5 Analyzing our Choices

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Introduction

The Wilmington Urban Area Metropolitan Planning Organization (WMPO) used both data analysis and stakeholder input to evaluate whether the projects included in *Cape Fear Navigating Change 2050* meet the region's future transportation needs and priorities. Projects included in the fiscally constrained roadway network were analyzed using a regional travel demand model to assess how they improve mobility, reduce congestion, and support planned development. A high-level screening of environmental and community resources was also completed to help identify potential impacts and guide project prioritization. It's important to note that this early analysis is not a substitute for the detailed environmental reviews required during later phases of project development. Together, the technical evaluations provide a foundation for future planning and help ensure decisions are both data-driven and context-sensitive.

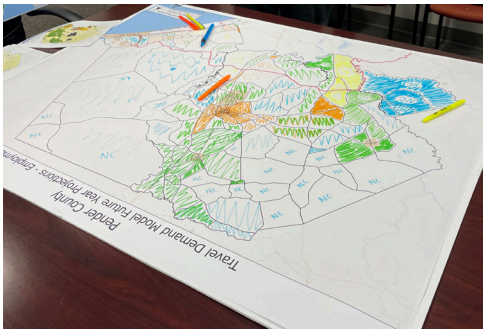
Beyond the technical analyses, public engagement and interagency coordination were central to the development of the plan. Phase II of public outreach created opportunities for stakeholders across the region to provide feedback on the plan's goals, proposed projects, and overall direction. Input from community members, member jurisdictions, and planning partners helped confirm alignment with shared priorities and highlighted areas where adjustments could strengthen the plan's relevance and impact.

2050 Wilmington Regional Travel Demand Model: Roadway Network Scenario Results

The Wilmington Regional Travel Demand Model (WRTDM) is a long-range, traffic forecasting tool that analyzes the relationship between transportation and land use. These models are utilized to evaluate the future transportation network based on forecasted land use, demographics, and facilities. Although future transportation networks will include multimodal accommodations, travel demand models are typically used for the evaluation of roadway improvements.

The WRTDM was initially developed with a base year of 2010, with a future year planning horizon set for 2040. The model was revised to a 2021 base year and a 2050 planning horizon.

North Carolina Department of Transportation (NCDOT) and WMPO staff coordinated with planning staff from each member jurisdiction to develop and verify socioeconomic data to update the base year of the model in 2021. The 2021 household estimates were determined by using both 2020 Census data and 2021 Certificate of Occupancy data. Inclusion of the 2021 Certificate of Occupancy data helped identify new households not captured in the 2020 Census, ensuring accurate household estimates for the base year. The 2021 employment estimate data was sourced from InfoUSA.

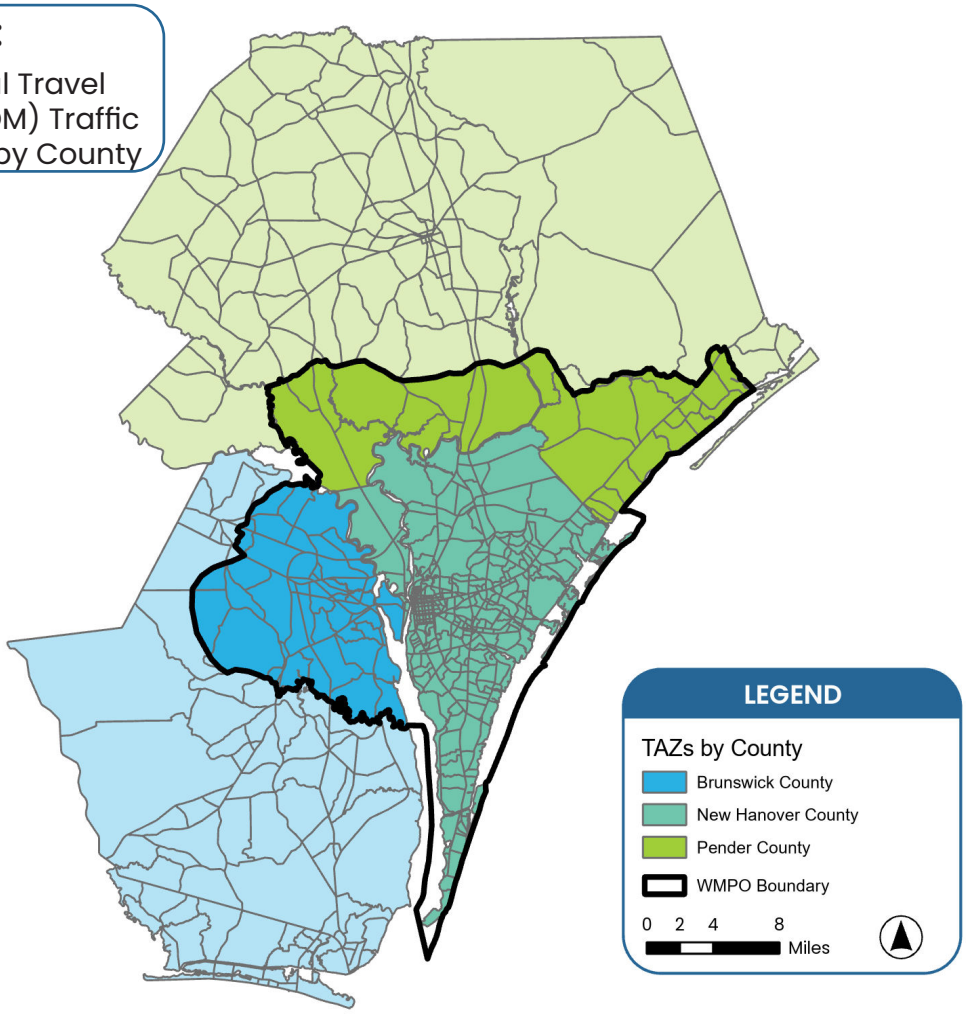


WMPO and Pender County staff verifying socioeconomic data for Pender County TAZ's.

The same group of WMPO and NCDOT staff worked to develop growth rate estimates for each county based on areas experiencing the highest growth and presumed future development. These estimated rates were established at a Traffic Analysis Zone (TAZ) level, assigning a high, medium, or low designation for population and employment for each TAZ. These assignments were then applied to numerical rates determined by NCDOT and based on data from the North Carolina Office of State Budget and Management. The existing roadway network of 2021 was also determined, and the list of existing and committed projects was reviewed and added.

See Chapter 2 for maps showing base year and future year socioeconomic outputs as modeled by the WRTDM.

Figure 5-1:
Wilmington Regional Travel Demand Model (WRTDM) Traffic Analysis Zones (TAZs) by County



Analysis

Utilizing the future growth rates that were established through collaboration with the WMPO's member jurisdictions, the model provides density and growth projections for population and employment in the year 2050. The Wilmington Regional Model was then used to evaluate the following scenarios:

1. Base Year (2021) as is.
2. Future Year (2050) with no fiscally constrained MTP projects.
3. Future Year (2050) with fiscally constrained MTP projects not including the Cape Fear Crossing
4. Future Year (2050) with fiscally constrained MTP projects including the Cape Fear Crossing

A Level of Service (LOS) analysis, a derivative of the volume over capacity (V/C) for roadways, was completed for each of the above scenarios. This is a basic operation used to determine if a road is experiencing overcrowding and congestion, based upon its given capacity. While a commonly used way to visualize the current and future projections of roadway congestion along roadway segments, this type of analysis fails to show changes in flow from one road segment to another and is limited in its usefulness for evaluating the entire transportation network including multimodal components.

See Appendix N for the non-fiscally constrained roadway project list.

A new metric to assess a corridor's overall effectiveness will likely be determined during the life of this plan. The following V/C ratios were used to determine grades:

Table 5.1 - Major Roads	
LOS	V/C Ratio
A	Less than 0.3
B	0.31 to 0.49
C	0.50 to 0.70
D	0.71 to 0.85
E	0.86 to 0.99
F	1 and above

Table 5.2 - Minor Roads	
LOS	V/C Ratio
A	Less than 0.33
B	0.34 to 0.55
C	0.56 to 0.76
D	0.77 to 0.87
E	0.88 to 0.99
F	1 and above

Results

Population growth in the region has caused numerous issues in roadway transportation, namely delays and congestion. The roadway projects outlined in this plan are a starting point to address the extreme need for improvements to the roadway network. The model demonstrates that the implementation of *Cape Fear Navigating Change 2050* roadway projects maintained or improved the LOS in 67% of the transportation network within the WMPO planning boundary, despite the rapidly increasing population.

The results shown do not account for improvements to bicycle and pedestrian facilities or public transportation improvements, which could lead to changing preferences and increased transportation mode choices. Upgrades to the multimodal network and an increase in roadway congestion will likely increase the number of individuals who opt to utilize alternative modes of transportation rather than single occupancy vehicles (SOVs).

Maps depicting the results of the 2050 WRTDM—LOS analysis and traffic volume (total number of cars) for each scenario—can be found on the following pages, as Figures 5-2 through 5-11.

