and 40 feet (rear yard). The minimum residential lot size is 1/2 acre with setbacks of 25 feet (front yard), 10 feet (side yard) and 15 feet (rear yard). CFA allows site built, modular, and manufactured housing (mobile homes). Maximum building height is 35 feet.

Single-family residential homes and most retail/commercial uses are permitted in the CFA zoning district. Parcels within the focus area currently are outside North Myrtle Beach City Limits. However, the North Myrtle Beach Comprehensive Plan identifies these large undeveloped parcels for potential annexation. Thus, the zoning and future land use plans from North Myrtle Beach were taken into consideration when creating the development scenarios. The Future Land Use Plan for North Myrtle Beach designates the focus area as Inland Low Density Residential deemed as "areas intended to allow incorporation of property west of the waterway at densities typical of inland development." This includes single-family residential including half-acre in size or larger, small farms and farm related uses, and mobiles homes on individual lots. The recommended density for the Inland Low Density Residential is 2 dwelling units per acre.

Step Three: Development Scenarios

Two development scenarios were created for the 330-acre Intracoastal Residential focus area: business-as-usual and a Traditional Neighborhood Development (TND). These scenarios are summarized below and illustrated on the following pages.

Intracoastal Residential
Focus Area Map



Business-as-Usual Scenario

The business-as-usual development scenario assumes residential (gated community) subdivisions would occur on single or recombined tracts of land. Current market forecasts indicate the addition of new retail support centers along the Main Street Connector/Robert Edge Sr. Parkway will spur residential growth west of the Connector, especially along the Intracoastal Waterway. The business-as-usual plan assumes provisions for Traditional Neighborhood Developments included in Envision 2025 (Horry County) and the North Myrtle Beach Comprehensive Plan have not been implemented and conforms to the existing Horry County Code of Ordinances Commercial Forest/Agricultural district regulations.

The Business-as-Usual Scenario includes:

- 300 single-family residential dwelling units
- 2.5 acres of civic use
- 40 acres of preserved open space, including an 8-acre park (40 acres of open space exceeds the requirement of 500 square feet per dwelling unit)

The business-as-usual plan provides only one type of use (residential). Although two linear roads are recommended through the focus area, curvilinear street patterns and the presence of cul-de-sacs greatly reduces road connectivity in the focus area. Minimum lot size (as indicated in the Horry County Code of Ordinances) for residential development is ½ acre. Most of the access to the Intracoastal Waterway in this scenario is private, putting a premium on lots but restricting public water access. The only greenway in this scenario is a ½-mile loop in the community park overlooking the Grand Strand Airport. A lack of connectivity within the open space exists because of the residential development patterns.

Traditional Neighborhood Development Scenario

Traditional Neighborhood Development (TND) communities promote higher densities and a mix of complementary land uses. These communities are characterized by compact, pedestrian-oriented development patterns that provide a variety of housing types and conserve open space. The transportation system emphasizes street connectivity and travel mode choice between nearby destinations.

The Traditional Neighborhood Development scenario for the Intracoastal Residential focus area includes:

- 344 residential dwelling units (single family and multi-family)
- 2.5 acres of civic use
- 10,000 square feet of community space at the public marina area
- 60 acres of preserved open space, including an 8-acre park and 10 acres of community/organic farmland

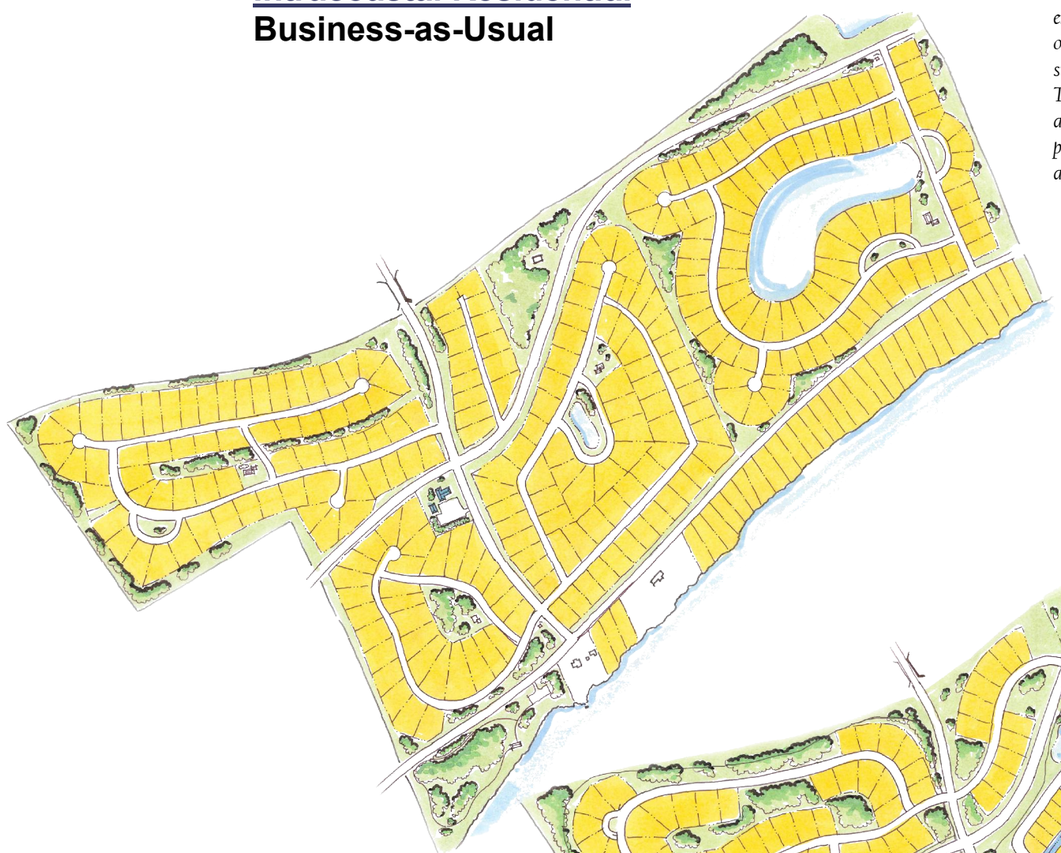
The site plan includes elements of the City and County comprehensive plans, with the walkable TND development centered around a public marina. The plan's housing options include townhouses, zero lot single-family, patio homes, and standard 1/8- to 1/2-acre single family lots. In addition to residences, a public marina is bounded by community buildings easily accessible to the water and surrounding neighborhood. An organic farm also is located along the waterfront to preserve an existing use along the Intracoastal and allow residents to grow local produce. These public oriented features along the Intracoastal Waterway provide nearly continuous public access. Approximately 3 miles of greenway meander through the interconnected open space while sidewalks on at least one side of the street link these public amenities.

Step Four: Development Scenario Trade-Offs

General development characteristics summarized in the previous section were used as input data for formulas to estimate travel demand impacts from land use and urban design changes. Comparative statistics calculated for the two development scenarios confirm that implementing the vision for Traditional Neighborhood Development established in Envision 2025 and the North Myrtle Beach Comprehensive Plan would have a positive impact on reducing the amount of vehicular travel generated inside the focus area. It is estimated that the increased density and specific design elements prescribed in the alternative development scenario would reduce both the number of vehicle trips (-4.32%) and vehicle miles traveled (-3.89%) compared to the business-as-usual scenario. Additional discussion of scenario planning can be found later in this chapter, beginning on page 4-23.




Intracoastal Residential
Business-as-Usual



The business-as-usual scenario assumes continuation of existing land use patterns and development intensities observed in the focus area with gated community subdivisions commonly seen in the area. In contrast, the Traditional Neighborhood Development Scenario offers a variety of residential types within a well connected pedestrian-oriented plan that conserves more open space and provides additional community amenities.

Traditional Neighborhood Development

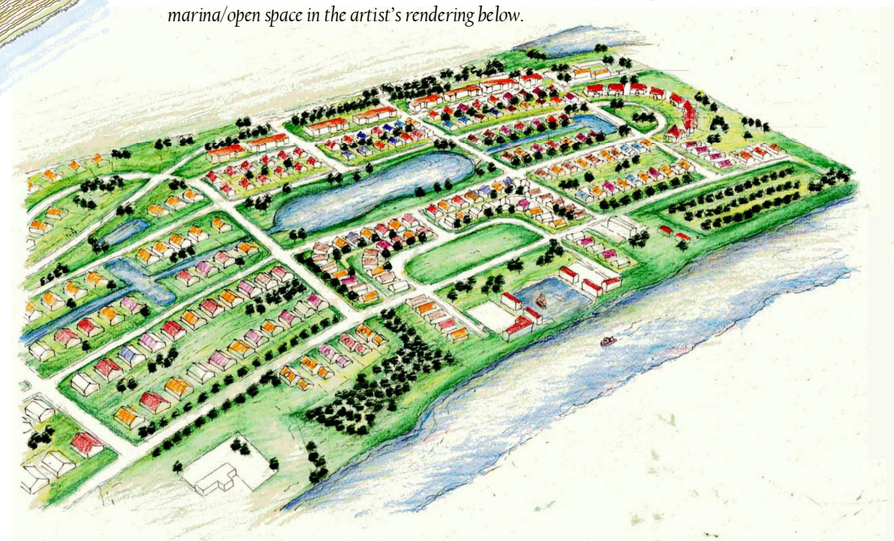
LEGEND

- Single-Family Residential
- Townhouse
- Civic
- Organic Farm/Produce Stand
- Community Mixed Use

Development Characteristics Comparison

	Business-As-Usual	Conservation Community
Average Residential Density	1-2 d.u. / acre	2-4 d.u. / acre
Average Non-Residential Intensity (FAR)	NA	0.15 – 0.20
Typical Street Pattern	Curvilinear	Grid
Typical Block Length	400-1000 lf	300-600 lf
General Land Use Pattern	Separation of Uses	Mixed Uses
Prevailing Building Height (stories)	2 stories	2 stories
Street Network Density	Low	High
Street Network Connectivity	Low	High
Pedestrian Infrastructure	Low	High
Bicycle Infrastructure	Low	Medium
Vehicle Infrastructure	Medium	High
Public Transit Infrastructure	None	Low
Preserved/Public Open Space	12%	17%

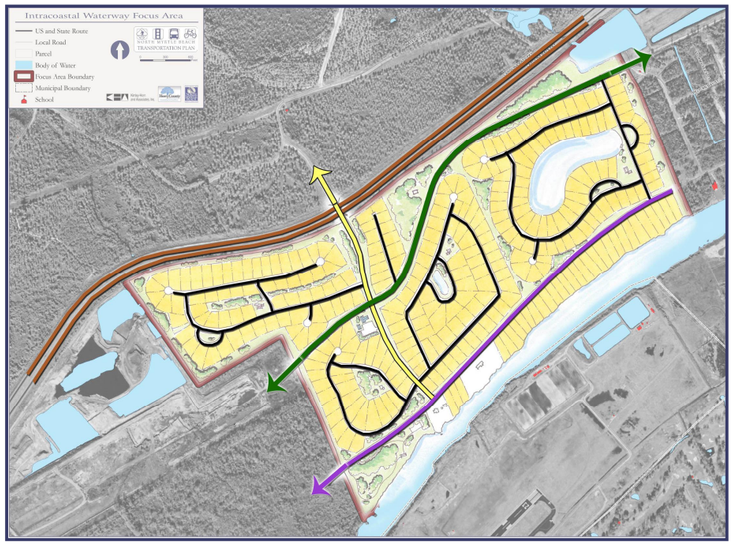
A view from the Intracoastal Waterway shows the density of development around the community marina/open space in the artist's rendering below.



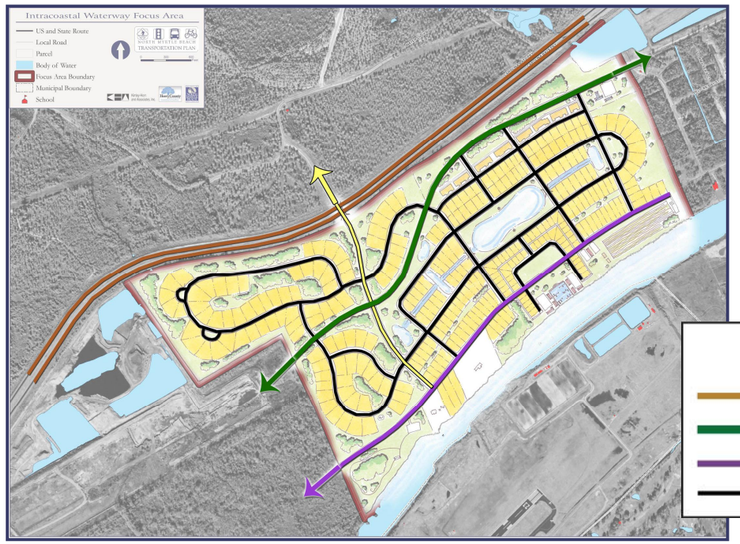
Street Network

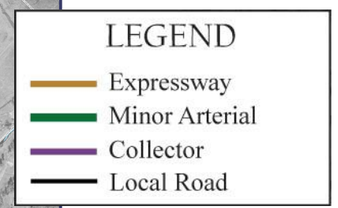
Curvilinear streets, cul-de-sacs, and limited access to residential developments characterize the business-as-usual scenario. It is clear in these network maps how the grid-like street network in the Traditional Neighborhood Development provides better efficiency that can ultimately reduce length of vehicular trips.

Business-as-Usual



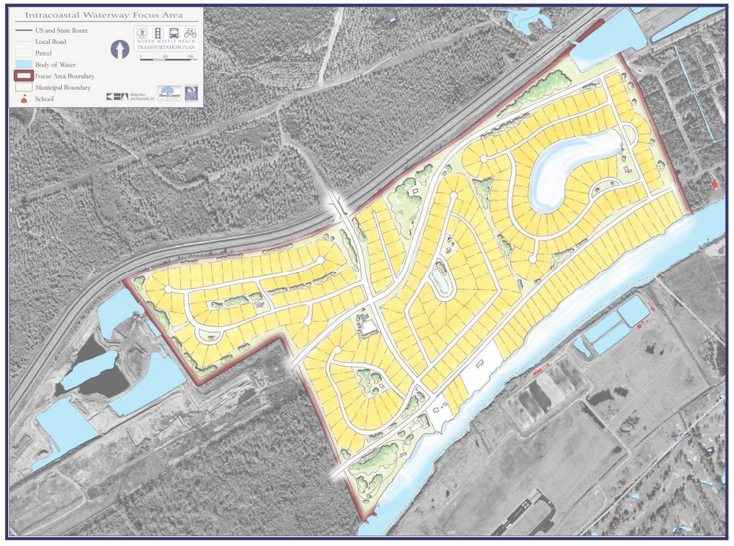
Traditional Neighborhood Development

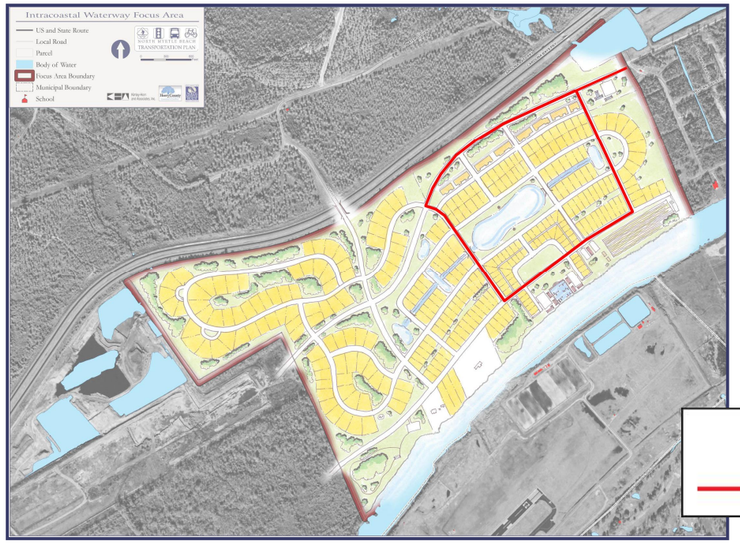




Transit Network

The spread out, low density development type in the business-as-usual does not support a transit network, however, the higher concentration of development near the core of the TND development could become part of a regional bus service that could spur from the Main Street Connector located just to the east of the focus area.

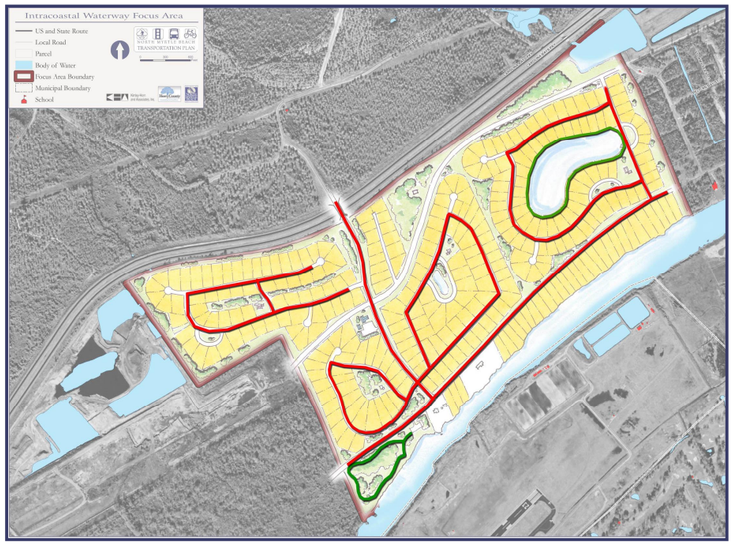




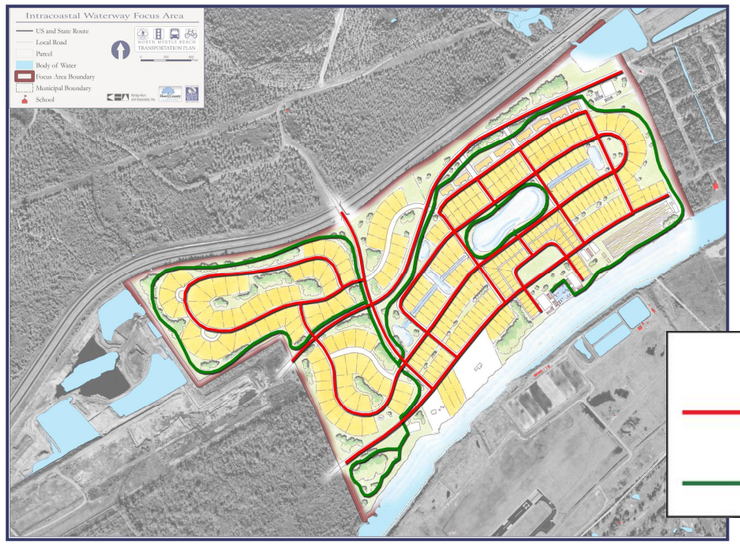
Pedestrian Network

Both of the development scenarios propose sidewalks on at least one side of most streets in the development. Even with these provisions, the TND provides a much more complete sidewalk network which promotes walking further than around the block. The community park, community marina and organic farm are all destinations along the extensive system of sidewalk on the TND.

Business-as-Usual

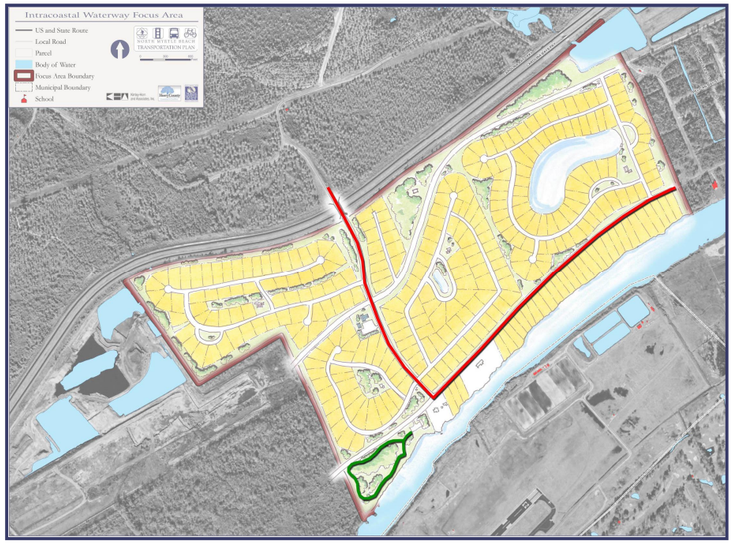


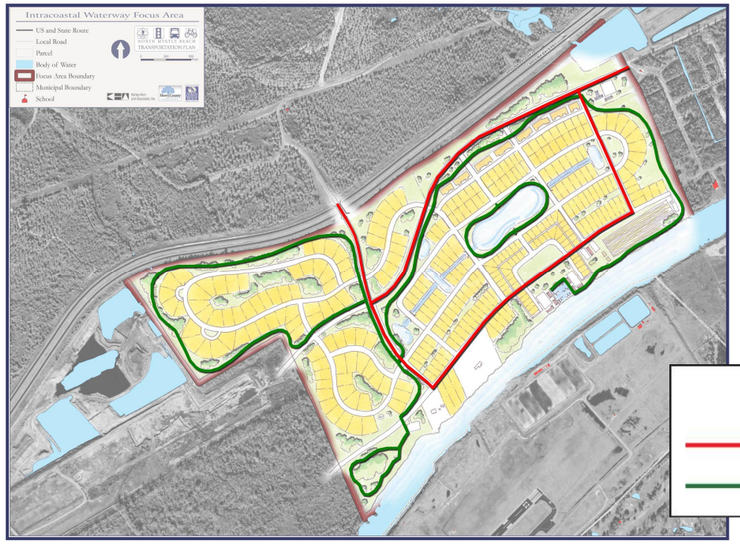
Traditional Neighborhood Development



Bicycle Network

Bike lanes on the new streets are offered in both plans, however the 3 mile greenway system that travels through the interconnected open space creates a bicycle network within the development that could connect to a regional greenway system in the future.





Focus Area 3 — Main Street Corridor

Once completed, the Main Street Connector/Robert Edge Sr. Parkway will create a new connection across the Intracoastal Waterway and provide new access to what have been very inaccessible areas. The focus area generally includes most of the undeveloped land adjacent to the new alignment of the Connector, bounded by St. Joseph Road in the east, SC 19 to the northwest and the Intracoastal Waterway to the southeast. This focus area also includes Palmetto Crossing (an approved retail development) and the Villages at Waterfront (an approved high density residential and mixed-use development). The most recent zoning ordinance classifies the area as "forest agriculture", which the County uses to designate most types of rural development.

Step One: Inventory Existing Conditions

A physical assessment of the focus area highlighted strengths, weaknesses, and opportunities for better integrating land use, urban form, and transportation decision-making. A summary of existing conditions for the focus area is organized using the 4D planning framework.

Density

The focus area generally is undeveloped. The few structures that exist are rural in nature with some residential neighborhoods scattered throughout. Average residential density for the focus area ranges between 1 and 2 dwelling units per acre. Potential development constraints include environmentally sensitive wetland areas (Carolina Bays) and a large lake.

Diversity

Existing land uses in the focus area include single-family residential, civic, and agriculture. These land uses are similar to those in surrounding Horry County. An elementary school and middle school are located just beyond the focus area along Sandridge Road.

Design

Much of the focus area can only be accessed via dirt roads or two-lane paved roads, many of which are dead-end streets. SC 31 (Carolina Bays Parkway) curves through the northern end of the area. Though the controlled-access highway currently does not provide access (and in fact divides an existing residential neighborhood), an interchange is under construction as part of the Main Street Connector/Robert Edge Sr. Parkway project. The Main Street Connector alignment creates a curved spine through the focus area as it avoids large wetland areas.

Distance

Until the addition of new infrastructure is complete, the predominant mode of transportation will remain automobiles. The Main Street Connector/Robert Edge Sr. Parkway will include bicycle and pedestrian connections across the Intracoastal Waterway. However, the distance to employment and shopping will be too far for alternative modes of transportation to be viable. Also, the lack of connectivity in the existing roads increases travel distances.

Step Two: Evaluate Existing Development Controls

The following documents were reviewed for the focus area to identify supporting policies and/or potential barriers in preparing development scenarios for the Main Street Connector focus area:

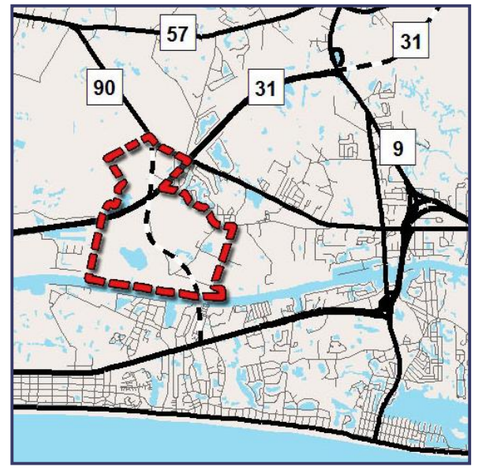
- Horry County Code of Ordinances, Appendix B
- North Myrtle Beach Code of Ordinances, Chapter 23 (Zoning)

The (Horry County) Commercial Forest Agricultural (CFA) zoning district promotes agriculture, residential, commercial and forestry uses as well as, social, cultural, recreational, and religious uses. The minimum lot size for commercial is 1 acre with setbacks of 60 feet (front yard), 25 feet (side yard) and 40 feet (rear yard). The minimum residential lot size is 1/2 acre with setbacks of 25 feet (front yard), 10 feet (side yard) and 15 feet (rear yard). CFA allows site built, modular, and manufactured housing (mobile homes). Maximum building height is 35 feet.