WILMINGTON REGIONAL TRAVEL DEMAND MODEL MAPS:

FIGURE 5-2: Level of Service Base Year (2021)

FIGURE 5-3: Traffic Volume Base Year (2021)

FIGURE 5-4: Level of Service Projections (2050) - No Build

FIGURE 5-5: Traffic Volume Projections (2050)- No Build

FIGURE 5-6: Level of Service Projections (2050)- Build, excluding Cape Fear Crossing

FIGURE 5-7: Traffic Volume Projections (2050)- Build, excluding Cape Fear Crossing

FIGURE 5-8: Level of Service Projections (2050)- Build, including Cape Fear Crossing

FIGURE 5-9: Traffic Volume Projections (2050)- Build, including Cape Fear Crossing

FIGURE 5-10: Level of Service Projected Change (2050)- Build vs. No Build

FIGURE 5-11: Traffic Volume Projected Change (2050)- Build vs. No Build

Figure 5-2:
Level of Service (LOS) Base Year (2021)

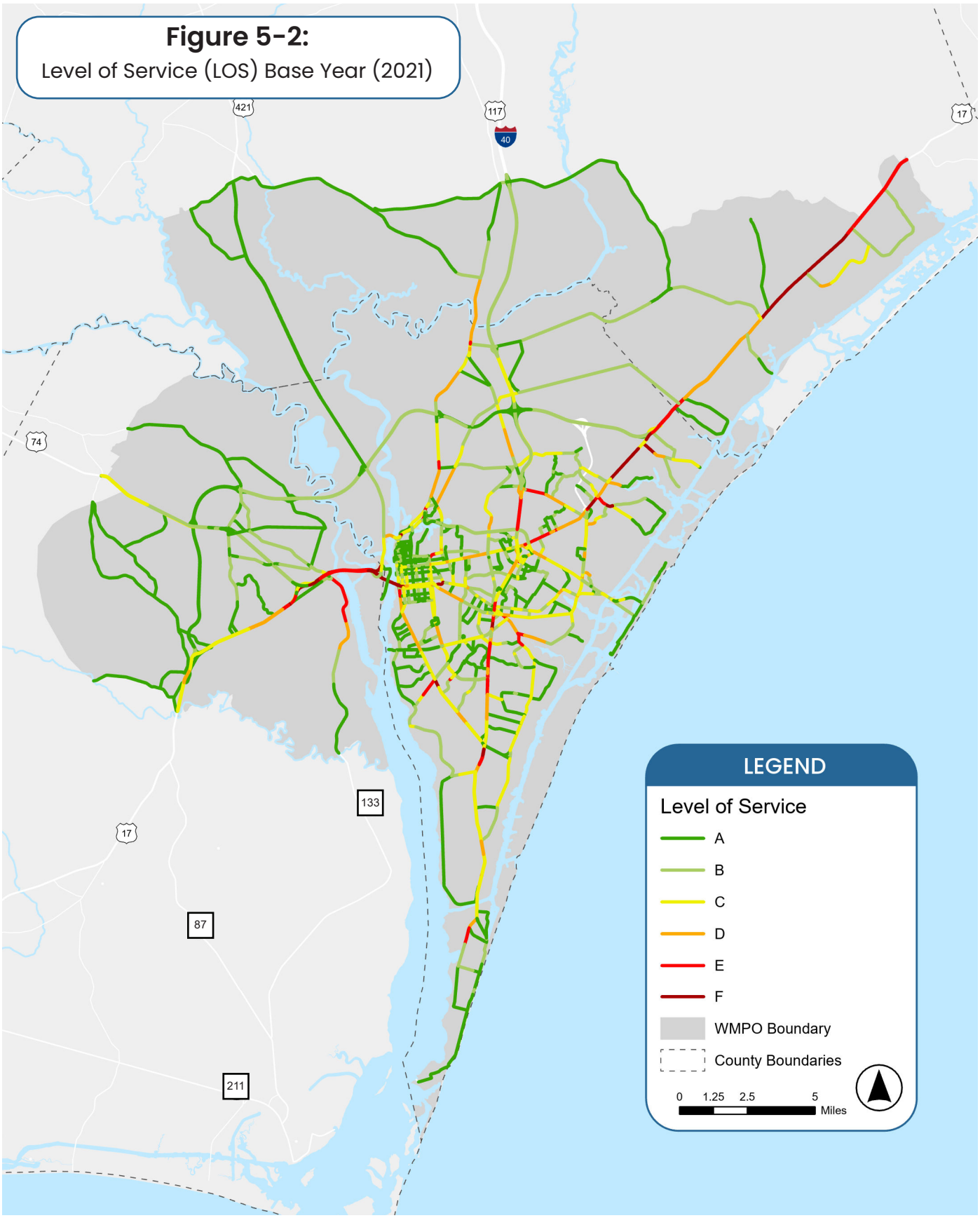


Figure 5-3:
Traffic Volume Base Year (2021)