Single-family residential homes and most retail/commercial uses are permitted in the CFA zoning district. A Planned Development District (PDD) must be approved in order to implement big box retail and multi-family uses in this area of Horry County.

With the Main Street Connector/Robert Edge Sr. Parkway soon to open, Chapter 6 of the North Myrtle Beach Comprehensive Plan outlines how the area west of the Intracoastal Waterway should grow, and how in time, large portions of Horry County immediately accessible to the Main Street Connector may be annexed. That is, areas currently under Horry County jurisdiction soon could be incorporated by North Myrtle Beach. Therefore, North Myrtle Beach zoning and future land use plans were considered when creating the development scenarios.

The Future Land Use Plan for North Myrtle Beach already has shown areas along the Main Street Connector as General Commercial to allow a variety of commercial uses such as retail, personal services, restaurants, and gas stations.



Main Street Corridor
Focus Area Map

These uses would support new growth, especially high density growth proposed as part of the Villages at Waterfront development. In addition to the General Commercial areas flanking the Main Street Connector, the Future Land Use Map for North Myrtle Beach identifies Marina Mixed Use, Inland Low/Medium Residential, and Inland Low Residential.

Table 5.1 details the recommended development standards for the future land use areas within the Main Street Connector focus area as indicated in the North Myrtle Beach Comprehensive Plan:

Table 5.1 – Recommended Development Standards, Main Street Connector Focus Area

Land Use Class	Density	Building Height	Principal Permitted Uses
Inland Low-Density Residential	2 units/acre	35 to 45 feet	Single-family residential, parks, religious uses, farms, timber
Inland Medium-Density Residential	8	35 to 45	Single-family residential, duplexes, townhomes, patio homes, mobile homes (where allowed)
General Commercial	N/A	45	Small shopping centers, personal services, restaurants
Marina Mixed-Use	16	35 to 55	Marine-related commercial or residential

Step Three: Development Scenarios

Two development scenarios were created for the 625-acre Main Street Connector focus area: business-as-usual and a mixed-use TND. These scenarios are summarized below and illustrated on the following pages.

Business-as-Usual Scenario

The business-as-usual development scenario assumes a variety of segregated land uses, a development pattern generated by the purchase and development of single or recombined tracts of land. Current market forecasts support rezoning portions of the site as a Planned Development District to allow multi-family units and neighborhood retail to sustain the high intensity of proposed residential developments. The business-as-usual plan assumes provisions for conservation developments and Traditional Neighborhood Developments included in both the Envision 2025 (Horry County) and North Myrtle Beach Comprehensive Plan have not been implemented.

The Business-as-Usual Scenario includes:

- 638 residential dwelling units (single family and multi-family)
- 200,000 square feet of commercial space
- 80,000 square feet of office space
- 7, 000 square feet of live/work
- 20,000 square feet of marina mixed use space
- Dedication of land for a new performing arts center/museum (identified as an appropriate use west of the Intracoastal in Chapter 6.3 of the *North Myrtle Beach Comprehensive Plan*)
- 195 acres of preserved open space, including 35 acres for a regional park (67 acres of open space are Carolina Bays, a flood prone wetland area not suitable for development)

The site plan separates residential, commercial, and office uses with a curvilinear street network that favors cul-de-sacs over street connections and creates a gated-community feel. Minimum lot size (as indicated in the existing zoning code) for residential development is 1/2-acre. However, this scenario assumes a PDD would be sought to allow residential lots between 1/2 and 1/4 acres. Office and commercial uses are oriented toward the Main Street Connector/Robert Edge Sr. Parkway and SC 31 (Carolina Bays Parkway), while residential subdivisions are located on remaining tracts of land. The large centrally located lake provides an amenity upon which single family lots could be sold at a premium. Some mixed-use sites take advantage of the Intracoastal Waterway by creating small live/work and retail opportunities at a public marina space focused on the waterfront.

A 3-mile greenway network provides connections throughout the focus area and connects to the planned East Coast Greenway. The linear open space buffers around the greenways contribute to total open space in the area, which exceeds the minimum amount of open space required in current regulations. The subdivision located at the edge of the Carolina Bay preserved area assumes full build-out of property without conserving any additional open space.



Mixed-Use/Traditional Neighborhood Development Scenario

Traditional Neighborhood Development (TND) communities promote higher densities and a mix of complementary land uses. These communities are characterized by compact, pedestrian-oriented development patterns that provide a variety of housing types and conserve open space. The transportation system emphasizes street connectivity and travel mode choice between nearby destinations. The Mixed Use/Traditional Neighborhood Development scenario for the Main Street Connector focus area includes:

- 642 residential dwelling units (single family and multi-family)
- 200,000 square feet of commercial space
- 60,000 square feet of office space
- 20, 000 square feet of live/work
- 20,000 square feet of marina mixed-use space
- Dedication of land for a new performing arts center/museum (identified as an appropriate use west of the Intracoastal in Chapter 6.3 of the *North Myrtle Beach Comprehensive Plan*)
- 230 acres of preserved open space, including 35 acres for a regional park (67 acres of open space are Carolina Bays, a flood prone wetland area not suitable for development)

The site plan includes several elements of Horry County and North Myrtle Beach Comprehensive Plans, including the conservation subdivision development along the wetland area east of Main Street Connector, marina mixed-use features along the Intracoastal Waterway, and a walkable TND development oriented toward the central lake. In the TND, the performing arts center is located adjacent to the lake, a feature very similar to Barefoot Resort. This plan offers multiple housing options, including multi-family units, townhouses, zero lot single-family lots, and standard ½-acre single-family lots. These residential neighborhoods are arranged within a 5 to 10 minute walk of the neighborhood commercial areas located along the axis of the central lake. The new performing arts center, a feature indicated by the North Myrtle Beach Comprehensive plan sits along this axis overlooking the lake, similar to the entertainment venue at Barefoot Landing.

The development is oriented toward the lake, with the road network organized in a grid network. The pedestrian network includes nearly 8 miles of sidewalks on both sides of the street. On-street bicycle lanes are provided on collector streets interior to the site. An approximately 6-mile greenway system (which includes an interpretive trail system through the preserved Carolina Bays) would connect into the regional system anchored by the East Coast Greenway.

Step Four: Development Scenario Trade-Offs

General development characteristics summarized in the previous section were used as input data for formulas to estimate travel demand impacts from land use and urban design changes. Comparative statistics calculated for the two development scenarios confirm that implementing the vision for Traditional Neighborhood Development and conservation development established in Envision 2025, the North Myrtle Beach Comprehensive Plan, and the future land use map would have a positive impact on reducing the amount of vehicular travel generated inside the focus area. It is estimated that the increased density, greater mixing of land uses, and specific urban design elements prescribed in the alternative development scenario would reduce both the number of vehicle trips (-1.40%) and vehicle miles traveled (-1.66%) compared to the business-as-usual scenario. Additional discussion of scenario planning can be found later in this chapter, beginning on page 4-23.





Main Street Corridor

Business-as-Usual

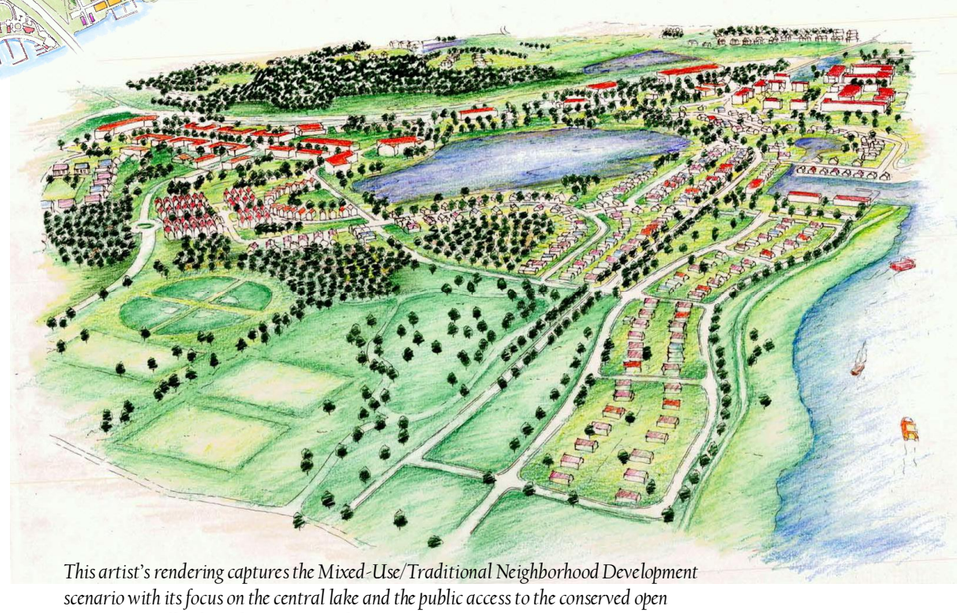
Mixed-Use/Traditional Neighborhood Development

Development Characteristics Comparison		
	Business-As-Usual	Conservation Community
Average Residential Density	2-4 d.u. / acre	4-8 d.u. / acre
Average Non-Residential Intensity (FAR)	0.07 - 0.15	0.15 – 0.35
Typical Street Pattern	Curvilinear	Curvilinear/Grid
Typical Block Length	300-1000 lf	300-600 lf
General Land Use Pattern	Separation of Uses	Mixed Uses
Prevailing Building Height (stories)	2 stories	3 stories
Street Network Density	Medium	High
Street Network Connectivity	Medium	High
Pedestrian Infrastructure	Medium	High
Bicycle Infrastructure	Low	Medium
Vehicle Infrastructure	Medium	High
Public Transit Infrastructure	Low	Low
Preserved/Public Open Space	30%	17%

LEGEND

- Single-Family Residential
- Townhouse
- Multi-Family Residential
- Retail
- Live-Work Mixed Use
- Office

The completion of the Main Street Connector will spur development around the existing central lake and infill will occur on some properties opposite of the Connector. While both plans offer similar retail, office, and civic components, the design principles used to create them are different. The business-as-usual scenario uses the central lake as an amenity surrounded by residential. The mixed-use plan deliberately creates an axis toward the lake that provides a mixture of retail, civic, and residential uses that all take advantage of the amenity. By extending retail and employment uses toward the lake, they become more accessible to the surrounding residents while offering alternative means of transportation other than automobiles.

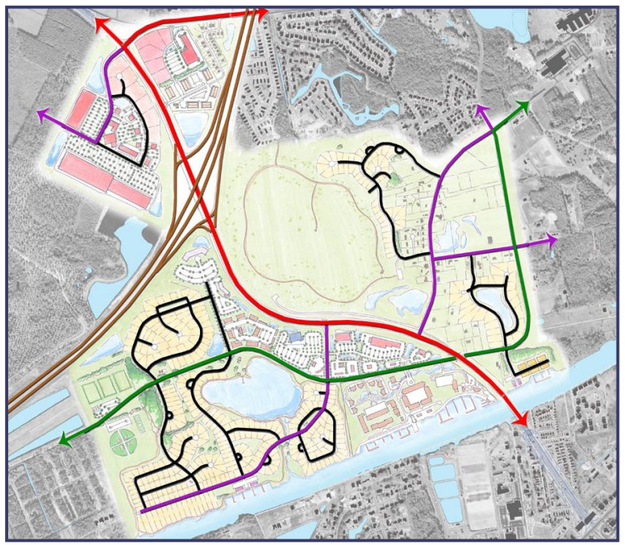


This artist's rendering captures the Mixed-Use/Traditional Neighborhood Development scenario with its focus on the central lake and the public access to the conserved open spaces, especially along the Intracoastal Waterway.

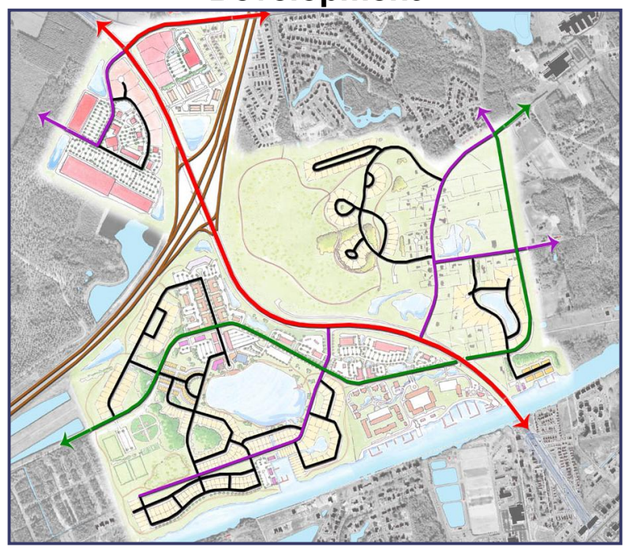
Street Network

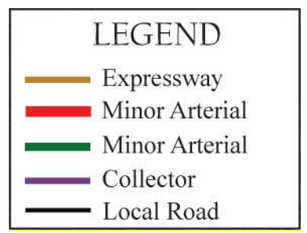
*The street networks of both development scenarios display how development patterns will develop from the existing infrastructure and new facilities proposed in the transportation plan (**Chapter 4**). Enhanced connectivity in the mixed-use scenario is the result of fewer cul-de-sacs.*

Business-as-Usual



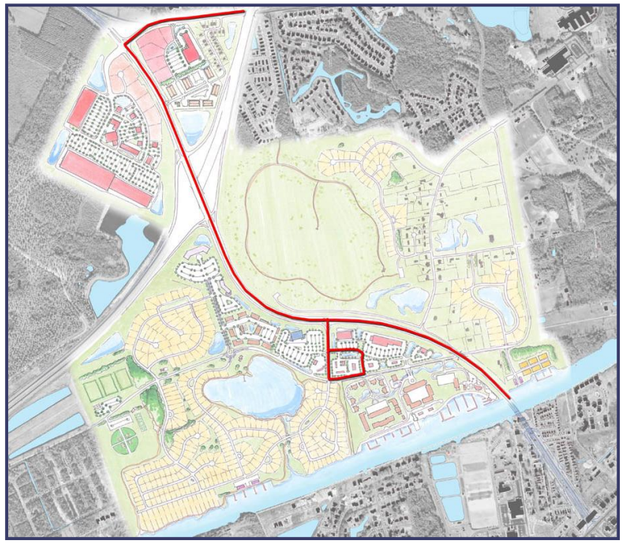
Mixed-Use/Traditional Neighborhood Development

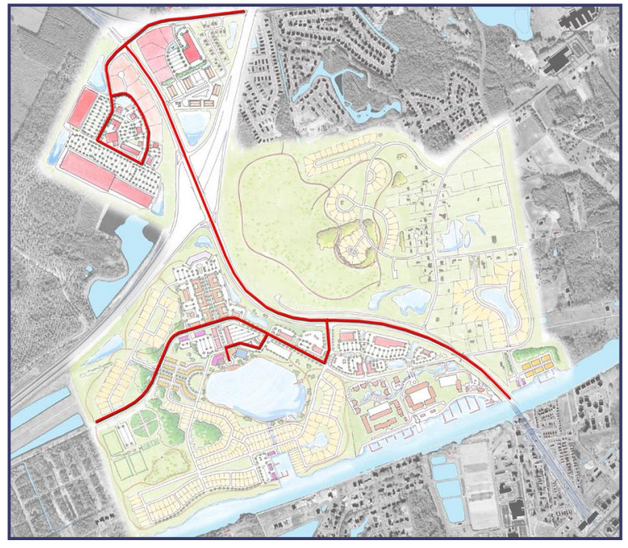




Transit Network

While a regional bus route could serve the retail along the Main Street Connector in the business-as-usual scenario, the density of the mixed-use center along the lake could support bus service further into the site making it more accessible to the residents living nearby.



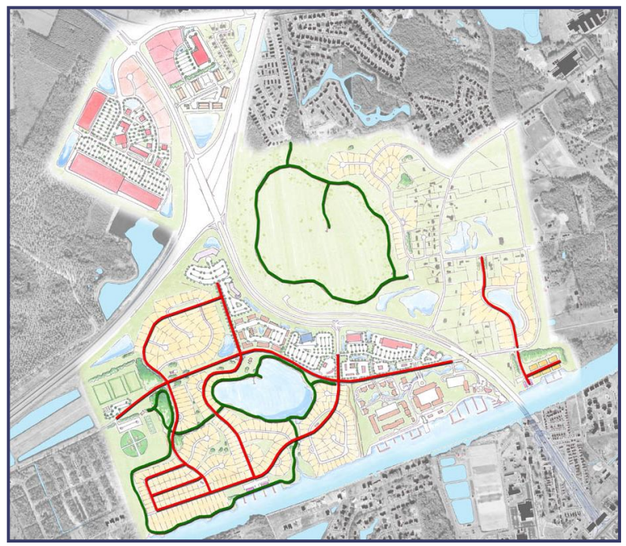




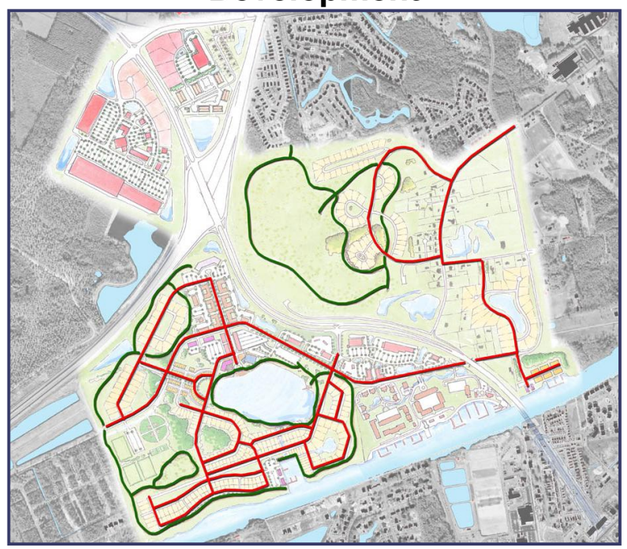
Pedestrian Network

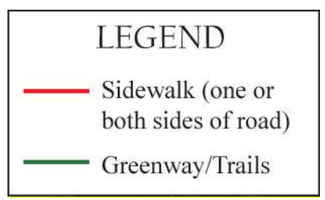
Sidewalks are provided along streets that connect, but not on cul-de-sacs in the business-as-usual scenario. The addition of these sidewalks creates a more complete network that includes 8 miles of sidewalk. Sidewalk connections such as these promote walking as a mode of transportation to and within the mixed-use center.

Business-as-Usual



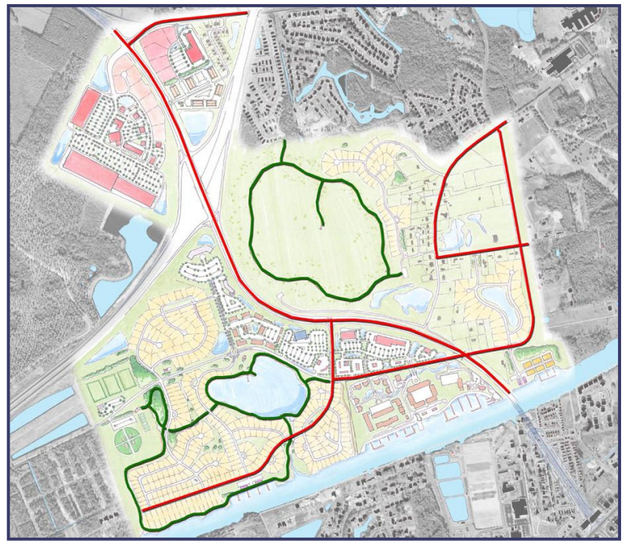
Mixed-Use/Traditional Neighborhood Development

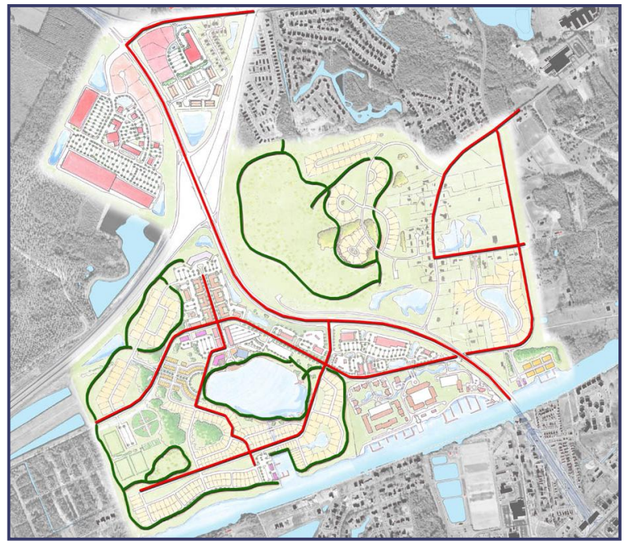




Bicycle Network

Improvements to the street infrastructure will include bicycle lanes to offer more choice to travelers. The two plans are similar in the provisions for bicycle lanes, however the increased and connected open space provided in the Mixed-Use/TND development provide almost 6 miles of greenway suitable for biking, with possible connections to the regional greenway network.





Scenario Planning

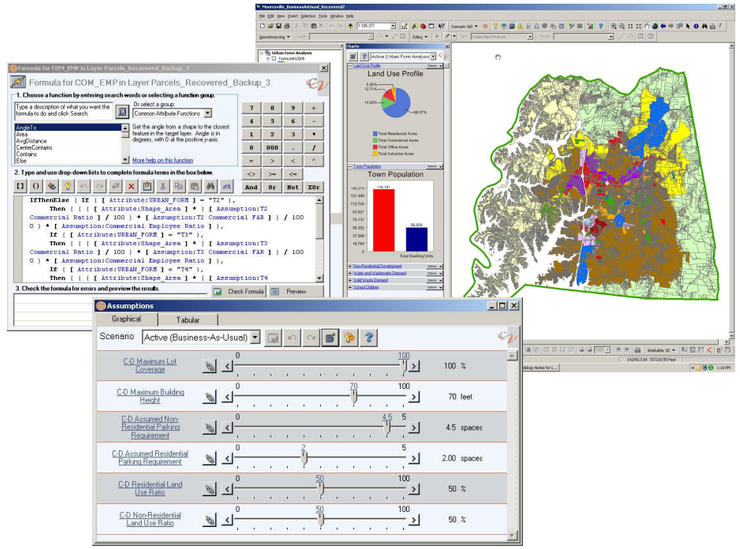
Scenario planning represents the next generation of analytical processes created to evaluate the influence of development intensities and land use patterns on the efficiency of a proposed transportation system. Visualization of the interaction between land use and transportation decisions, as well as causational factors that explain the push-pull relationship between them, provide community leaders with the information they need to evaluate the consequences of potential actions. Building on this momentum, the Federal Highway Administration and other federal agencies actively are promoting the use of scenario planning models by state departments of transportation, metropolitan planning organizations, and local governments to better integrate transportation and land use decisions.

North Myrtle Beach and Horry County have joined their peers in South Carolina in taking a proactive approach to integrate land use, urban design, and transportation planning processes. Evaluating the relationship between land use, urban design, and regional travel behavior in a scenario planning analysis produces several benefits. When considered together, decisions and investments regarding all three elements can have a significant bearing on the study area:

- The impacts to sensitive land uses can be minimized when facilities identified for transportation investments are located *after* considering appropriate land use patterns and development intensities for the area.
- Prime locations for development can be stimulated if transportation investments consider available capacity or appropriate mobility options.
- Complementary activities can be placed next to existing or planned transportation infrastructure, making the most of land use opportunities and dedicated transportation investments.
- The quantity and location of travel demand can be influenced by land use decisions, making the possibility of real choices for various modes of travel both accessible and attractive.

CommunityViz Software

The two-dimensional map and data analysis component of CommunityViz® software, Scenario 360®, was used to evaluate impacts on the transportation system generated by competing future year development scenarios considered for the study area. It adds the functionality of a spatial spreadsheet to ArcGIS Map®, similar to how a spreadsheet program like Microsoft Excel® handles numerical data. Dynamic calculations embedded in the spatial spreadsheet were controlled by user-written formulas that change value as referenced inputs change. Formulas were written to supply the result of mathematical relationships with other spatial data included in the analysis and with assumptions programmed in the planning model that reflect certain public policies, development controls, or market conditions unique to the study area.



Development Scenarios

Two extreme development scenarios (i.e., "business-as-usual" and "compact development centers") were created for the study area to measure the impact of competing development alternatives on demand factors (i.e., trip generation, trip length, and travel mode choice) that influence the efficiency of the transportation system. Both development scenarios represent the same study area, long-term planning horizon (2030), and control totals for population, acreage, and employees maintained in the Grand Strand Area Transportation Study (GSATS) Regional Travel Demand Model.