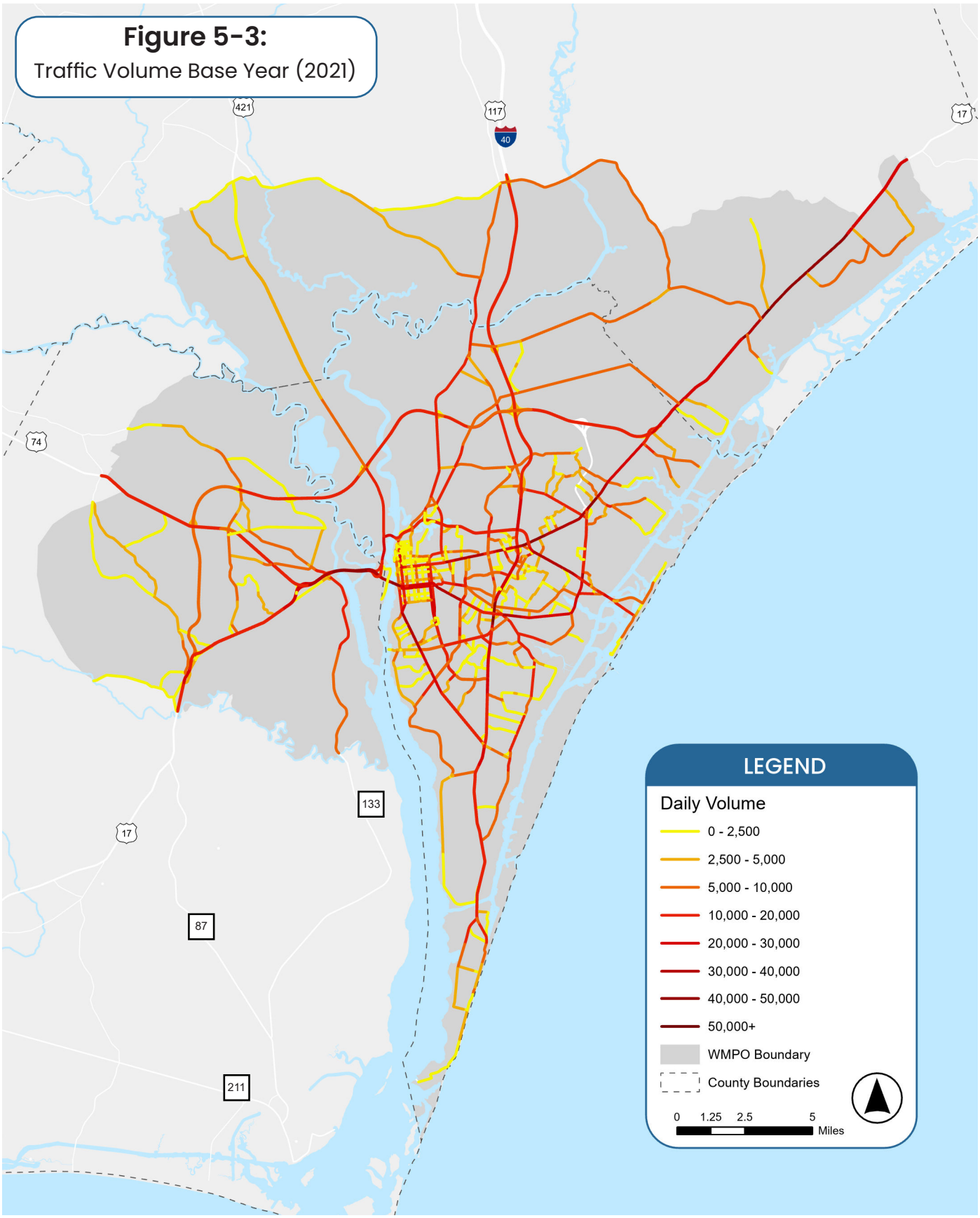


Figure 5-4:
Level of Service (LOS) Projections (2050)
No Build

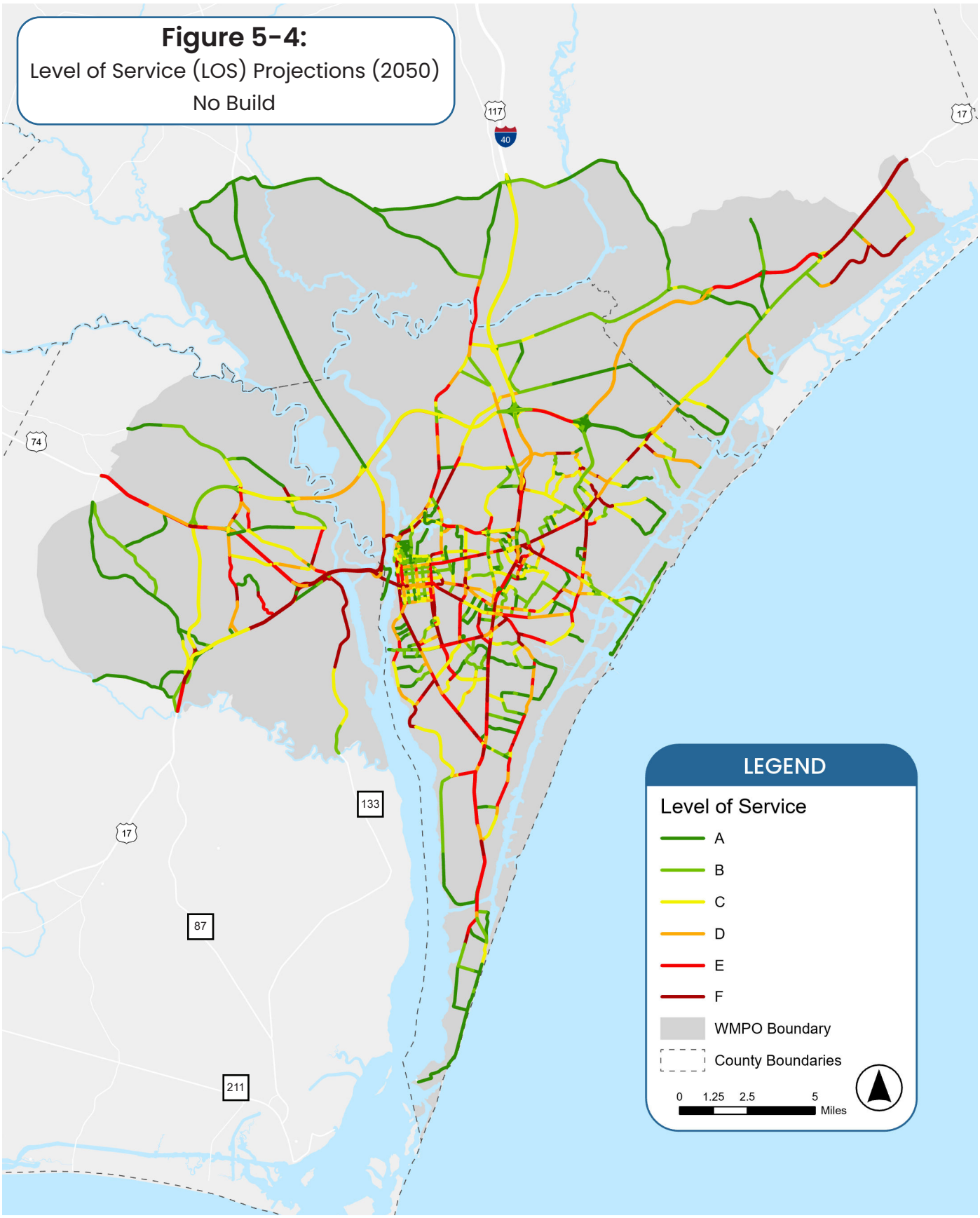


Figure 5-5:
Traffic Volume Projections (2050)
No Build

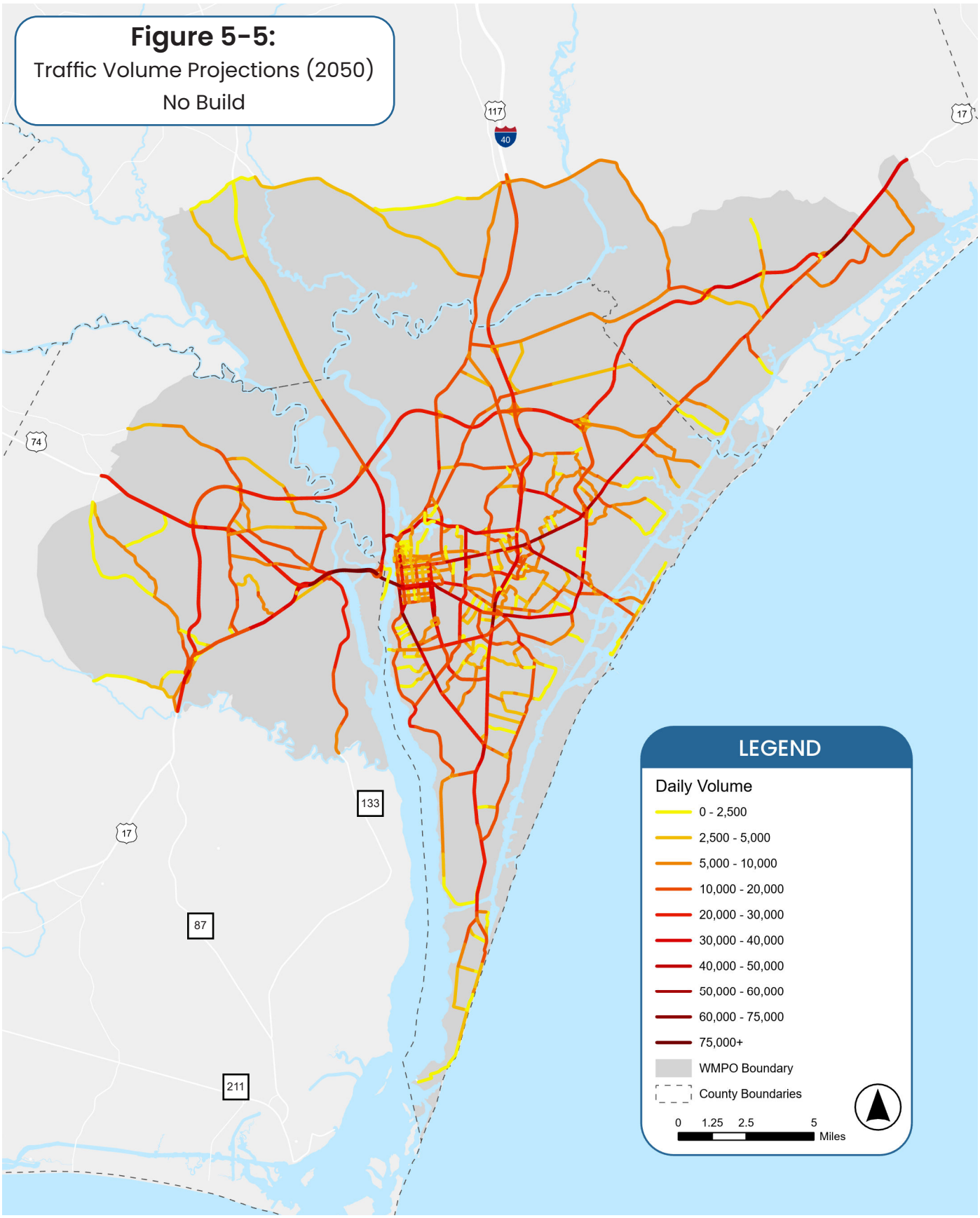


Figure 5-6:
Level of Service (LOS) Projections (2050)
Build, *excluding* Cape Fear Crossing

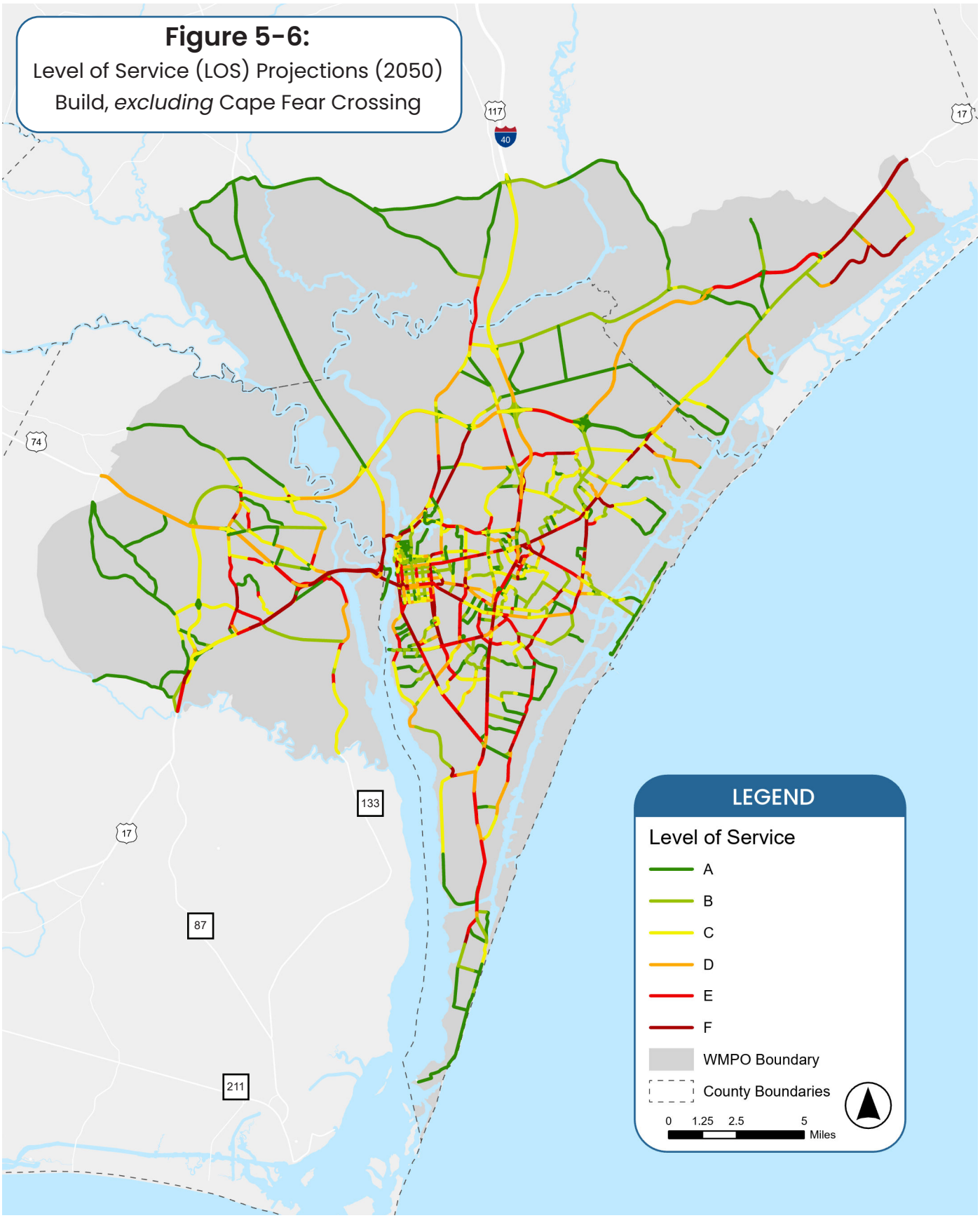


Figure 5-7:
Traffic Volume Projections (2050)
Build, *excluding* Cape Fear Crossing