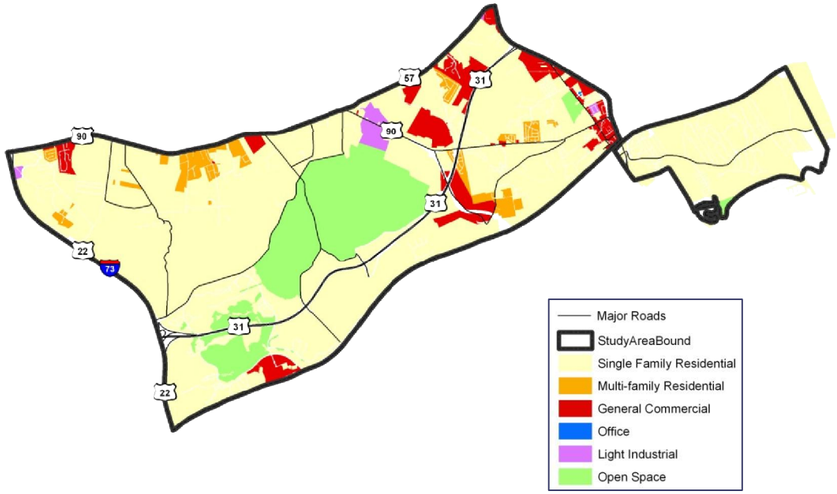
A brief summary of the two development scenarios follows.



Business-as-Usual Scenario

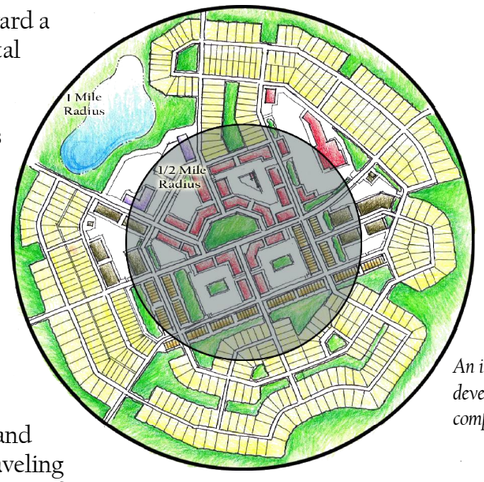
The business-as-usual (BAU) scenario represents continuation of the suburban development pattern prevalent in the study area. New construction is characterized by isolated, single-use development surrounded by sprawling residential neighborhoods. Low-density development patterns and the physical distance between complementary land uses tends to promote automobile travel, particularly since safe, convenient facilities are not easily available for pedestrians, bicyclists, and transit riders.

Transportation mobility in the study area is hindered by the Intracoastal Waterway, with major bridge crossings limited to SC 9, SC 22, and the new bridge for the Main Street Connector/Robert Edge Sr. Parkway currently under construction. Increased traffic congestion on the sparse road network means less mobility for residents and visitors to the study area as well as others traveling through the community.



Compact Development Centers[1] Scenario

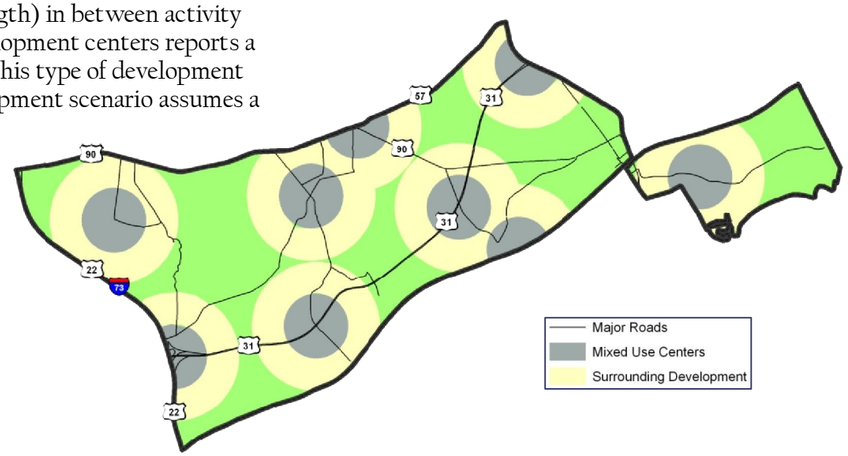
The compact development scenario represents a paradigm shift toward a more sustainable development pattern — measured by environmental stewardship and equitable distribution of community resources — that also celebrates the community's unique character, local values, and natural features. In this planning scenario, future year growth is largely directed to one of nine compact development centers identified for the study area. Each compact development center would be designed following the principles of new urbanism (i.e., containing town center, walkable streets, higher densities, etc.) and may include multiple neighborhoods within it.



An illustration of the prototypical development pattern assumed for a compact development center.

The diversity of close-by, complementary land uses and local travel options within designated compact, high-density development centers encourages better distribution of trips and shorter trip lengths, thereby reducing the number of vehicles traveling similar routes on a daily basis. This scenario also assumes provision of safe and convenient facilities for pedestrians, bicyclists, and transit riders traveling between complementary land uses, and the use of regional transit service for higher order trips (i.e., greater than one mile in length) in between activity centers. Literature surveying transit oriented development centers reports a 5% to 20% vehicle trip reduction associated with this type of development pattern. (Note: The analysis of the compact development scenario assumes a 10% mode shift to non-vehicular modes of travel.)

Permanent preservation of natural areas in between designated compact development centers respects the vulnerability of this environmentally-sensitive area while accommodating new growth.



[1] The compact development scenario represents a purely hypothetical situation, whereby total and complete redevelopment of the study area was assumed regardless of property ownership, existing development, etc. This scenario is meant only to demonstrate the merits of a more compact, mixed-use development pattern for application in future development opportunities.

Scenario Planning Results

Summary statistics for evaluating the impacts of two development scenarios were created using CommunityViz software® and the 2030 GSATS model. Measures of Effectiveness (MOEs) articulate the significance of reorganizing land use patterns and development densities/intensities to improve efficiency of the regional transportation system (i.e., business-as-usual scenario vs. compact development scenario).

Viable travel alternatives and more compact, mixed-use development centers reduce travel distance between complementary land uses and reliance on the automobile for day-to-day activities. This leads to less vehicle miles traveled, less vehicle hours traveled, and higher average automobile travel speeds (system-wide) compared to the sprawling development pattern in the business-as-usual scenario. Further, vehicle miles traveled at times of highest demand on the transportation system were reduced by approximately 7% (i.e., VMT at LOS E in **Table 5.2**), resulting in a more efficient transportation system. **Table 5.2** summarizes all the MOEs generated from the 2030 GSATS Model for the two development scenarios.

A compact development scenario also reduces the spatial footprint of the built environment on the surrounding landscape. Urban centers and surrounding walkable neighborhoods identified in the hypothetical compact development scenario would limit creeping low-density, sprawl development patterns and reduce accompanying public infrastructure costs. Output data from Community Viz® indicates that up to 35% of the total land area identified within the study area could remain in a natural setting compared to 14% in the business-as-usual scenario — while accommodating the same magnitude of growth projections for 2030.

Beyond environmental stewardship, the compact development scenario supports prudent fiscal responsibility for capital improvements planning and room for purposeful growth beyond the 2030 planning horizon. **Table 5.3** summarizes development characteristics associated with the two development scenarios.

Detailed study and public outreach for reaffirming a long-term vision toward more sustainable land use patterns in North Myrtle Beach and Horry County should be prepared independent of this document.

Table 5.2 – Comparison of Daily Travel Characteristics (2030)

Measure of Effectiveness	Business-as-Usual Scenario	Compact Development Scenario	Percent Change
Total Population	44,911	44,426	-1.08%
Total Trips	155,333	155,143	-0.12%
Trips per Person	3.46	3.49	0.87%
Vehicle Miles Traveled (1,000s)	2,064	1,934	-6.30%
Vehicle Miles Traveled per Person	45.96	43.53	-5.29%
Vehicle Hours Traveled (1,000s)	73.0	68.5	-6.16%
Vehicle Hours Traveled per Person	1.63	1.54	-5.52%
Average Travel Speed	34.1	34.3	0.59%
Vehicle Miles Traveled at LOS E	1,686	1,567	-7.06%
Percent Vehicle Miles Traveled Over Capacity	81.7%	81.0%	-0.86%

Table 5.3 – Comparison of Development Characteristics

Measure of Effectiveness	Business-as-Usual Scenario	Compact Development Scenario	Percent Change
Total Population	44,911	44,426	-1.08%
Total Acres	19,510	19,510	--
Developed Acres	16,833	12,655	-24.82%
Undeveloped Acres	2,677	6,845	155.70%
Population Density	2.66	3.51	31.95%
Percent of Land Developed	86%	65%	-24.42%
Percent of Land Undeveloped	14%	35%	150.00%



Policy & Guidelines Toolbox

The Policy & Guidelines toolbox is intended to identify a sampling of strategies North Myrtle Beach and Horry County have adopted that supports the land use considerations outlined in this chapter. Likewise, the toolbox outlines ways North Myrtle Beach and Horry County can strengthen the connections between the four Ds commonly associated with improving the relationship between land use, urban design, and transportation – density, diversity, design, and destinations. By doing so, local leaders can shorten commuting distance between complementary land uses, provide more travel choices, and create a more efficient transportation system. These tools focus on implementing the vision of the *Northeast Area Transportation Plan* — namely creating vibrant communities supportive of transportation mobility and land use accessibility.

Support Increased Connectivity Within and Between Developments

Street connectivity refers to the directness of routes and the density of connections (i.e., intersections) within a transportation system. As connectivity increases, travel distances decrease and route options increase, allowing the transportation system to be used more efficiently by pedestrians, bicyclists, transit, and automobiles. When the local street network is not sufficient, arterials often become the preferred travel route. Unfortunately, this reduces regional mobility for through traffic.

A highly connected transportation system includes several options for entering or leaving a new development. When possible, these options are located on secondary roads rather than highways. Cul-de-sacs should be restricted to areas where topography, environment, or existing development make other street connections prohibitive and stub-outs should be encouraged and signed to accommodate future street extensions and connections with neighboring parcels. The City and County also should encourage developments with minimum street spacing, which will diffuse traffic congestion and more easily connect other streets and developments.

Connectivity in the study area should not be limited to automobiles. Encouraging a network of connected pedestrian and bicycle facilities as well as facilities appropriate for golf carts offers more transportation alternatives, especially when that network provides access to a variety of land uses, roadways, and developments. Connections to the proposed East Coast Greenway will help establish a regional network of non-vehicular connections. These connections need not only to be planned but also implemented during the development review process.

Promote Development Design to Manage Access and Reduce Congestion Levels on Major Roadways

For the study area to truly achieve transportation efficiency, the City and County will need to consider the potential conflicts between the transportation system's mobility (transportation) and accessibility (land use). Access management will help balance mobility and accessibility. From a land use perspective, the number, location, and spacing of driveways along the street network significantly impact vehicular movements and levels of congestion. Land use and transportation professionals agree that the number of driveways or curb cuts serving a property should be minimized and that regulations and incentives can be used to encourage shared-use driveways. North Myrtle Beach and Horry County can work together to promote greater street network efficiency through cross access agreements, which limit the number of driveways and allow roadway access for multiple parcels across a single property.

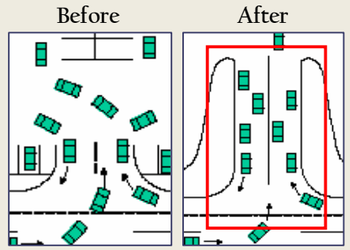
Building on the momentum of this collaborative planning process, local leaders should partner with other localities and SCDOT to review the State's current access management guidelines and local ordinances that regulate access to the street network. Following this review, a formal access management overlay ordinance should enforce consistent access management standards that ensure the proper function of strategic corridors throughout the study area. In particular, minimum spacing and maximum driveways per development should be regulated and minimum lot frontage requirements should be strengthened and enforced to prevent the proliferation of small frontage lots along the corridors. In addition, regulations should encourage the construction of parallel routes for backdoor access. These routes can be integrated into the local street system when small frontage lots are unavoidable.

Implementation of access management tools can be accomplished in a number of ways — changing local zoning ordinances, developing an access management overlay ordinance, or approving rules and regulations for the subdivision and site plan review process to include application of access management solutions. More detailed access management techniques are discussed in **Chapter 3** and illustrated for select strategic corridors in **Chapter 4.**

Access Management Solutions

Site Access Treatments

Improved On-Site Circulation



Consolidated Driveways

Median Treatments

Non-Traversable Median

Left-Over

*See **Chapter 3** for a more detailed toolbox of access management solutions.



Promote Sustainable Land Development

Land development can have positive or negative impacts on the transportation system, either creating more congestion or providing alternate routes for traffic. North Myrtle Beach and Horry County should consider not only how a mix of land uses will relate when considering development opportunities but also the way each use is accessed. If sustainable land development principles are followed, local officials can create land development projects that reduce congestion. Offering smart alternatives will help limit the number and lengths of local trips as well as provide alternatives to congested corridors.

Efficient travel between land uses can be encouraged by promoting development patterns that favor higher densities and intensities, a mix of land uses, and an environment that accommodates bicycles, pedestrians, and transit. In turn, the transportation system should connect complementary land uses and focus on more efficient travel behavior defined by mode and route choices.

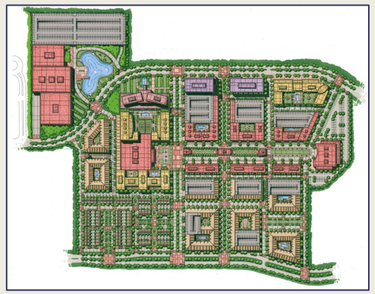
To encourage on-site improvements for more sustainable land patterns, the area's transportation system should favor efficient travel between interior destinations and safe, predictable connections to adjacent properties. The orientation of buildings and parking lots should favor a "park once" mentality, whereby the design, location, and supply of parking promote more balanced transportation that facilitates walking after arriving to the site.

By not providing excessive parking, North Myrtle Beach and Horry County will encourage pedestrian and bicycle travel and discourage automobile travel. Pedestrian walkways within a newly or re-developed site should connect building entrances and provide safe crossings. Locating parking and vehicle driveways away from building entrances also will encourage pedestrian activity. At the edges of development, rules and standards should be adopted that require purposeful connections to the public sidewalk and regional greenway system for promoting alternative modes of travel for accessing the site.

Sustainable Transportation Initiatives

Compact, Mixed-Use Development

Newer development initiatives recognize the benefits of increased density, mixture of land uses, and pedestrian-friendly design on the regional transportation system.



Park Once Districts

To promote sustainable land development, buildings should be oriented and parking located to favor a "park once" mentality. Excessive parking should be discouraged.

Reorganization of traditional suburban scale development creates a "park once," walkable environment.

Traditional "sea of asphalt parking" typically serves big box suburban development.



Local Strategies

Both Horry County and North Myrtle Beach have used the comprehensive planning process to establish strategies that support these tools. These efforts seek to balance land use (demand), urban form (design), and transportation (supply) in an economically and environmentally sustainable way. A small sampling of these strategies includes:

Horry County Comprehensive Plan – Land Use Element

- Address the need for open space retention, parks and schools, landscaping, subdivision connectivity, public safety and multi-modal transportation.
- Adjust the County's zoning regulations to provide for greater flexibility for mixed uses, multiple housing types and compact development patterns.
- Develop and implement an Incentive Zoning Ordinance for developments that provide public facilities, infrastructure improvements and/or improved design standards.
- Develop and implement a Cluster Development Ordinance for commercial, residential and mixed-use developments in which a significant portion of the site is set aside as undivided, permanently protected open space, while the buildings (houses, shops, etc.) are clustered on the remainder of the property.
- Encourage the preservation of sensitive environmental features and open space within development plans in exchange for incentives to the developer.
- Encourage low impact development designs to minimize impervious coverage throughout Horry County.
- Develop a Horry County Trails and Open Space Master Plan to identify current and future needs, potential acquisitions, potential funding mechanisms and an implementation program.
- Develop an ordinance to severely limit the discharge of untreated stormwater runoff from developed areas into wetlands.
- Revisit "Parking Regulations" to determine the best site design requirements concerning vehicular ingress and egress, proximity to congested intersections, lateral access between separate but adjacent sites, and forward motion design.

North Myrtle Beach Comprehensive Plan – Future Land Use Element

- Review the subdivision ordinance and other codes to ensure that new subdivisions connect to existing streets in a grid networks.
- Ensure that changes to building and zoning code allow for development of varying housing styles.
- Review and update subdivision and zoning code as needed to ensure that development with new streets serving more than 10 lots or on existing streets should connect to other neighborhoods by streets, sidewalks, and bike paths.
- Revise subdivision regulations to require grid system for streets along with pedestrian and bicycle facilities for new developments.
- Obtain a consultant to help prepare a plan for west of waterway. The plan should include land development policies regarding transportation, water supply / demands and housing needs.
- Provide landscaping, medians, street furniture, and street lighting so the "Main Street" atmosphere is continued on the west side of the waterway for a smooth transition.
- Use access management to alleviate stop and go traffic jams by reducing curb cuts, installing a landscape median, and requiring joint access points where possible.
- Work with regional transit provider to implement greater transit services to special needs population such as the elderly or disabled.
- Review housing and transportation plans with an eye towards ensuring that employees are able to live within a reasonable distance to workplaces and / or have adequate modes of transportation to employment centers.

Chapter 6 — Implementation

Introduction

Successful implementation of the *Northeast Area Transportation Plan* will depend to a great extent on the ability for local, state, and private entities to work together. The Implementation Plan provides a summary of the various elements of the implementation strategy, including available funding sources, specific projects and policy measures, planning level cost estimates, project phasing, and agencies responsible for implementing specific projects. An Action Plan matrix organizes this information in a succinct format. The intent of the Implementation Plan is two-fold — to provide decision-makers with an implementation blueprint that will enable them to track progress and schedule future year improvements and to enable North Myrtle Beach and Horry County to identify public and private investment opportunities that create a coordinated, multimodal transportation system.

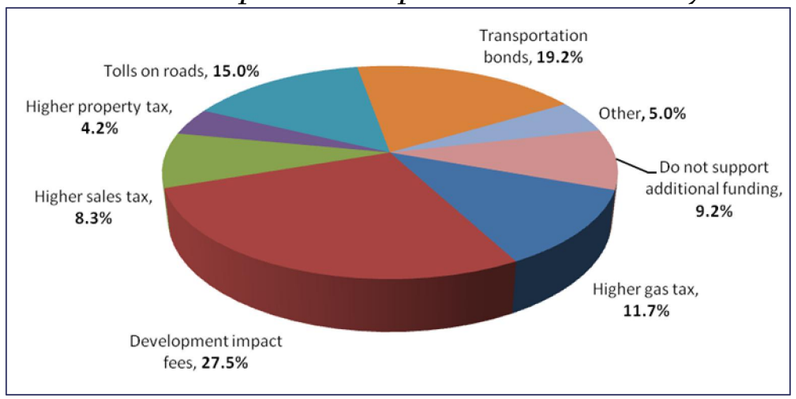
Planning, design, and implementation are all critical components of a successful plan. The citizens of North Myrtle Beach and eastern Horry County have expressed a desire to implement a transportation plan that enhances the quality of life and promotes the unique character of the area. However with limited funding resources, implementation can be challenging and time-consuming. With this in mind, the policy recommendations and action plan have been developed to specifically help local staff focus their efforts and identify strategic opportunities to expedite the implementation of this plan.

The Implementation Plan recognizes the effect various improvements can have on travel safety and mobility, beach tourism, development patterns, and the visual appeal of the area. Some improvements will be implemented through the development review process, while major infrastructure improvements most likely will require state and federal funding. Funding for these major projects is limited and competition for it spirited. Completion of the *Northeast Area Transportation Plan* represents an important initial step toward creating a safe, efficient multimodal transportation system. The Implementation Plan provides a blueprint for the necessary steps to ensure its vision is fulfilled.

Funding Opportunities

The construction of a comprehensive and connected transportation network can occur through incremental adoption of local policies and programs and state programs as well as through the receipt of private contributions. It will be important for North Myrtle Beach, Horry County and the Grand Strand Area Transportation Study (GSATS) to identify funding resources to implement the recommendations of this plan. Participants at the public workshops were asked to help identify a list of funding strategies available for implementing recommendations in the plan. These funding strategies included general obligation bonds, development impact fees, local sales tax, vehicle registration fees, SCDOT partnership funding, developer contributions, property tax incentives, community grants, and local city/county budget appropriations. Meeting participants then were asked to vote their preferences for instituting one or more of the funding strategies in the community. The diagram to the right illustrates the results.

How would you fund transportation improvements in the study area?



State revenues alone will not sufficiently fund a systematic program of constructing transportation projects within the study area. Therefore, North Myrtle Beach and Horry County must consider alternative funding measures that could allow for the implementation of this plan. Several alternative funding measures under consideration follow.

Local/State/Federal Initiatives

Transportation Bonds

Transportation bonds have been instrumental in the strategic implementation of local roadways, transit, and non-motorized travel throughout South Carolina. Voters in communities both large and small regularly approve the use of bonds in order to improve their transportation system. Nearly every improvement identified in this plan could be financially supported using a transportation bond program. Where the improvement occurs on a state-owned street, approvals and encroachment permits from SCDOT will be required.

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Grand Strand Area Transportation Study (GSATS) Metropolitan Planning Organization

North Myrtle Beach is a member of the Grand Strand Area Transportation Study Metropolitan Planning Organization (GSATS MPO). The MPO aids local planning efforts and provides services and guidance in coordinating with SCDOT. As members of the MPO, North Myrtle Beach and Horry County can request funding from the MPO through two primary resources: Transportation Improvement Program (TIP) and Enhancement Grants. Both of these are state programs, but local prioritization by MPO's weighs heavily in the selection of projects for funding.

Transportation Improvement Program (TIP)

The Transportation Improvement Program (TIP) includes funding for roadway, bridge, maintenance, bicycle, pedestrian, and transit projects. The TIP supports communities through an array of funding resources including Federal Aid Construction Funds and State Construction Funds. As part of the application process, strict criteria must be met before project selection. Criteria include providing right-of-way information, adherence to design standards, the need for the project, local support of the project, and the inclusion of the project in the community's planning processes.

Enhancement Grants

State and federal grants can play an important role in implementing strategic elements of the transportation network. Several grants have multiple applications, including Transportation Enhancement Grants as well as State and Federal Transit Grants. The Enhancement Grant program, established by Congress in 1991 through the Intermodal Surface Transportation Efficiency Act (ISTEA), ensures the implementation of projects not typically associated with the road-building mindset. While the construction of roads is not the intent of the grant, the construction of bicycle and pedestrian facilities is one of many enhancements that the grant targets, and these projects could play an important role in enhancing pedestrian safety and connectivity at key locations within the study area.

Aesthetic Enhancement Funding

In order to create a more pleasing transportation system, small aesthetic improvements often have a large impact. SCDOT has two formal programs to help provide an avenue for community involvement in the transportation system. The Adopt-A-Highway program allows individuals or groups to help maintain a part of the highway system. SCDOT's Adopt-An-Interchange program provides 80% funding (and requires a 20% local match) toward landscaping and beautifying an interchange. This initiative is a part of the state's enhancement funding program.

Safe Routes to School

Safe Routes to School, a national initiative, has encouraged many children to bike and walk to school by promoting bicycle and pedestrian education. Funding for this federal program is provided through the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU divides $612 million over five years among the states, including $1.9 million for South Carolina for FY 2008. In FY 2009, the state is projected to receive $2.4 million. The program provides funding for individual schools to create route plans or develop facilities that create a safer walking and biking environment for their students. South Carolina has a yearly application program for which any school, school district, municipality or other governmental body, or non-profit association may apply.

SCDOT District Funds, Hazard Elimination, and Railroad Crossing Programs

District funds provide allocations or discretionary funds for special projects within each SCDOT District. These and other safety-related funds are a subset of the State Transportation Improvement Program (STIP) funding and are intended to inventory and correct the safety concerns of all travel modes. These funds also can be used to acquire right-of-way.

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SCDOT Commission Intersection Safety Improvement Program

The SCDOT Commission has approved safety funds for federal fiscal year 2009 to begin work on a prioritized list of intersection safety improvement projects across South Carolina. The safety improvements will consist of low-cost engineering techniques such as additional signing and/or pavement markings. More information about the program can be found at: http://www.scdot.org/ArtMan/publish/article_785.shtml

Public/Private Initiatives

Developer Contributions

Through diligent planning and early project identification, regulations, policies, and procedures could be developed to protect future transportation corridors and require contributions from developers when property is subdivided. To accomplish this goal, it will take a cooperative effort between local City and County planning staff, SCDOT planning staff, and the development community.

Impact Fees

Developer impact fees and system development charges provide a funding option for communities looking for ways to pay for transportation infrastructure. Impact fees most commonly are used for water and wastewater system connections or police and fire protection services but recently have been used in South Carolina to pay for the impacts of increased traffic on existing roads. Impact fees place the costs of new development directly on developers and indirectly on those who buy property in the new developments. Impact fees relieve other taxpayers from the burden of funding costly new public services that do not directly benefit them. Cities and Counties in South Carolina may enact development impact fees without special authorization using the South Carolina Development Impact Fee Act. All requirements for enacting an impact fee ordinance are set forth in the legislation.