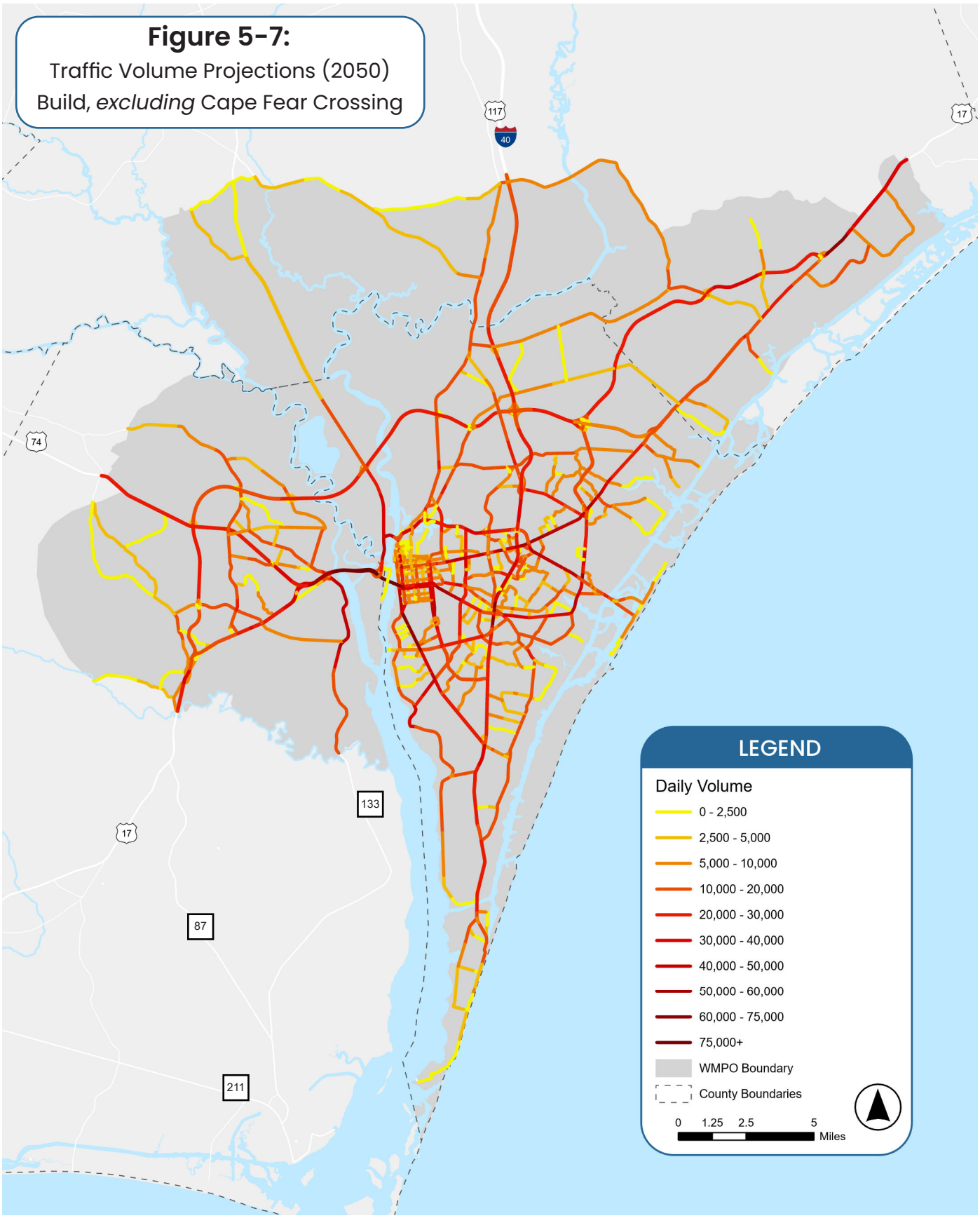


Figure 5-8:
Level of Service (LOS) Projections (2050)
Build, *including* Cape Fear Crossing

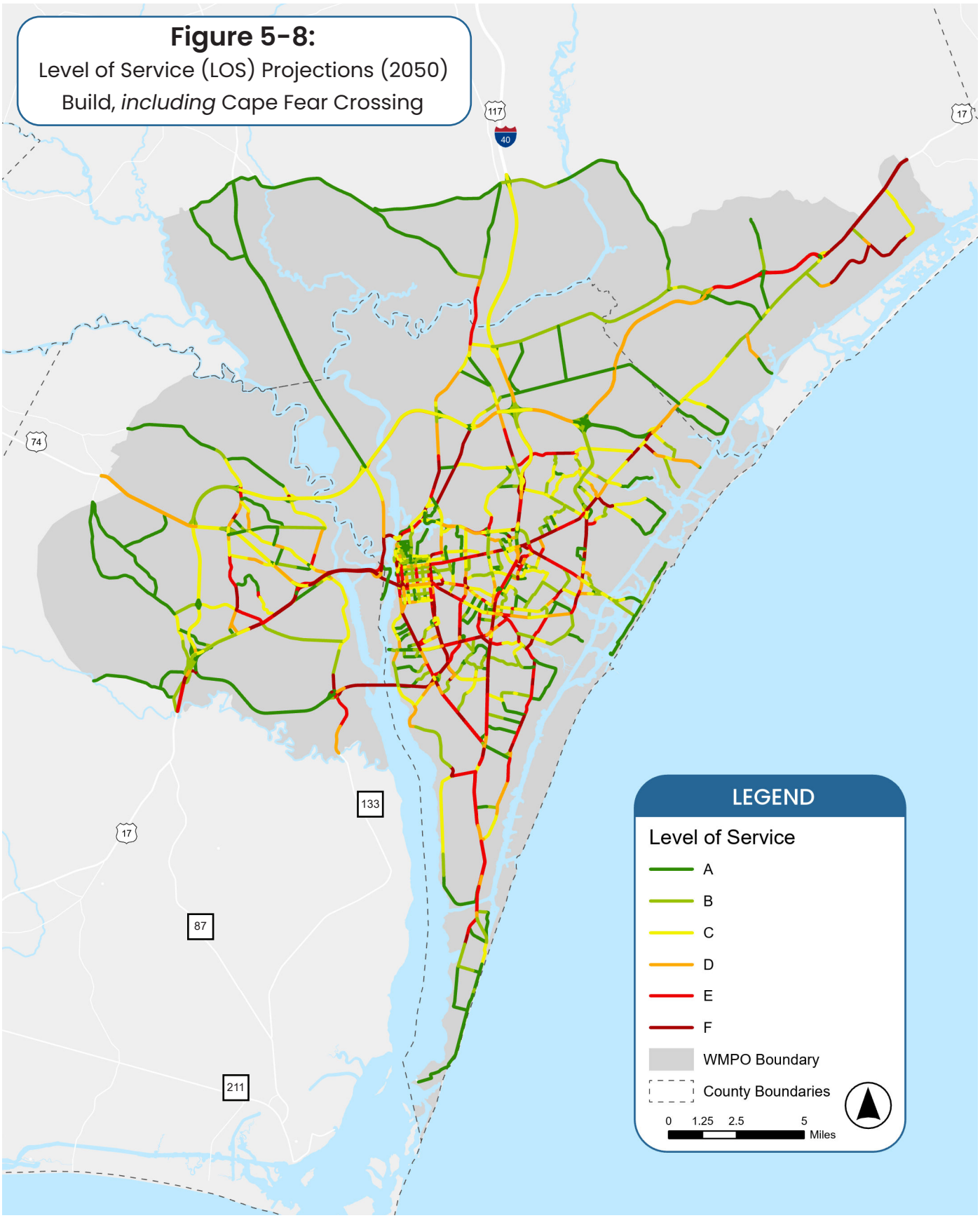


Figure 5-9:
Traffic Volume Projections (2050)
Build, *including* Cape Fear Crossing

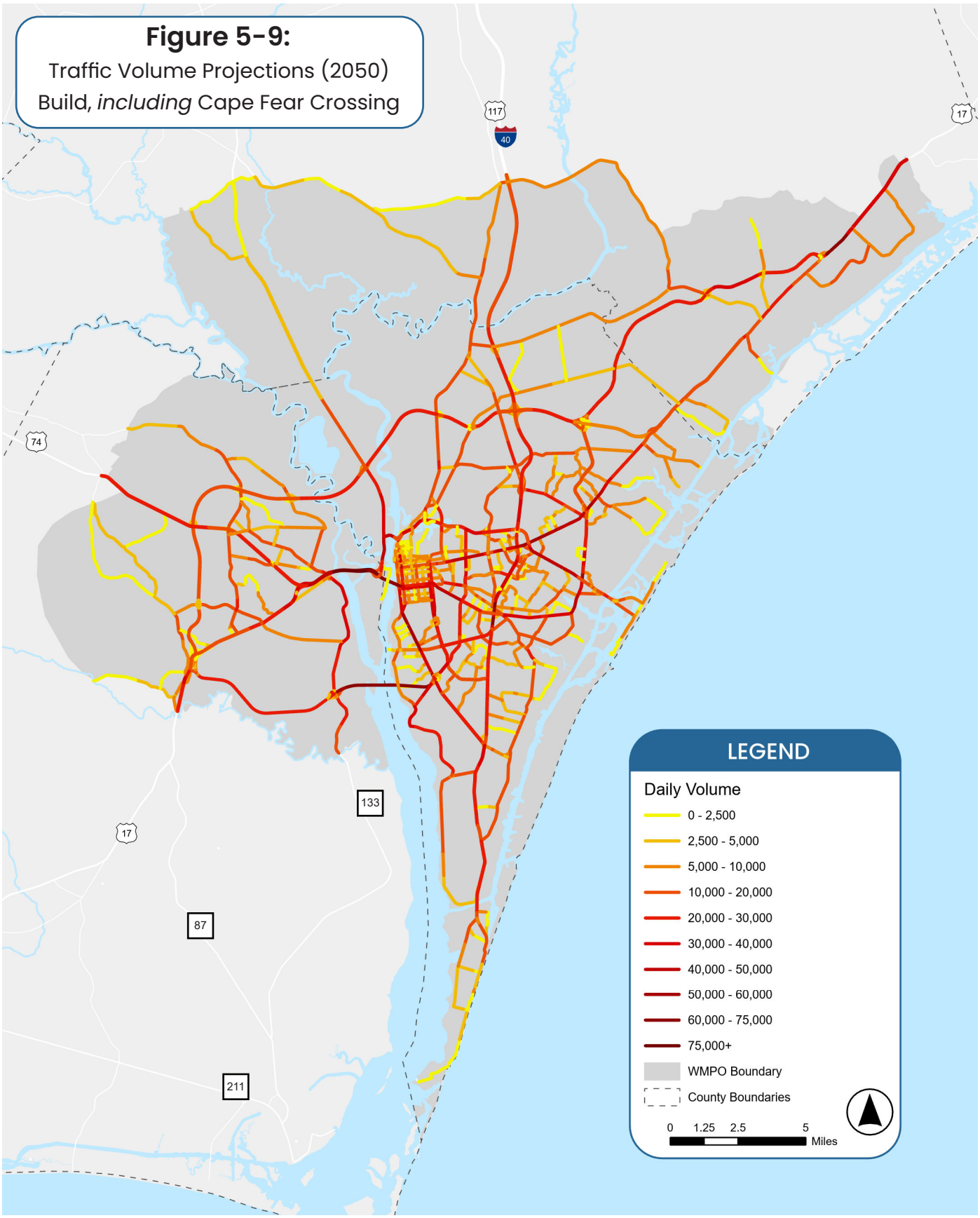


Figure 5-10:
Level of Service (LOS) Projected Change (2050)
Build vs. No Build

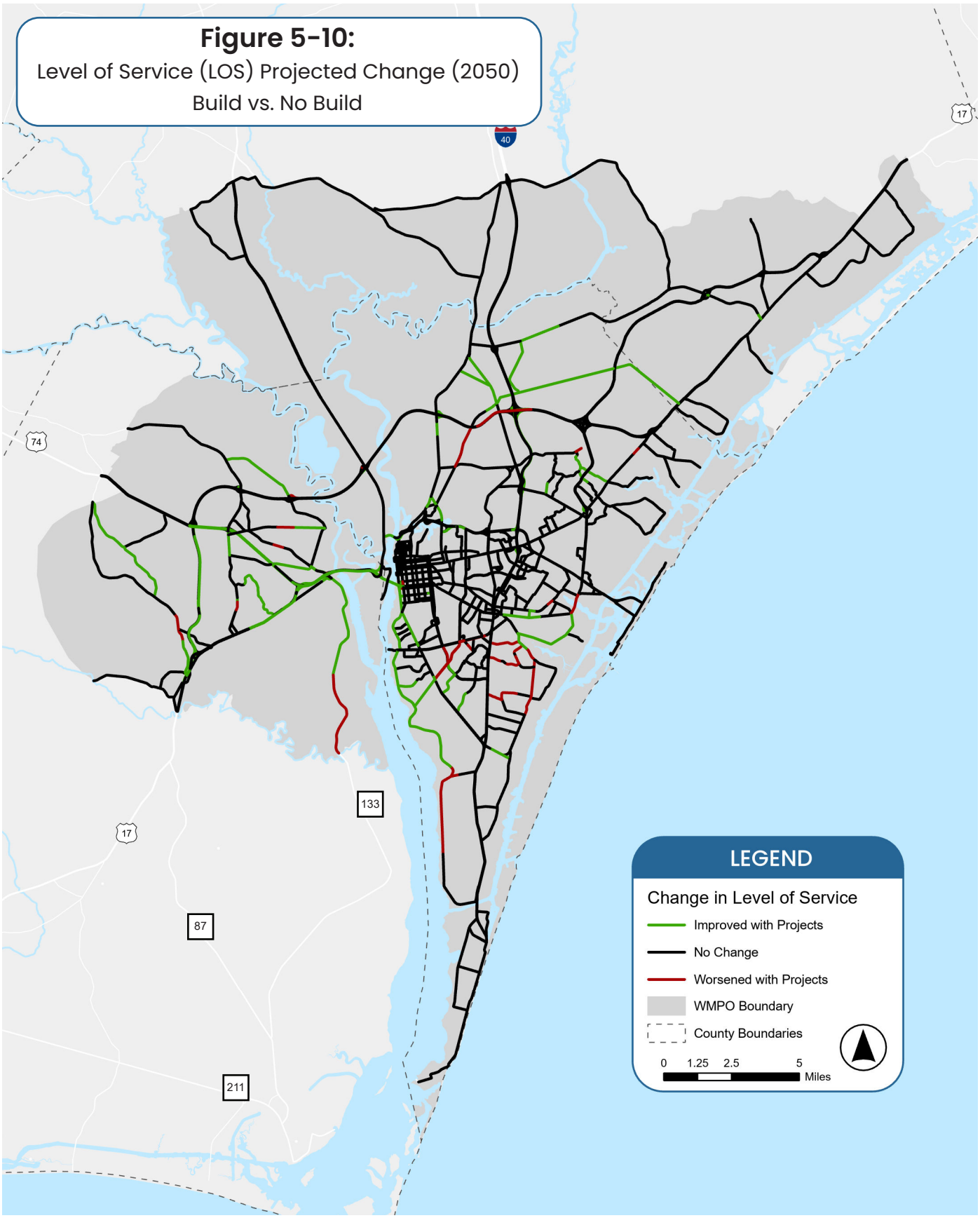
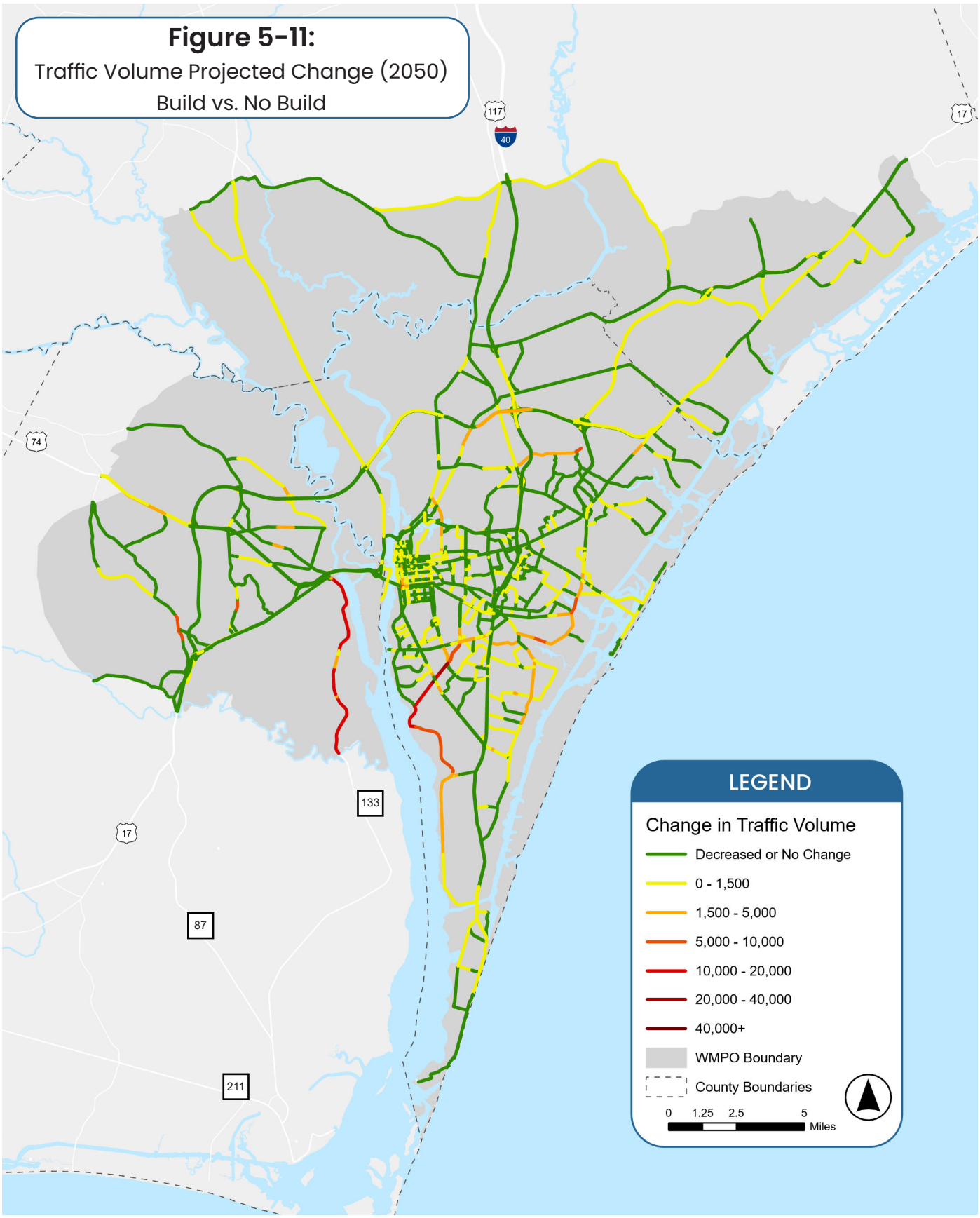


Figure 5-11:
Traffic Volume Projected Change (2050)
Build vs. No Build



Planning-Level Critical Resource Analysis

Assessing Impacts

The WMPO coordinated with state and local environmental agencies and professionals to ensure that natural resource considerations and disaster resilience were incorporated into *Cape Fear Navigating Change 2050*. NCDOT and members of the Metropolitan Transportation Plan Committee (MTPC), with expertise in environmental and emergency management, contributed to shaping the plan's vision and goals, and project screening process. They also reviewed the draft plan to confirm its alignment with key environmental priorities along with staff from the North Carolina Department of Environmental Quality (NCDEQ) and Federal Highway Administration (FHWA). This collaboration strengthens long-term regional resilience and supports consistency with broader planning efforts.

In support of this coordination, a planning-level, qualitative screening analysis of critical environmental and community resources was conducted to assess potential impacts of the fiscally constrained roadway project recommendations in this plan. For this analysis, project locations were overlaid onto a series of critical resource maps. Only resources with available GIS data were evaluated, consistent with the study's planning-level scope. Project encroachments into natural or community resources were identified and assigned a score from 0 to 3, reflecting the perceived degree of impact. The tables below and on the next page define the scoring parameters for factors within three categories: hydrologic, environmental, and community.

Table 5.3 - Impact Scores	
Perceived Degree of Impact	Score
No Impact	0
Minor Impact	1
Moderate Impact	2
Major Impact	3

Table 5.4 - Hydrologic Factors		
Score	Water Supply Watershed	Flood Hazard Area
0	not within 1/2 mile of water supply watershed	not within 1/4 mile of flood hazard area
1	within 1/2 mile of water supply watershed	within 1/4 mile of flood hazard area
2	within 1/4 mile of water supply watershed	passes through or along flood hazard area
3	passes through or along water supply watershed	predominately in flood hazard area

Score	Wetlands (NWI)	High Quality Waters	Water Bodies
0	not within 1/4 mile of wetlands	not within 1/2 mile of high quality waters	not within 1/2 mile of water bodies
1	within 1/4 mile of wetlands	within 1/2 mile of high quality waters	within 1/2 mile of water bodies
2	passes through or along wetlands	within 1/4 mile of high quality waters	within 1/4 mile of water bodies
3	predominately in wetlands	passes through or along high quality waters	passes through or along water body

Table 5.5 - Environmental Factors			
Score	NPDES Discharge Site	Managed Areas	Natural Areas
0	not within 1/2 mile of a NPDES site	not within 1/2 mile of a managed area	not within 1/2 mile of a natural area
1	within 1/2 mile of a NPDES site	within 1/2 mile of a managed area	within 1/2 mile of a natural area
2	within 1/4 mile of a NPDES site	within 1/4 mile of a managed area	within 1/4 mile of a natural area
3	has more than 1 NPDES site in direct proximity	passes through or along a managed area	passes through or along a natural area

Table 5.6 - Community Factors				
Score	Schools	Parks	State Owned Land	Federal Owned Land
0	not within 1/2 mile of a school	not within 1/2 mile of a park	not within 1/2 mile of state owned land	not within 1/2 mile of federally owned land
1	within 1/2 mile of a school	within 1/2 mile of a park	within 1/2 mile of state owned land	within 1/2 mile of federally owned land
2	within 1/4 mile of a school	within 1/4 mile a park	within 1/4 mile of state owned land	within 1/4 mile of federally owned land
3	has more than 1 school in direct proximity	passes through or along a park	passes through or along state owned land	passes through or along federally owned land

Each fiscally constrained roadway project is evaluated based on the hydrologic, environmental, and community factors listed previously. These scores are then added to determine a total score, and subsequent degree of impact for the project.

Table 5.7 - Comprehensive Perceived Impact Scores	
Project's Perceived Impact on the Surrounding Environmental and Community Resources	Total Score
No Impact	0
Minor Impact	1-10
Moderate Impact	11-16
Major Impact	17+

These total scores are used to evaluate candidate projects and their potential impact on the environment. The information gained from this analysis allows proposed roadway alignments to be adjusted or refined to avoid or minimize environmental impacts. This screening process also allows for early identification of likely impacts and areas of uncertainty that will need to be investigated in more detail as a project moves forward in planning and design. Maps depicting the data sources utilized for the critical resource analysis can be found in beginning on page 113. These illustrate how fiscally constrained roadway projects identified in *Cape Fear Navigating Change 2050* intersect with hydrologic, environmental, community resources. All resource data is based on available GIS sources and should be considered approximate.

Table 5.8 - Perceived Project Impact Scores

Project ID	Project Name	Funding Band	Project Cost Estimate	Hydrologic					Environmental			Community				Total Score
				Water Supply Watershed	Flood Hazard Area	Wetlands	High Quality Waters	Water Bodies	NPDES Discharge Site	Managed Areas	Natural Areas	Schools	Parks	State Owned Land	Federally Owned Land	
RW-1	NC 133/River Rd SE Widening	2034-2040	$113,500,000	0	2	2	0	2	0	3	2	2	3	3	0	19
RW-2	Cape Fear Memorial Bridge Replacement (Toll Option)	2034-2040	$444,000,000	0	3	3	0	3	2	3	3	1	2	1	0	21
RW-3	Cape Fear Blvd/Canal Dr Roundabout	2041-2050	$2,020,000	0	3	1	0	2	0	2	0	1	2	1	0	12
RW-5	N 23rd St Widening	2024-2028	$7,400,000	0	2	2	0	2	2	3	0	0	0	3	0	14
RW-7	Basin St Extension	2041-2050	$5,980,000	0	2	2	0	0	0	2	3	2	0	0	0	11
RW-8	Old Fayetteville Road Interchange at US 74/76 Interchange	2041-2050	$116,800,000	0	1	1	0	0	0	2	1	3	0	0	0	8
RW-9	US 17/Hwy 87 Connection	2041-2050	$56,830,000	0	2	3	0	0	0	1	3	0	0	0	0	9
RW-10	US 17/NC 133 Connection	2034-2040	$41,500,000	0	2	2	0	0	0	2	1	0	0	0	0	7
RW-11	Village Rd/Lanvale Rd/Fletcher Rd Intersection Improvements	2024-2028	$2,020,000	0	0	1	0	0	0	2	0	0	0	0	0	3
RW-12	Village Rd/Lincoln Rd Intersection Improvements	2041-2050	$2,020,000	0	1	1	0	0	0	2	0	1	2	0	0	7
RW-13	Village Rd Streetscape	2041-2050	$7,880,000	0	1	2	0	1	0	3	1	0	2	1	0	11
RW-14	Cedar Hill Rd Widening	2041-2050	$35,590,000	0	2	2	0	0	0	3	1	0	3	0	0	11
RW-19	Ivester Ct/Eastbrook Connector	2041-2050	$12,980,000	0	1	3	0	0	0	3	1	1	0	3	0	12
RW-20	Mt. Misery/Daniels Connector	2041-2050	$7,180,000	0	2	2	0	0	0	3	1	0	3	0	0	11
RW-22	Park/Pine Valley/Brooklyn Connector West of North Navassa Road	2041-2050	$4,140,000	0	2	2	0	0	0	1	2	0	0	0	0	7
RW-23	Ridge Rd Extension	2041-2050	$4,430,000	0	0	3	0	0	0	0	0	0	0	0	0	3
RW-24	Sandy Ln Extension	2041-2050	$3,520,000	0	1	1	0	0	0	2	1	0	0	0	0	5
RW-26	Victoria Ln Extension	2041-2050	$1,300,000	0	3	3	0	0	0	2	3	0	0	0	0	11
RW-31	Upgrade US 74/76 to Interstate	2041-2050	$68,300,000	0	2	2	0	0	0	1	0	0	3	1	0	9
RW-33	US 17 Reduced Conflict Intersections	2041-2050	$74,800,000	0	1	2	0	0	0	3	0	1	0	0	0	7
RW-36	Blue Clay Rd Modernization	2041-2050	$29,090,000	0	2	2	0	0	0	3	0	2	2	2	0	13
RW-37	Future Hampstead Bypass/ Sidbury Rd Interchange	2034-2040	$13,900,000	0	0	1	0	0	0	0	0	0	0	0	0	1
RW-39	I-140/Blue Clay Rd Interchange	2034-2040	$69,200,000	0	0	1	0	0	0	0	0	0	0	0	0	1
RW-40	Mohican Trl/Masonboro Loop Rd Roundabout	2041-2050	$2,020,000	0	1	1	1	0	0	0	0	0	0	0	0	3
RW-41	Murrayville Rd Modernization and Extension	2034-2040	$141,700,000	0	2	2	0	0	0	3	0	2	3	0	0	12

Table 5.8 Continued - Perceived Project Impact Scores

Project ID	Project Name	Funding Band	Project Cost Estimate	Hydrologic					Environmental			Community				Total Score
				Water Supply Watershed	Flood Hazard Area	Wetlands	High Quality Waters	Water Bodies	NPDES Discharge Site	Managed Areas	Natural Areas	Schools	Parks	State Owned Land	Federally Owned Land	
RW-43	Myrtle Grove Rd/Piner Rd/Masonboro Loop Rd Roundabout	2041-2050	$2,020,000	0	0	1	0	0	0	2	0	1	1	0	0	5
RW-44	Navajo Trl/Masonboro Loop Rd Roundabout	2041-2050	$2,020,000	0	1	1	1	0	0	0	0	0	0	0	0	3
RW-45	New Roadway Connector between Sidbury Rd and Holly Shelter Rd	2041-2050	$15,500,000	0	0	2	0	0	0	0	0	0	0	2	0	4
RW-46	Piner Rd Widening and Intersection Realignment	2041-2050	$15,300,000	0	1	2	1	0	0	2	0	3	2	0	0	11
RW-47	Sidbury Rd Widening	2041-2050	$33,400,000	0	2	2	0	0	2	2	0	3	0	0	0	11
RW-48	US 17/US17 BUS/I-140 Interchange Improvements	2041-2050	$19,510,000	0	0	1	0	0	0	2	0	0	0	0	0	3
RW-52	NC 210 Bridge - Harrison Creek	2041-2050	$3,821,634	0	3	3	0	0	0	1	3	0	0	0	0	10
RW-53	NC 210 Bridge - Merricks Creek	2041-2050	$4,062,150	0	3	3	0	0	0	0	3	0	0	0	0	9
RW-54	NC 210 Widening	2041-2050	$22,950,000	0	1	2	0	0	2	3	0	0	0	0	0	8
RW-56	US 117/NC 210 Intersection Improvements	2041-2050	$1,116,000	0	0	1	0	0	0	0	2	0	0	0	0	3
RW-57	US 17/NC 210 Intersection Improvements	2034-2040	$1,160,000	0	0	1	0	0	2	0	0	0	0	0	0	3
RW-58	17th St Offset Lefts	2034-2040	$577,500	0	0	2	0	0	0	3	3	3	3	0	0	14
RW-59	Barnards Creek Bridge	2041-2050	$4,347,648	0	3	3	0	2	0	0	3	0	0	0	0	11
RW-61	Dogwood Ln Extension	2034-2040	$22,700,000	0	3	2	0	3	0	2	0	1	2	0	0	13
RW-62	Greenville Loop Rd Widening	2041-2050	$146,600,000	0	2	2	0	2	0	3	0	2	2	0	0	13
RW-63	Independence Blvd Widening	2041-2050	$19,401,274	0	3	2	0	2	0	2	2	0	2	0	0	13
RW-64	Market St Road Diet	2041-2050	$39,600,000	0	2	2	0	2	1	3	2	3	3	3	0	21
RW-65	Peele St Extension	2041-2050	$3,438,195	0	0	1	0	0	0	3	0	1	1	0	0	6
RW-66	River Rd Widening	2041-2050	$6,170,955	0	2	2	0	2	0	1	3	1	1	1	0	13
RW-71	Oleander Dr Access Management Improvements	2034-2040	$145,500,000	0	1	2	0	1	0	1	0	2	3	0	0	10
RW-72	US 17 (Ocean Highway) Access Management	2041-2050	$60,900,000	0	2	2	0	0	0	3	0	0	0	0	0	7
RW-73	US 74/NC 133 Merge Lane Widening	2041-2050	$30,800,000	0	3	3	0	2	0	3	3	1	1	3	0	19
RW-67 (U-4738)	Cape Fear Crossing	2050+	$956,300,000	0	2	2	0	3	3	1	3	0	1	1	0	16

Figure 5-12:
Hydrologic Factors

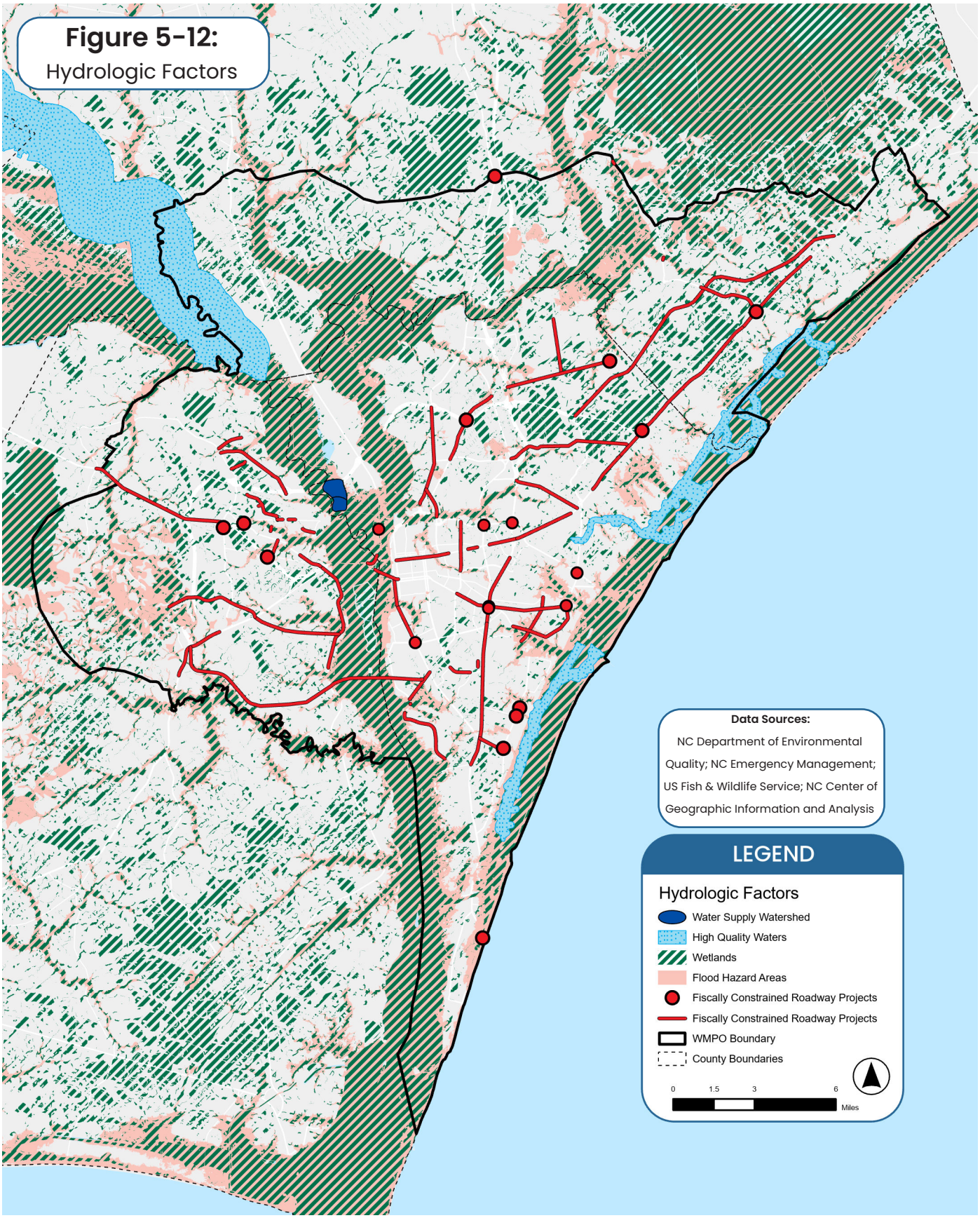


Figure 5-13:
Environmental Factors

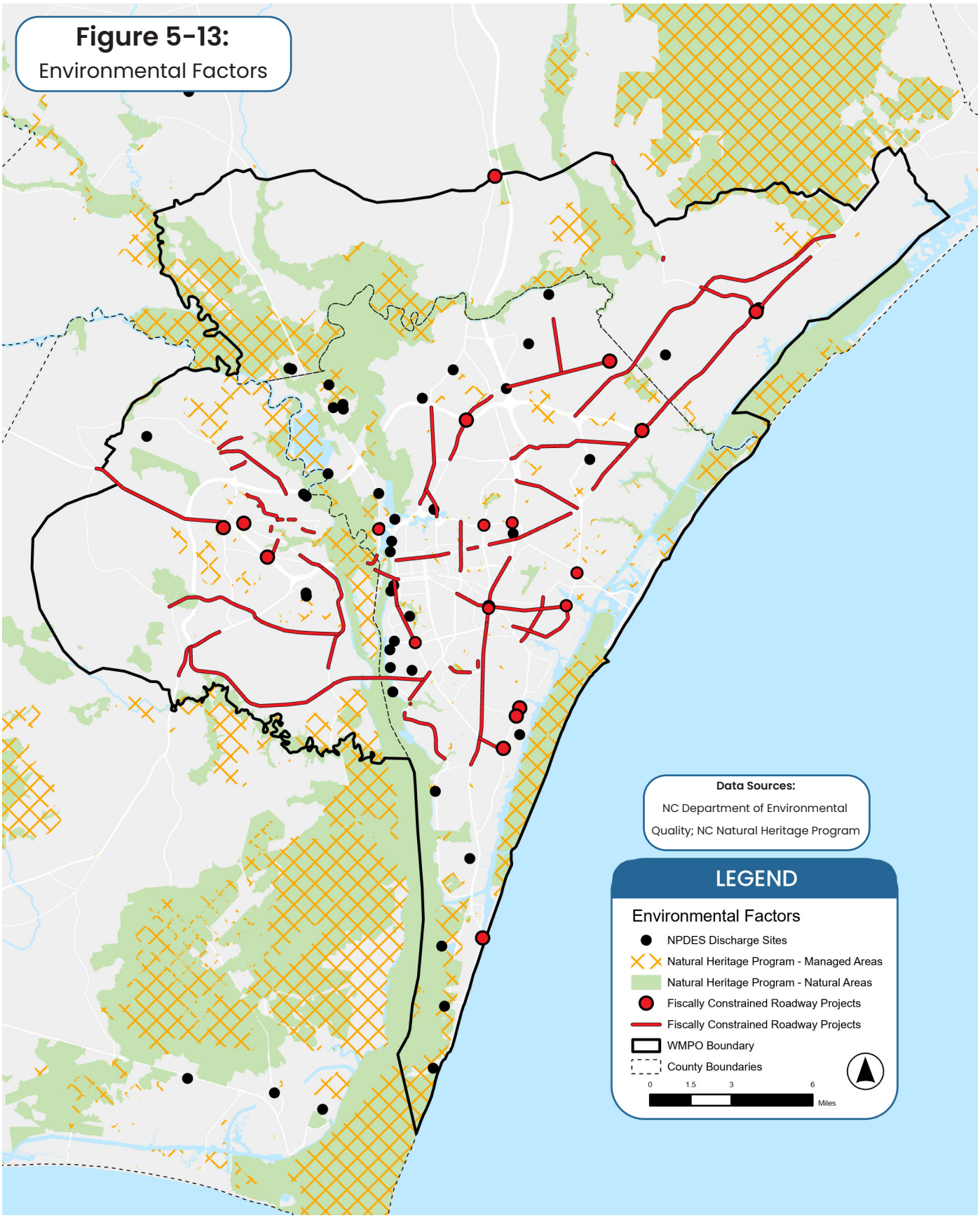
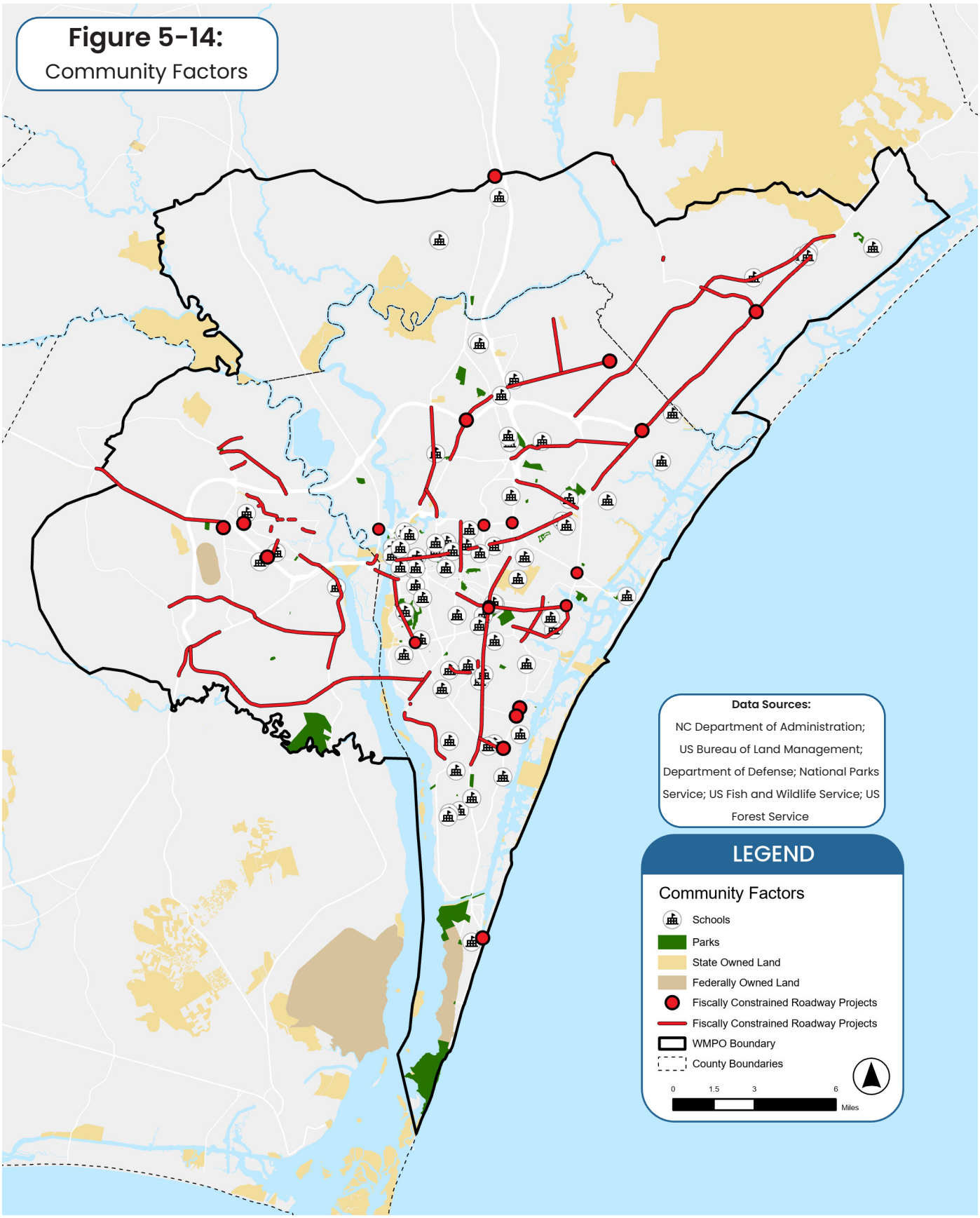


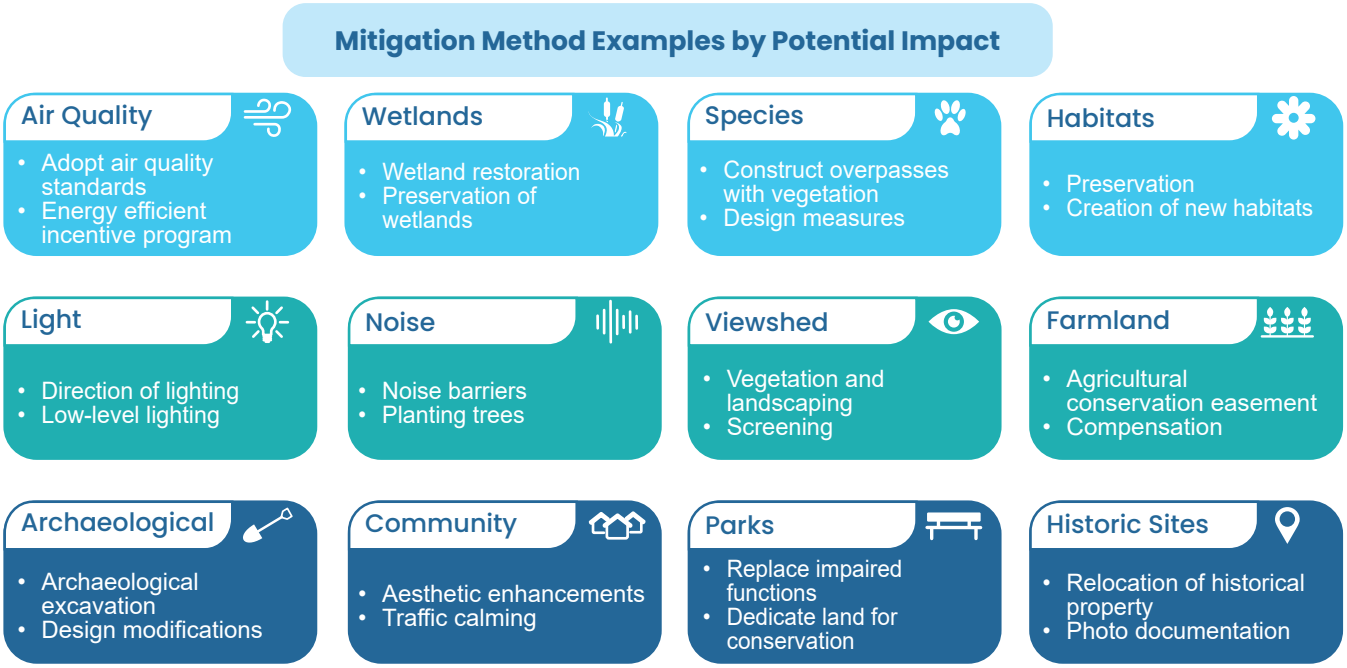
Figure 5-14:
Community Factors



Impact and Mitigation Activities

Since the transportation planning activities of the WMPO are regional in scope, this environmental mitigation discussion does not focus on individual projects within the plan but rather offers a summary of environmentally sensitive areas. The WMPO conducts these analyses to identify conflicts between planned transportation projects and environmentally sensitive areas in an effort to minimize negative impacts that a project may have on natural resources.

The greatest potential environmental impacts of transportation projects being constructed in North Carolina's coastal plain are on wetlands, floodplains, and other hydrologic features. Other common potential environmental impacts include habitat fragmentation and loss of forest land. Beyond the ecological impacts, the human environment also requires careful monitoring to mitigate any adverse effects on the community, such as an increase in noise or light pollution, bisection of communities, the loss of cultural or historical elements, or reduced accessibility to businesses. All recommended projects within *Cape Fear Navigating Change 2050* should continue to be evaluated for any and all environmental and social impacts.



The WMPO is committed to developing transportation projects which avoid or minimize impacts on the natural and built environment. Preserving the natural and built environment is essential for maintaining the quality of life for which our region is known for. Projects should be considered on an individual basis and assessed for all potential impacts. The assessment contained within this section offers a high level, first look analysis of the potential impacts a project may have. The WMPO strongly encourages the use of this analysis during the early stages of project development.

If impacts are unavoidable, and cannot be minimized, mitigation measures should be implemented. It is critical to determine which mitigation measures may be necessary early in the planning and design phases to avoid potential project stoppage or delays once a project is under construction.

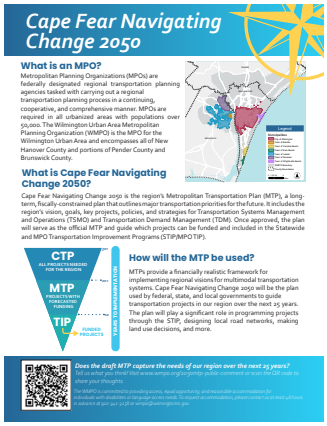
Public Outreach Phase II Summary

Public input is a critical component of transportation planning and was central to the development of *Cape Fear Navigating Change 2050*. Two phases of public input were launched as part of the planning process, with Phase I occurring as part of the existing conditions analysis. Phase II occurred following the release of the draft plan and sought to ensure the document reflected regional needs and priorities and was in alignment with what was heard during Phase I.

The WMPO released a draft of *Cape Fear Navigating Change 2050* on May 28, 2025, and opened a public comment period running through June 27, 2025, giving the community a chance to review the draft and provide feedback on the final plan.

During the 30-day public comment period, WMPO staff solicited feedback on the draft through multiple channels. The WMPO received a total of 57 comments from citizens and external agencies or organizations. All comments were compiled and reviewed by WMPO staff to develop recommendations regarding necessary revisions and updates to the draft plan.

The majority of comments submitted resulted in clerical changes, including contextual clarifications, mapping updates, and correcting typographical errors. A few comments resulted in proposed additional content, including adding more details on existing conditions and the plan development process. No public comments resulted in changes to the modal project lists.



Clockwise from top left: MTP advertisement; MTP one-pager; WMPO staff connecting with residents during MTP outreach at the Leland Hurricane Expo; WMPO staff on site for MTP outreach at the Carolina Beach Farmers Market.

See Appendix C for more information on public outreach throughout the planning process.

Sources

- The Wilmington Regional Travel Demand Model
- 2020 Decennial Census data
- 2021 Certificate of Occupancy data
- North Carolina Department of Environmental Quality: https://data-ncdenr.opendata.arcgis.com/datasets/fb32d3871a5640a986b72087c4121125_0/explore
- North Carolina Emergency Management: https://www.nconemap.gov/datasets/3a2a84ccaa824fb6a87087553bf25f92_2/explore
- United States Fish and Wildlife Service: https://www.fws.gov/program/national-wetlands-inventory/download-state-wetlands-data
- North Carolina Department of Environmental Quality: https://data-ncdenr.opendata.arcgis.com/datasets/c861cd03ebe245f38c88304a1ebe4ed1_0/explore
- North Carolina Center for Geographic Information and Analysis: https://www.nconemap.gov/datasets/nconemap::major-hydrography-streams-rivers/explore
- North Carolina Department of Environmental Quality: https://data-ncdenr.opendata.arcgis.com/datasets/cd70229f8b1f407caa28c2586857c5f4_0/explore
- North Carolina Natural Heritage Program: https://ncnhde.natureserve.org/content/data-download
- North Carolina Department of Administration: https://www.nconemap.gov/datasets/fcb3d26b5a644d78805678203153f15d_0/explore
- Esri, United States Bureau of Land Management, United States Department of Defense, National Parks Service, United States Fish and Wildlife Service, US Forest Service: https://services.arcgis.com/P3ePLMYs2RVChkJx/arcgis/rest/services/USA_Federal_Lands/FeatureServer
- Mitigation Measures
  The mitigation measures are derived from the Compensatory Mitigation Measures set by the EPA in the 1990 Memorandum of Agreement between the EPA and Army, as well as the Clean Water Act, specifically section 404.