Active Living by Design (ALbD)

Active Living by Design is a program sponsored by the Robert Wood Johnson Foundation. ALbD seeks to bring together the health care and transportation communities to create an environment that encourages residents to pursue active forms of transportation such as walking and bicycling. Grants are awarded each year to a selected number of communities, who are then required to produce a local match. These grants can be used to create plans, change land use policies, institute education policies, and develop pilot projects. For more information, visit www.activelivingbydesign.org.

The Trust for Public Land (TPL)

Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land to enhance the health and quality of life in American communities. TPL works with landowners, government agencies, and community groups to create urban parks and greenways, as well as to conserve land for watershed protection. For more information on the Trust for Public Land, visit www.tpl.org.

Action Plan

The Action Plan discusses the appropriate steps for local leaders to implement the recommendations of this plan and identifies key agencies that should be involved with the task. It is not expected that every item listed would be completed over the next several years. However, the process should be initiated to best take advantage of the momentum gained with the development of this plan.

Beyond the tasks listed below, it is vital to the success of this plan that the City and County continue to work with and educate local citizens and businesses. While public support can encourage implementation, opposition can significantly delay a project. The Advisory Committee formed to guide this plan has been critical to providing a consistent voice from vision through implementation. The continuation of this committee through project implementation would encourage advocacy and maintain focus on those issues identified as important during preparation of the *Northeast Area Transportation Plan*.

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Policy Measures

The City should work with the MPO and the County to ensure the preservation of roadway corridors as development applications are considered. Historically, many projects throughout the state have been impacted by development that was not responsive to adopted plans. The City should work cooperatively with the MPO and County by providing review and comment on proposed development applications. Where corridor preservation isn't feasible, reasonable alternatives should be sought. In an effort to improve corridor protection, copies of the adopted plan also should be forwarded to the MPO, County, Board of Realtors, Chamber of Commerce, and Economic Development Departments. Additional copies should be made available for public review in the local planning departments, library, and online. Key policy measures recommended as part of this plan are included in the Action Plan Matrix at the end of this chapter. The Matrix classifies the recommendations into short-, mid-, and long-term prioritizations in accordance with their appropriate design year.

Highway Improvements

The City of North Myrtle Beach, Horry County, and SCDOT should conduct the necessary studies and secure funding to adopt the recommended Official Thoroughfare Map shown in **Figure 4.2**. This will require the roadway improvements identified in the **Figure 4.4**, including new roadway facilities, existing roadway widening, roadway realignments, intersection improvements, access management, and corridor enhancements. Future corridors shown on the map do not represent specific alignments but rather a series of connections. While topography and the natural and built environments were considered during this planning process, specific feasibility studies should be conducted for these corridors to determine the most appropriate alignments. Key roadway recommendations have been summarized into the Action Plan Matrix at the end of this chapter. Within this matrix, projects have been grouped into short-, mid-, and long-term prioritizations.

Freight

While formal recommendations for freight facilities are not included as part of the *Northeast Area Transportation Plan*, the increased industrial development along SC 9 and US 17 indicates a likely spike in truck traffic. For this reason, several general provisions should be provided through the implementation of the roadway recommendations. In addition, North Myrtle Beach and Horry County should work with SCDOT to designate local and through truck routes. During this process, the following should be considered:

- **Truck Definition** — The City and County should review its truck definition to determine if changes might restrict heavier vehicles, thereby protecting and maintaining the integrity of its streets.
- **Truck Route Signage** —Truck route designations should be sought for major routes and industrial streets. The following corridors could be examined for truck route designation eligibility: US 17, SC 22, SC 9, SC 90, SC 57, and SC 31. Likewise, designated routes should be established through well-marked signage at city limits, major highway intersections, interchanges, and other appropriate locations. Within North Myrtle Beach, consideration could be given specifically prohibiting through trucks on local streets. Prohibition of trucks on any segment of state maintained roadways requires approval from SCDOT.

Additional tasks for establishing truck routes through urban areas include:

- Working with SCDOT to prioritize resurfacing on designated routes in an effort to reduce noise and vibration from trucks.
- Adjusting signal timing (coordination) along high priority routes to reduce vehicle delay and maintain vehicle speeds within an acceptable range of the posted speed limit. Impacts of the adjusted timing could include travel time (and reliability), reduced noise (from accelerating and braking vehicles), and air pollution.
- Publishing and distributing educational materials to businesses and industries concerning truck routes.
- Working with SCDOT to make improvements to critical intersections on truck routes to more easily facilitate large vehicle movements and encourage their use by truckers. Improvements include providing adequate curb radii, lane width, and exclusive turn lanes.

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Collector Streets

The collector street plan discussed in **Chapter 4** should be used by local staff and developers to ensure adequate connectivity as development and redevelopment occurs. By expanding the area's transportation system through an increased number of collector streets, traveling between local streets and arterials is enhanced. Key outcome goals of the plan include improved accessibility to higher intensity residential areas and activity centers while avoiding or minimizing impacts to sensitive areas for the preservation of the natural environment. It is recommended to use the general policy recommendations from **Chapter 4** when requiring collector street network improvements. These recommendations include:

- Use the plan as a tool to communicate desired roadway connectivity as development projects are proposed.
- Review all development proposals for consistency with the approved collector street element and emphasize connections rather than alignments.
- Require new developments to reserve right-of-way for and construct future collector streets.
- Integrate future bikeway, greenway, and trail networks **(Figure 4.6)** with the Collector Street element to improve access and enhance connectivity between systems.

Sidewalks, Bikeways, and Greenways

The Bicycle and Pedestrian Plan elements shown in **Figure 4.6** should be implemented through the joint efforts of North Myrtle Beach, Horry County, and the MPO. Non-motorized vehicular facilities can be constructed as stand-alone enhancement projects. However, these projects often are implemented more effectively when incorporated into public and private infrastructure projects such as roadway widenings, regular street maintenance, utility line replacements, and new road construction. The system represented in this plan is intended to work as a comprehensive network that maximizes the benefit to the transportation system and overall community.

Key recommendations identified as a part of the *Transportation Plan* have been summarized in the Action Plan Matrix at the end of this chapter. Linear mile costs for pedestrian and bicycle facilities have been developed based on typical material and construction costs. These unit costs are shown in **Table 6.1**. Costs provided in this table do not include right-of-way acquisition or environmental mitigation. The Action Plan Matrix utilizes these construction cost estimates to develop cost estimates for the recommended bicycle and pedestrian facilities discussed in the plan.

Sidewalks

In general, sidewalks in the study area are recommended to have the following characteristics:

- **Width** — Sidewalks should be a minimum width of 5 feet in suburban locations (4 feet may be acceptable for some local streets) and sized to complement/support the streetscape in urban areas.
- **Set-back** — In areas where curb and gutter exists, sidewalks should be set back from the street by a minimum of 5 feet (planted or hardscaped). In areas where there is not curb and gutter, sidewalks should be located with the open drainage channel between the traveled way and the sidewalk.
- **Material** — Generally, sidewalks should be concrete. However, other decorative materials (if level and smooth) should be permitted in areas where streetscape designs designate other materials.
- **Location** — Sidewalks should be located in accordance with North Myrtle Beach and Horry County ordinances and generally on both sides of all collector streets, minor thoroughfares, and major thoroughfares. If a greenway is shown for a corridor, the greenway takes the place of a sidewalk on one side of the street and a sidewalk may or may not be required on the opposite side of the street (at the discretion of the local community).

Table 6.1 – Bicycle and Pedestrian Unit Cost Estimates

Facility Type	Cost Per Mile
Bicycle Projects	
Wide Paved Shoulder	$480,000
Signed Route	$1,200
Striped Bike Lanes	$18,000
Wide Outside Lanes	$18,000
Signed Route with Striped Parking	$18,000
Striped Bike Lanes (Additional Pavement)	$440,000
Greenway Projects	
Multi-Use Path	$600,000
Neighborhood Connector	$85,000
Pedestrian Projects	
5-foot Sidewalk (One Side)	$150,000
5-foot Sidewalk (Both Sides)	$300,000

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Bikeways

When implementing a bicycle facility, elements beyond the location of the facility must be analyzed. It is important to consider the population that the facility will serve as well as their bicycling preferences. It also is critical to consider neighboring activity centers and destination points. For example, facilities serving an elementary school and or other facilities with higher child ridership likely will be very different than facilities serving experienced riders. The bicycle facilities recommended in **Chapter 4** are a result of input from the general public, stakeholder, advisory committee members and technical analysis.

Greenways

Greenways can play a significant role in linking the pedestrian and bicycle network of a community or region. They connect people to nature and often represent the safest and shortest route between destinations. Often greenways follow natural systems along streams or floodplains, which limits their potential conflict with development. While new to this planning area, an emerging greenway system can evolve in a logical way and may take its origin in the form of hiking trails that over time transform to a formal paved multi-use path. The implementation of trail systems requires cooperation of land owners and represents great opportunities for community service projects.

Generally trail systems are natural paths with marked trailhead signs and generally pervious surfaces (dirt, mulch, or gravel). As funding becomes available, more formal paved paths can be installed along the same alignment. A typical multi-use path is a minimum 10' wide paved facility. The proposed bicycle network in **Chapter 4** builds upon the proposed East Coast Greenway.

Intersections

It also is important to consider improvements to the bicycle and pedestrian network at an intersection level. Often the improvements made at this level make tremendous improvements to the overall walkability and bikeability of an area.

Transit

Transit within the study area currently is limited to taxicab services, although a previous route along US 17 served shopping centers and local neighborhoods. Current studies conducted by Myrtle Beach suggest that a shuttle service providing connection to US 17, Main Street and Ocean Boulevard is feasible as a short- to mid-term connection. While fixed route express bus service to the study area may not be feasible today, it is logical to plan for future shuttle and fixed route service. Public feedback indicates that emphasis on future transit service could grow, especially as development and population growth occurs at a more transit-supportive density. The Action Plan Matrix at the end of this chapter presents these key transit recommendations, along with establishing prioritizations.

Conclusion

A variety of funding strategies are available to implement the *Northeast Area Transportation Plan* recommendations. These funding strategies include limited state and local monies and state grants that require a local match. Some improvements will be made in partnership with the private sector. While in general an incremental funding approach would be possible, it is not as attractive because the full benefit of the collective improvements would not be realized for quite some time. Alternative funding sources for expediting construction include special assessments and/or a locally-adopted Impact Fees or tax incentives.

One thing is certain, with the current local and state funding shortfall, the most critical steps toward implementation will be performed by leaders identified within the community. In collaboration with state and local officials, the collective efforts of these champions will lead to the well-connected, multimodal, sustainable community that is attractive to visitors and residence alike.

Projects for Further Study

Some recommendations should be considered for further study to assess the feasibility and reasonability of each project. These projects include the Little River Neck Road Roundabout Design, US 17/SC 9 Interchange Redesign, a Comprehensive Horry County Transportation Plan, and a Horry County Collector Street Plan.

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Action Plan Matrix

The implementation of system-wide improvements will occur through local policies, programs, and funding as well as state contributions and private investment. The following Action Plan Matrix provides a blueprint for a coordinated approach to fulfilling the *Plan*'s vision.

Table 6.2 – Action Plan Matrix

General Action Items	Timeframe[A]	Responsible Party
Adopt the ***Northeast Area Transportation Plan***	2009	Horry County North Myrtle Beach GSATS MPO
Apply the recommendations of this plan during the development review process. Use this plan as a tool to review proposed development projects and plans as they locate and are implemented within the study area	2009	Horry County North Myrtle Beach
Integrate the findings and recommendation of this plan into the ***GSATS MPO Long Range Transportation Plan*** and ***Horry County Comprehensive Plan***	2009	Horry County GSATS MPO
Work collaboratively with the Transportation Plan Advisory Committee, Horry County Commissioners, North Myrtle Beach City Council, GSATS MPO and the SCDOT to secure funding and implement the vision and recommendations of the ***Northeast Area Transportation Plan***	2009	Horry County North Myrtle Beach
Complete a multimodal transportation study for the remaining section of the Horry County planning area using the same guiding principles as outlined in the ***Northeast Area Transportation Plan***	2009	Horry County
Update the Collector Street Plan and network as development occurs. The alignments identified in the collector street plan are conceptual and therefore are not required to be built specific to an alignment. The collector street alignments identify the need to provide healthy interconnected system of streets.	2010	Horry County North Myrtle Beach
Develop an ordinance to implement the recommendations from the ***Northeast Area Transportation Plan***, including provisions for mixed-use design guidelines outlined in the focus area studies	2010	Horry County North Myrtle Beach
Implement items in the land use considerations "Tool Box" to encourage cluster and mixed-use development, sustainable growth initiatives and protect open space and the environment	2011	Horry County North Myrtle Beach

[A] Timeframe for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities.

Committed Projects	Funding Program	Timeframe[A]	Responsible Party
Water Tower Road (Parkway PUD to SC 90) – Pave existing dirt road to provide enhanced connections between Parkway PUD, Barefoot PUD, and SC 90.	City/County General Funds	2009-2010	Horry County North Myrtle Beach
Widen US 17 (SC 9 to 8th Avenue North)	RIDE II	—	SCDOT
Various Paving Projects: Gore Road, Andrew Road, Rainbow Drive, Dessie Drive, Churchview Lane, Old Sawmill Circle	Sales Tax	2009-2016	Horry County SCDOT
Various Resurfacing Projects: Robin Hood Circle, Red Tip Boulevard, Olympic Street, Dewitt Road/Willard Road, Sandridge Road, Old Chesterfield Road	Sales Tax	2009-2016	Horry County SCDOT
Carolina Bays Parkway Extension – Extension of SC 31 from SC 9 to the North Carolina State Line	State TIP	—	SCDOT

[A] Timeframe for implementation is based on project information provided by funding program.

Short-Term "Action Items"	Cost Estimate[A]	Timeframe[B]	Responsible Party
SC 90 and SC 57 – Intersection Improvements – Evaluate signal warrants based on crash history and traffic volumes, particularly given the increased volumes anticipated upon completion of the Main Street Connector.	$120,000	2009	Horry County SCDOT
SC 90 and Sea Mountain Highway – Spot Safety Improvements – Remove free flow right turn lanes at the intersection, consolidate existing driveways, delineate left turning lanes, and re-evaluate the existing signal timing and phasing to include protected only turn phasing during school hours. These improvements are intended to address the high number of crashes caused by turning vehicles that fail to yield right-of-way.	$70,000	2010	Horry County SCDOT
SC 90 and Mt. Zion Road – Spot Safety Improvements – Evaluate signal warrants based on crash history and traffic volumes, particularly given the increased volumes anticipated due to large levels of development occurring along Mt. Zion Road and SC 90.	$120,000	2010	Horry County SCDOT
SC 9 (from SC 57 to US 17 interchange) – Strategic Corridor – Implement access management improvements along corridor, including construction of plantable median with appropriate median opening spacing between full movement signalized intersections and partial movement leftover access. Access management improvements should include driveway consolidation, appropriate cross access between developments, and proper collector street access for alternative travel options.	$2,000,000	2011	Horry County SCDOT

[A] Cost estimate includes estimated design cost and twenty percent contingency, right-of-way is not included. Probable cost estimate is engineer's approximation in 2009 dollars and is subject to change based on increased construction materials, design, or time of implementation.

[B] Timeframe for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities.

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Mid-Term "Action Items"	Cost Estimate[A]	Timeframe[B]	Responsible Party
Little River Neck Road and Hill Street – Intersection Improvement – Improve awkward intersection alignment and congestion by constructing a roundabout at the existing Y-intersection. The improvement includes the realignment of 27th Avenue and the conversion of Grove Lane to a cul-de-sac. The short term improvements to Little River Neck Road calls for a two-lane divided cross section on four lane divided right-of-way.	$500,000	2012	Horry County North Myrtle Beach
SC 9 and Sea Mountain Highway – Spot Safety Improvements – Reconstruct SC 9 and Sea Mountain Highway intersection to align with Barber Street. This improvement is intended to reduce the number of crashes attributed to the awkward skew of the intersection, site distance issues, and the heavy volume of left turning vehicles onto SC 9. This improvement can be implemented concurrently with the SC 9 access management improvements and should reduce the overall number of crashes and provide for a higher level of mobility at the intersection.	$50,000	2012	Horry County SCDOT
SC 90 and Bombing Range Road – Convert to right-in/right out operation through the installation of a 1,000'plantable median along SC 90. The recommendation is based on crash history and drivers failing to yield the right-of-way.	$250,000	2013	SCDOT
SC 90 and St. Joseph Road – Evaluate signal warrants based on crash history and traffic volumes, particularly given the increased volumes anticipated due to large levels of development occurring along Sandridge Road, the Intracoastal Waterway, and SC 90.	$120,000	2013	Horry County SCDOT
New Intracoastal Parkway (from Long Bay Road to Sandridge Road) – Construct new four-lane divided minor arterial between Long Bay Road and Sandridge Road. This facility is intended to provide direct connections between the new Main Street Connector, Sandridge Road, and the largely undeveloped land along the Intracoastal Waterway. This facility will provide a direct connection to undeveloped land and should provide a spur for future growth in that area.	$10,500,000	2014	Developers
Little River Neck Road/Hill Street (Sea Mountain Highway to Tidewater Development) – Widen existing Little River Neck Road and Hill Street to a two-lane divided roadway with bicycle and pedestrian amenities, while preserving right-of-way for a future four-lane divided facility. This improvement will provide for a higher level of vehicle and pedestrian mobility in the mid-term.	$7,650,000	2015	Horry County North Myrtle Beach SCDOT
Long Bay Road (Intracoastal Waterway to SC 90) – Pave existing alignment to two-lane divided minor arterial standards on four lanes right-of-way. The reservation of additional right-of-way ensures that additional future volumes can be generated as this largely undeveloped area of the County continues to develop,	$12,000,000	2016	Horry County SCDOT
SC 90 (from Main Street Connector to US 17 interchange) – Widen to four lane-divided cross section with bicycle and pedestrian amenities and implement access management improvements along corridor, including construction of a plantable median with appropriate median opening spacing between full movement signalized intersections and partial movement leftover access. Access management improvements should include driveway consolidation, appropriate cross access between developments, and proper collector street access for alternative travel options.	$17,800,000	2017	SCDOT
Sea Mountain Highway (SC 90 to SC 9) – Improve existing alignment to two-lane undivided minor arterial standards, including bicycle and pedestrian amenities with adequate turning pockets at major intersections.	$3,100,000	2018	Horry County SCDOT

[A] Cost estimate includes estimated design cost and twenty percent contingency, right-of-way is not included. Probable cost estimate is engineer's approximation in 2009 dollars and is subject to change based on increased construction materials, design, or time of implementation.

[B] Timeframe for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities.

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Mid-Term "Action Items" (Continued)	Cost Estimate[A]	Timeframe[B]	Responsible Party
SC 90 (from SC 22 to Main Street Connector) – Widen to four lane-divided cross section with bicycle and pedestrian amenities and implement access management improvements along corridor, including construction of a plantable median with appropriate median opening spacing between full movement signalized intersections and partial movement leftover access. Access management improvements should include driveway consolidation, appropriate cross access between developments, and proper collector street access for alternative travel options.	$29,450,000	2019	SCDOT

[A] Cost estimate includes estimated design cost and twenty percent contingency, right-of-way is not included. Probable cost estimate is engineer's approximation in 2009 dollars and is subject to change based on increased construction materials, design, or time of implementation.

[B] Timeframe for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities.

Long-Term "Action Items"	Cost Estimate[A]	Timeframe[B]	Responsible Party
Water Tower Road (from Parkway PUD to SC 90) – Widen to four-lane divided minor arterial between Parkway PUD and SC 90. This facility is intended to provide direct connections between the new Parkway PUD development, Barefoot PUD, and SC 90 as well as enhanced mobility along a vital north-south alternative across the study area.	$26,100,000	2020	Developers SCDOT
Sea Mountain Highway, SC 9 and US 17 Interchange Reconfiguration – Reconfiguration of existing interchange to remove dangerous loop ramps and weaving movements between US 17 and Sea Mountain Highway. Existing configuration includes high speed weaving movement on a tight ramp structure between US 17 and Sea Mountain Highway. The proposed improvement removes the weave, using slip ramps to move vehicles between the two facilities, while utilizing collector streets to move local traffic.	$3,600,000	2022	Horry County SCDOT
Little River Neck Road/Hill Street (Sea Mountain Highway to Tidewater Development) – Widen Little River Neck Road and Hill Street to a four-lane divided roadway with bicycle and pedestrian amenities. This improvement will provide for a higher level of vehicular capacity as development occurs along Little River Neck Road.	$7,260,000	2023	Developers Horry County North Myrtle Beach SCDOT
SC 9 and US 17 Interchange Reconfiguration – Existing "dual" interchange lacks two major movements. Add two ramps to the existing interchange by providing a flyover (bridge) connecting eastbound SC 9 to northbound US 17 and an additional "loop" ramp at the diamond interchange connecting northbound SC 90 to westbound SC 9 and northbound US 17.	$3,900,000	2024	Horry County SCDOT
Mt. Zion Road (SC 90 to SC 57) – Improve existing alignment to two-lane undivided minor arterial standards, including bicycle and pedestrian amenities with adequate turning pockets at major intersections.	$3,500,000	2026	Horry County SCDOT
SC 57 (SC 90 to SC 9) – Widen to four lane-divided cross section with bicycle and pedestrian amenities. This improvement is intended to accommodate additional traffic volumes as SC 90 and SC 57 continue to develop.	$13,500,000	2028	Horry County SCDOT

[A] Cost estimate includes estimated design cost and twenty percent contingency, right-of-way is not included. Probable cost estimate is engineer's approximation in 2009 dollars and is subject to change based on increased construction materials, design, or time of implementation.

[B] Timeframe for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities.

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Bicycle and Pedestrian "Action Items"	Cost Estimate[A]	Timeframe[B]	Responsible Party
Barefoot Neighborhood Loop – Signed bike route on existing neighborhood streets in the Barefoot Neighborhood - Beginner Route (connects with East Coast Greenway that utilizes Club Course Drive)	$2,000	2009	Developer North Myrtle Beach
Main Street Spur – Dedicated bike lane on Main Street Extension - Intermediate Route (connects to North Myrtle Beach School Loop)	—	2010	North Myrtle Beach
City Connector – Wide outside lane on SC 90 and West Shore Dr -Experienced Route (connects to Carolina Bays Loop and East Coast Greenway)	$52,000	2012	Horry County North Myrtle Beach GSATS MPO
Little River Neck Spur – Dedicated bike lane on Little River Neck Road - Intermediate Route (connects to East Coast Greenway)	$648,000	2015	Horry County North Myrtle Beach
Intracoastal Connector – Dedicated bike lane on New Intracoastal Parkway - Intermediate Route (connects to North Myrtle Beach School Loop and Carolina Bays Loop)	$648,000	2016	Developers
North Myrtle Beach School Loop – Multi-use path alongside various collector streets in the vicinity of North Myrtle Beach Schools (connects to East Coast Greenway and Intracoastal Connector)	$1,600,000	2017	Horry County North Myrtle Beach
Carolina Bays Loop – Wide outside lane or paved shoulder on various new and existing collector streets and Water Tower Road - Intermediate Route (connects to East Coast Greenway at Water Tower Road)	$132,000	2020	Horry County North Myrtle Beach

[A] Cost estimate includes estimated design cost and twenty percent contingency, right-of-way is not included. Probable cost estimate is engineer's approximation in 2009 dollars and is subject to change based on increased construction materials, design, or time of implementation.

[B] Timeframe for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities.

Chapter 6 — Implementation

Transit "Action Items"	Cost Estimate[A]	Timeframe[B]	Responsible Party
Ocean Front Loop – Shuttle circulator along US 17 and Ocean Boulevard, connects various shopping centers and the public beach areas.	$1,350,000	2011	North Myrtle Beach
Cherry Grove/Little River Neck Road Loop – Shuttle circulator along Ocean Boulevard, US 17, Sea Mountain Highway, and Little River Neck Road.	$800,000	2014	North Myrtle Beach
Main Street Extension Loop – Shuttle circulator along the Main Street Extension, SC 90, Sea Mountain Highway, and US 17.	$850,000	2016	Horry County North Myrtle Beach
Barefoot Resort/Parkway PUD Loop – Shuttle circulator within Barefoot and Parkway PUD developments - utilizes neighborhood streets, Water Tower Road, SC 22, and US 17.	$1,550,000	2018	Developers Horry County North Myrtle Beach
Highway 90 Loop – Shuttle circulator in southwestern portion of study area along Water Tower Road, SC 90, and Shore Drive.	$1,100,000	2025	Developers Horry County North Myrtle Beach
Stephens Crossroad Loop – Shuttle circulator in northwestern portion of study area along SC 90, SC 57, SC 9, and Carolina Bays Parkway.	$900,000	2030	Developers Horry County North Myrtle Beach

[A] Cost estimate includes estimated design cost and twenty percent contingency, right-of-way is not included. Probable cost estimate is engineer's approximation in 2009 dollars and is subject to change based on increased construction materials, design, or time of implementation.

[B] Timeframe for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities.