Existing Conditions

Existing plans were reviewed to determine locations where bicycle and pedestrian facilities had already been proposed. Demographic data was then analyzed for the study area to determine the demographic makeup and population characteristics. This data helped determine the areas of highest need for bicycle and pedestrian facilities.

Findings from Existing Plans

NC-210 East Coast Greenway Corridor Feasibility Study (Draft 2023)

The East Coast Greenway is a 3,000-mile route from Maine to Florida with the purpose of connecting cities and towns along the east coast with a safe walking and biking facility. The greenway crosses the study area in two locations. The main line is along US Hwy 421 and the coastal route enters from Jacksonville and passes through Wilmington. The NC-210 East Coast Greenway Corridor Feasibility Study concerns the coastal route along NC-210 and determines the feasibility of creating a dedicated facility separated from the roadway, and alternative routes. Community input is being gathered with a draft study slated for public review early 2023.

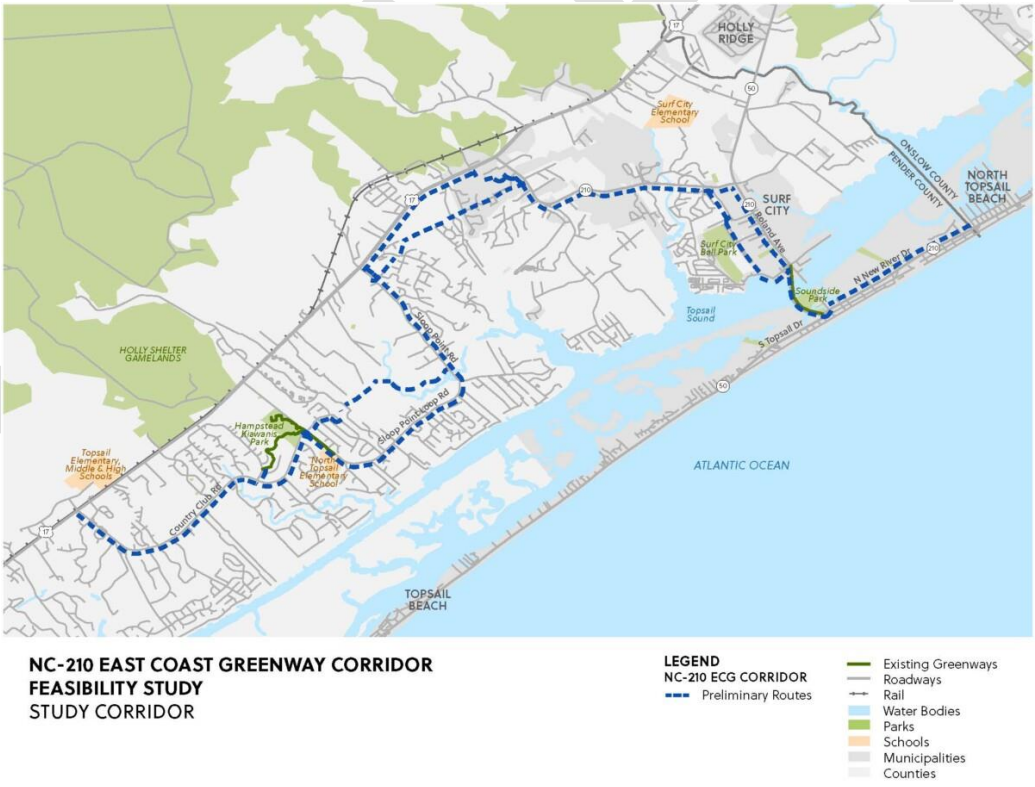

Figure 1: Preliminary Route for the NC-210 East Coast Greenway Corridor

Pender County Comprehensive Parks and Recreation Master Plan (2022)

There are very few bicycle or pedestrian facilities identified as existing within the project study area, but the masterplan does identify several planned parks just outside of the area that could serve as points of

connection. The proposed Canetruck Community Park is just west of the Black River and looks to encompass the inland spur of the Mountains to Sea trail. It is also a Federal Emergency Management Agency buyout property. At the northwestern extent, the proposed Long Creek Community Park straddles NC 210 at the Montague community and is on county-owned property.

Pender County Streets Plan (2021)

The Pender County Streets Plan is an update to the 2016 Pender County Collector Street Plan for the determination of future transportation needs as it relates to connectivity. The plan identified opportunities for new collector street alignments and corresponding bicycle and pedestrian facilities. To incorporate non-motorized facilities, each recommended street section provided the option to add either a multi-use path or a bike lane and sidewalk combination.

There was significant support for the addition of these facilities for any new streets. Public input from the plan indicated that 58% of respondents would walk or bike more often if better, safer facilities were provided. Another 20% were receptive to utilizing facilities if they were present. Furthermore, almost 35% of responses indicated a desire for the installation of bike lanes, multi-use paths and sidewalks whenever new streets are added to the network.

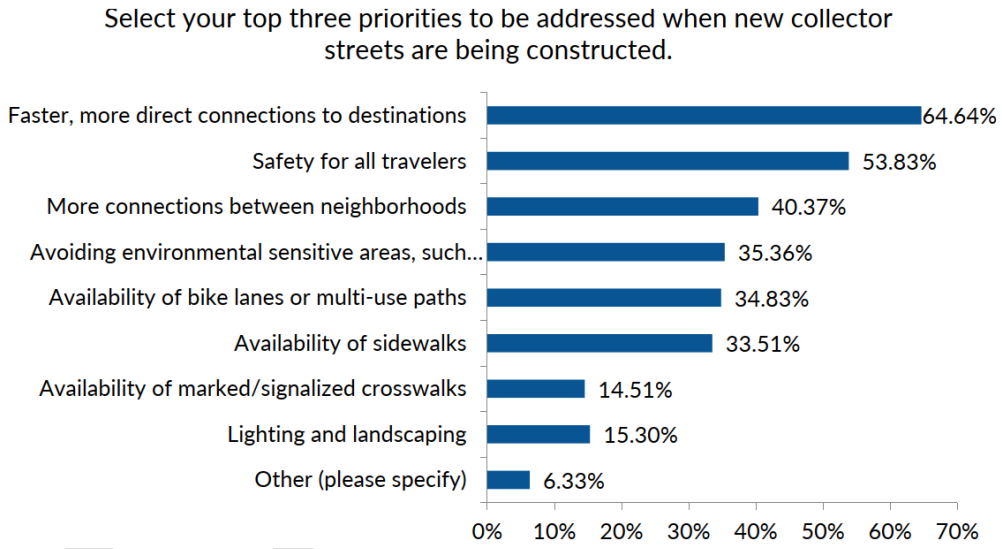

Figure 2: Transportation Priorities Identified in the First Public Survey for the Pender County Streets Plan

Cape Fear Moving Forward 2045 (2020)

The Cape Fear Moving Forward 2045 plan provided an assessment of all modes of transportation and provided an overview of potential projects. The study area is included in this assessment but very few projects have been identified for the more rural portion of the Wilmington Area Metropolitan Planning Organization urban planning area. The study does recognize that significant population growth is anticipated though the year 2045 for the northern most areas of the planning jurisdiction, which include the study area.

Pender 2.0: Comprehensive Land Use Plan (2018)

The Pender 2.0: Comprehensive Land Use Plan was developed in 2018 with the goal of guiding the direction of future growth and other needs within unincorporated areas in the County. The plan addresses the role of transportation alternatives in the county and identifies the increasing desirability of non-motorized alternatives. Transportation alternatives, like biking and walking, are increasingly utilized to access community resources as well as for recreational uses according to current trends. Unincorporated Pender County lacks pedestrian and bicycle facilities outside of those provided within planned subdivisions to support the growth in these trends. The plan identified several projects, which, at the time, were not under construction and the specific alignments had not been determined.

- Mountains-to Sea Trail
- Coastal Pender Greenway
- Coastal Pender Rail Trail
- Central Pender Rail Trail
- East Coast Greenway

Cape Fear Regional Bicycle Plan (2017)

The Cape Fear Regional Bicycle Plan identifies several existing bike and pedestrian trails through preservation areas in Pender County. The East Coast Greenway is currently being planned through the eastern side of the study area and the plan identifies planned and existing paths to the north and south that terminate at the borders of the study area.

Pender County Comprehensive Transportation Plan (2016)

NCDOT Transportation Planning Branch completed a study of Pender County's transportation needs through 2040. The transportation plan assessed highway, public transportation, rail, bike, and pedestrian facilities within Pender County. The project study area was not included in the Pender County Transportation Plan because it exists in the northern portion of the Wilmington Metropolitan Planning area. Nevertheless, several recommendations for pedestrian and bike facilities were provided within the plan that may be relevant to this study.

- A multi-use path recommended for Shaw Hwy (SR 1522) terminating at its intersection with NC 210
- A multi-use path recommended along US Hwy 117 terminating at its intersection with NC 210
- A multi-use path recommended along NC 210 between Malpass Corner Road (SR 1120) which terminates at Montague Road

- A multi-use path recommended near the intersection of Blueberry Road and Malpass Corner Road that terminates near the vicinity of the Pender County Solid Waste facility on Montague Road
- An on-road bike facility recommended along Blueberry Road (SR 1114) terminating at Montague Road

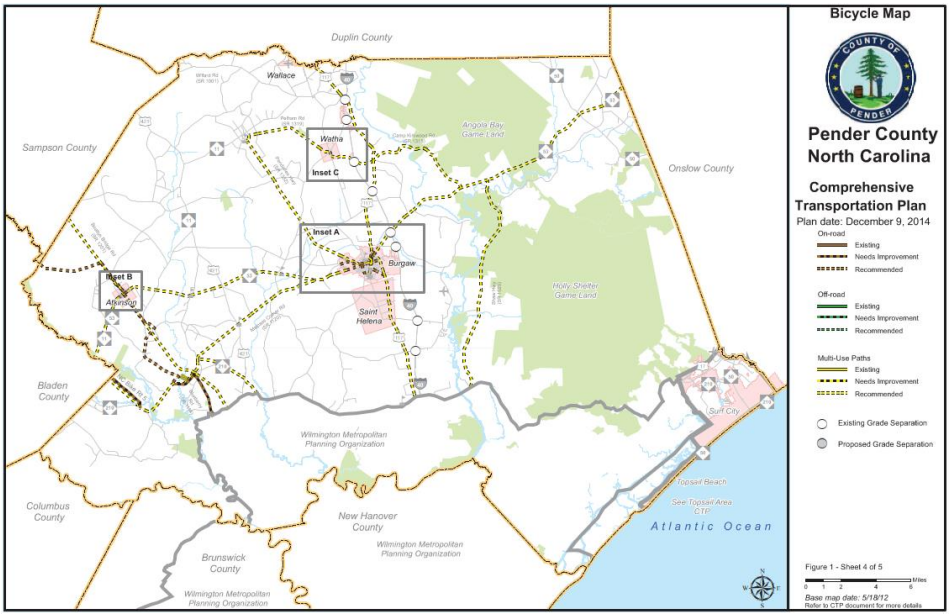

Figure 3: Pender County Transportation Plan Bicycle Map

Wilmington Comprehensive Greenway Plan (2013)

A portion of the greenway plan was proposed, but not included on the prioritized project list. It consists of a bike lane which connects to the East Coast Greenway at Holly Shelter Road and terminates in Castle Hayne to the west. It does not appear that this alignment for the Greenway is still proposed at present.

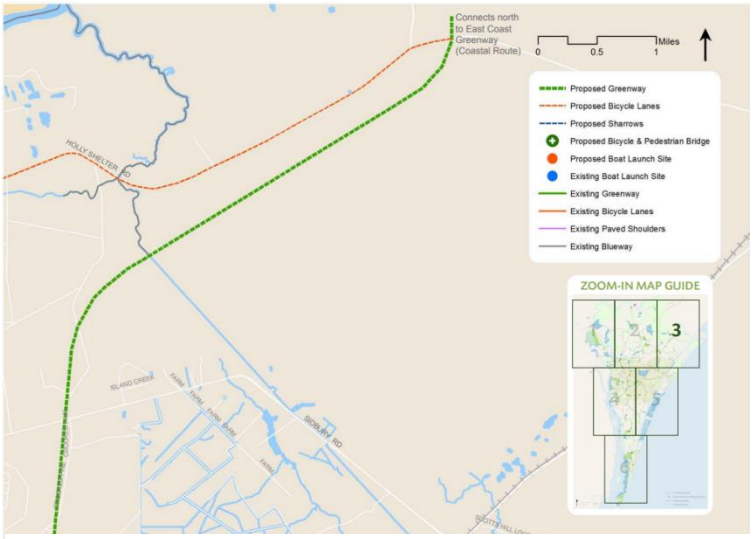

Figure 4: Proposed Greenway from the Wilmington Comprehensive Greenway Plan

Review of Development Codes

The Pender County Unified Development Ordinance (UDO) was last updated in September of 2022 where there are supportive bike and pedestrian codes throughout. Below is a summary:

- Bicycle and Pedestrian Improvement Overlay District (BPIOD)
  - Areas will be determined on a case-by-case basis depending on existing studies and plans, development patterns, and other factors
  - Individual single-family lots and some subdivisions are exempt
  - Fee-in-lieu option for applicants who are unable to provide facilities and can demonstrate hardship
- Site designs cannot degrade existing bike and pedestrian
- Planned Development districts must address bicycle, transit, and pedestrian circulation

Demographics and Socioeconomics

A demographic and socioeconomic analysis was carried out for the study area based on the data obtained from American Community Survey (ACS) 2020 5-year estimates. The study area does not overlap completely with the Census Tracts and Census Block Group (CBG) boundaries in the ACS data; therefore, this section may contain data from parts of the census tracts and CBGs partially outside the study area. Figure 5 shows the Census Tracts and CBGs considered for this analysis.

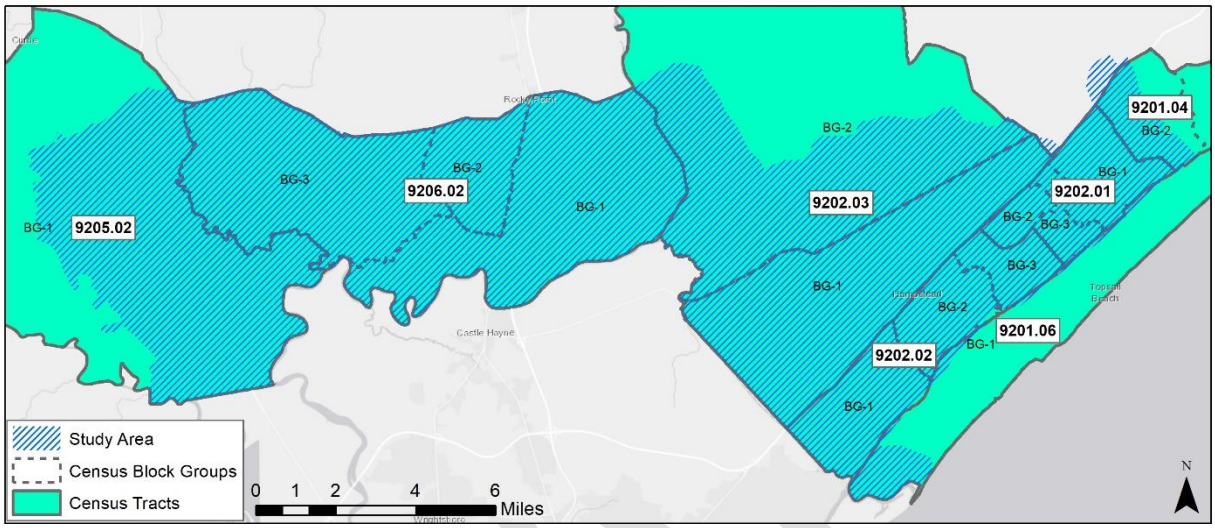

Figure 5: Census Block Groups in the Study Area

In 2020, the population of the study area was 36,027, which is not distributed equally across the study area. The areas west of US-17 are sparsely populated with an overall density of fewer than 1 person per 10 acres. East of US-17, the population density is between 1.1 to 2.2 persons per acre which leads to 57% of the area's population living in 17% of the total study area. This is because most development in the study area is concentrated between US-17 and the Atlantic Ocean. Figure 6 shows the population in each CBG (shown as number) and the density (shown in color).

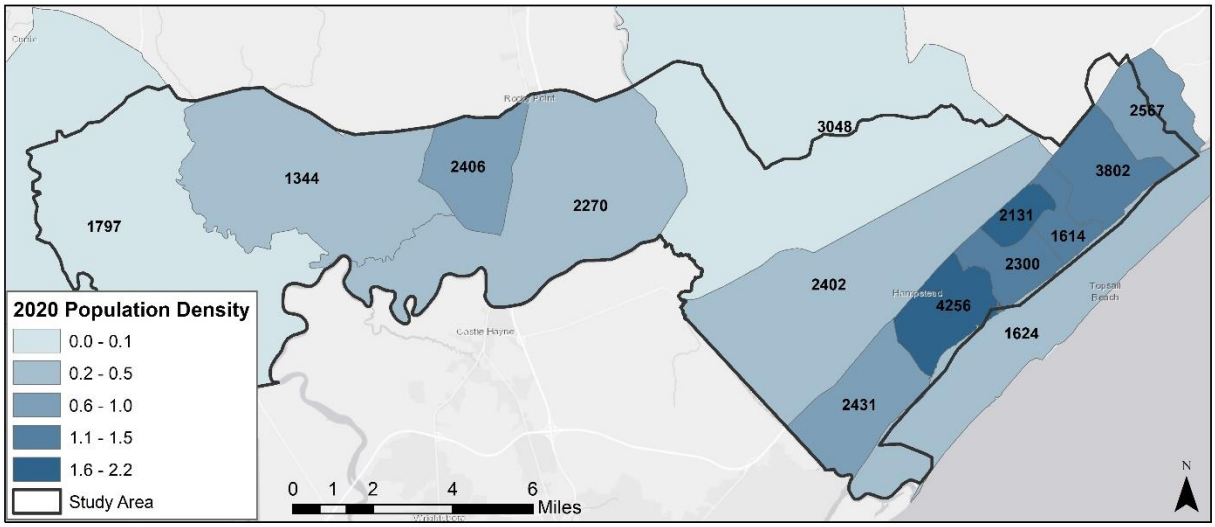

Figure 6: 2020 Population Density

The Wilmington MPO Travel Demand Model (TDM) contains the population forecast for 2045. This is considered to be the official forecast on which transportation projects are based. According to this forecast, the population of the study area is projected to increase to 48,574 in 2045, which is an increase of approximately 33% from 2020. The geographic distribution of this growth is shown in Figure 7 where the colors show the population density, and the numbers show the population in the Traffic Analysis Zones (TAZs). TAZs are geographic divisions smaller than CBGs specially created for analyzing travel behavior in TDMs. The population density distribution in 2045 is projected to be similar to that in 2020, with a key exception of the area between US-17 and US-17 bypass in the southeast of the study area.

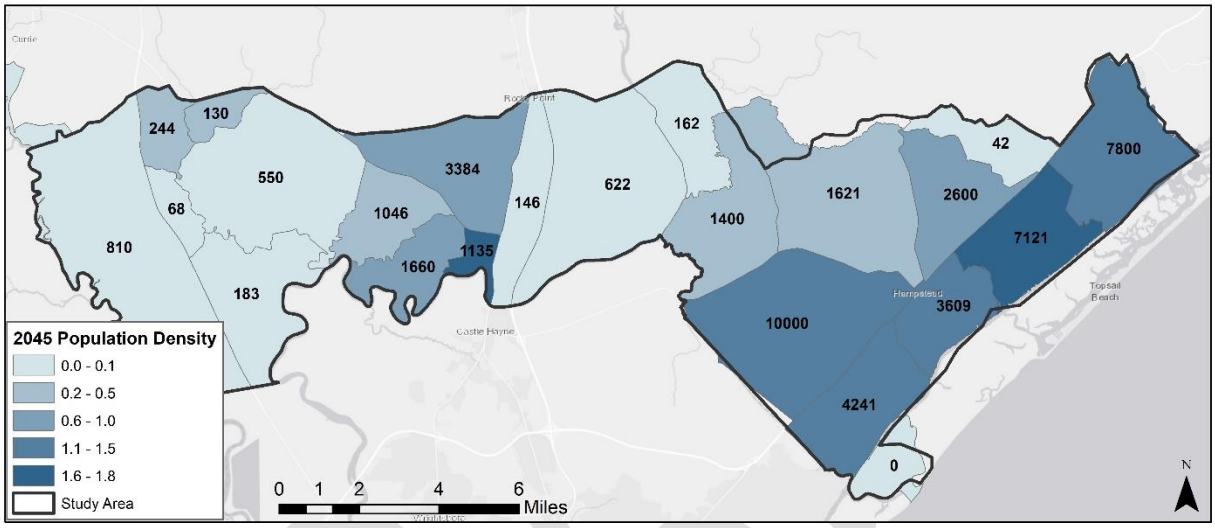

Figure 7: 2045 Population Density

The Pender County Comprehensive Plan (PCCP) was developed prior to the Wilmington MPO TDM being adopted. The Future Land Use in the PCCP allows for a significantly higher level of density than what was later assumed in the TDM. This issue was realized during the preparation of the Pender County Collector Street Plan (PCCSP) and population projections were calculated based on the density assumed in the PCCP. According to those calculations, even at 50% buildout of the adopted land use, the future population of the study area was projected to be higher than 200,000 which is four times that of the official projections (Figure 8).

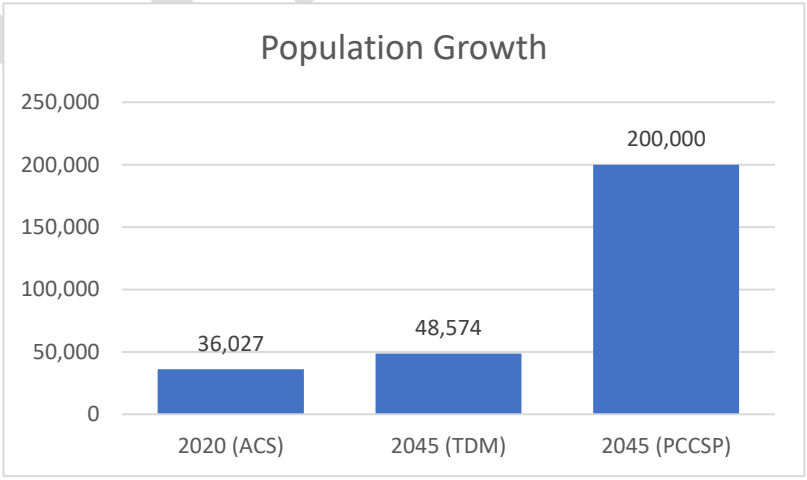

Figure 8: Population Growth

Age and Sex

Of the total population in 2020, 17,001 (49.3%) were male and 17,456 (50.7%) were female. The median age of the study area is 42.2 years which was higher than North Carolina's median age of 38.9 years. The median age varies significantly within the study area as shown in Figure 9. The areas to the northeast have the highest concentration of younger population.

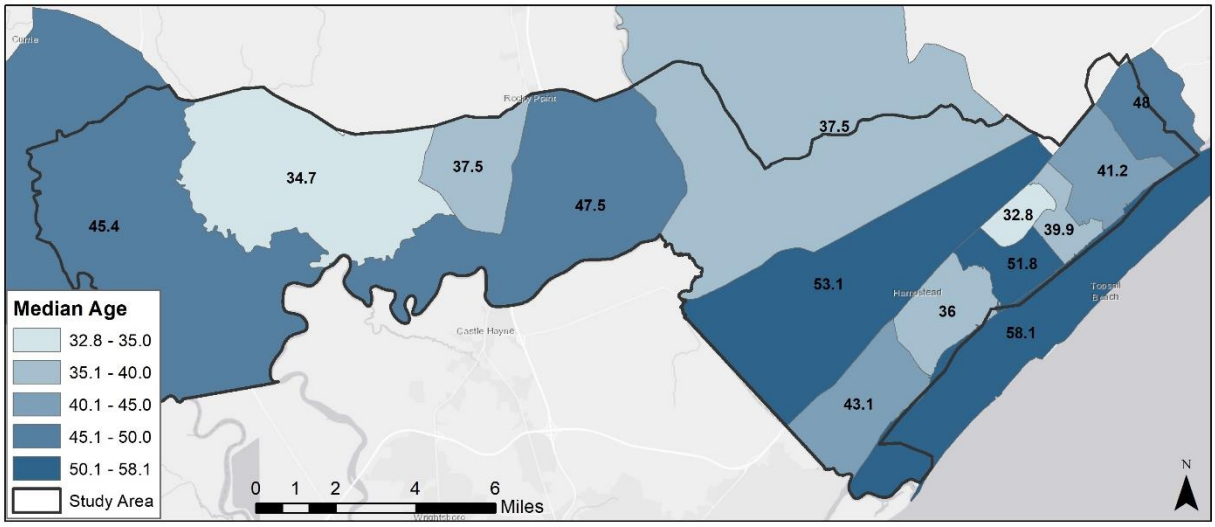

Figure 9: Median Age

Of the total population, 17.7% were under the age of 15, 64.5% were between the ages of 15 and 64, and 17.8% were of 65 years of age or above. Figure 10 shows the population pyramid of the study area.

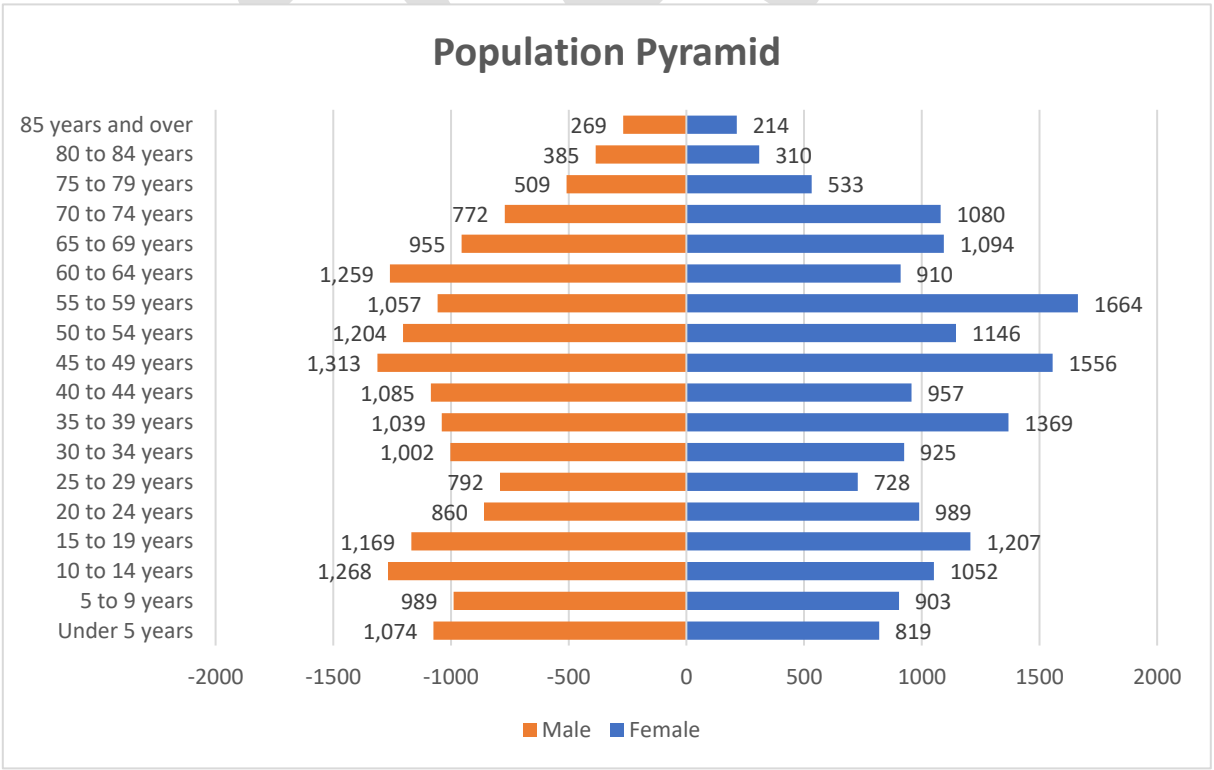

Figure 10: Population Pyramid

Race

The racial breakdown of the population in the study area in 2020 was as follows: 90% White, 3.4% African American, 2.7% Two or more races, 2.6% some other race, 0.9% Asian, 0.2% Native American, and 0.2% Pacific Islander or Native Hawaiian. 4.6% of the total population identified as of Hispanic or Latino origin. The racial makeup of the area is very different from the overall makeup of North Carolina where 67.6% of the population is White, and 22.3% is African American, and more than 10% of the population identifies as Hispanic or Latino. Figure 11 shows the comparison of the racial makeup between the Study Area and North Carolina.

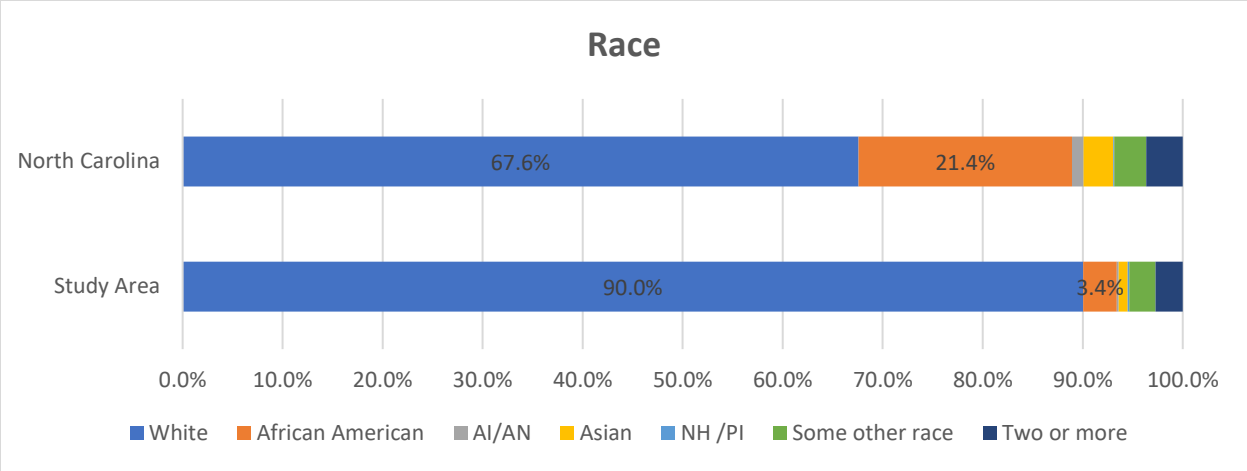

Figure 11: Racial makeup of the study area compared to North Carolina

Income and Poverty

The Median Household Income (MHHI) of the Study Area in 2020 was approximately $69,500, which was significantly higher than that of the state ($56,642) which suggests that overall, the study area is wealthier than the state as a whole. However, as shown in Figure 12, there are significant regional variations in income distribution. The MHHI of areas to the west of the Northeast Cape Fear River trends lower than the statewide MHHI while the converse is true for the areas to the east. The areas to the east of US-17 have a higher MHHI than the rest of the study area.

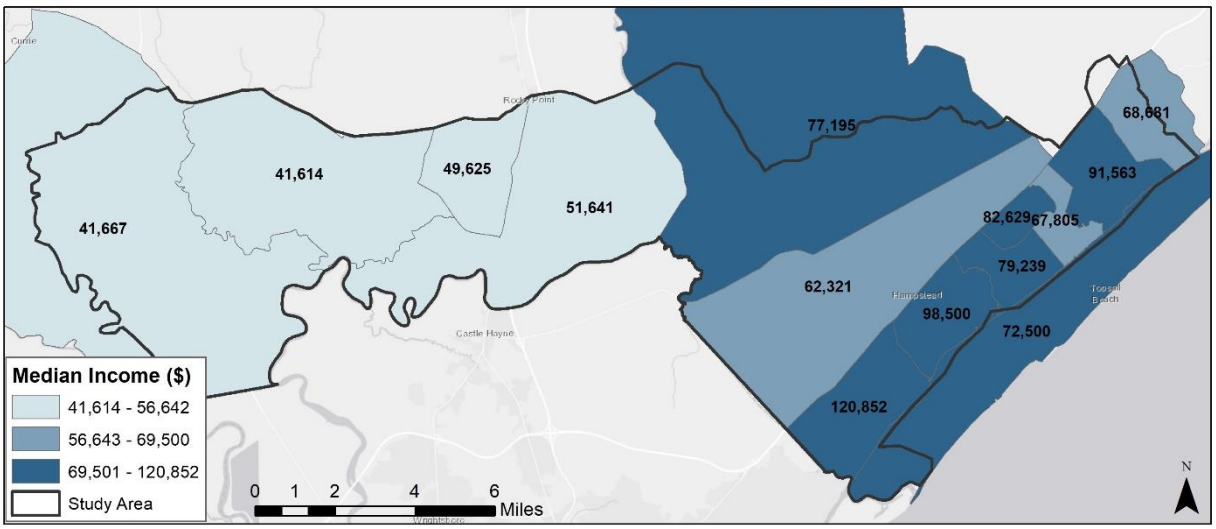

Figure 12: Median Income

Figure 13 shows the comparison of household income distribution between the study area and the state of North Carolina. The study area has fewer proportions of households with a MHHI less than $50,000 than the state, and has higher proportions of households with a MHHI above $50,000 than the state. This is in line with the fact that the MHHI of the study area is higher than that of the state.

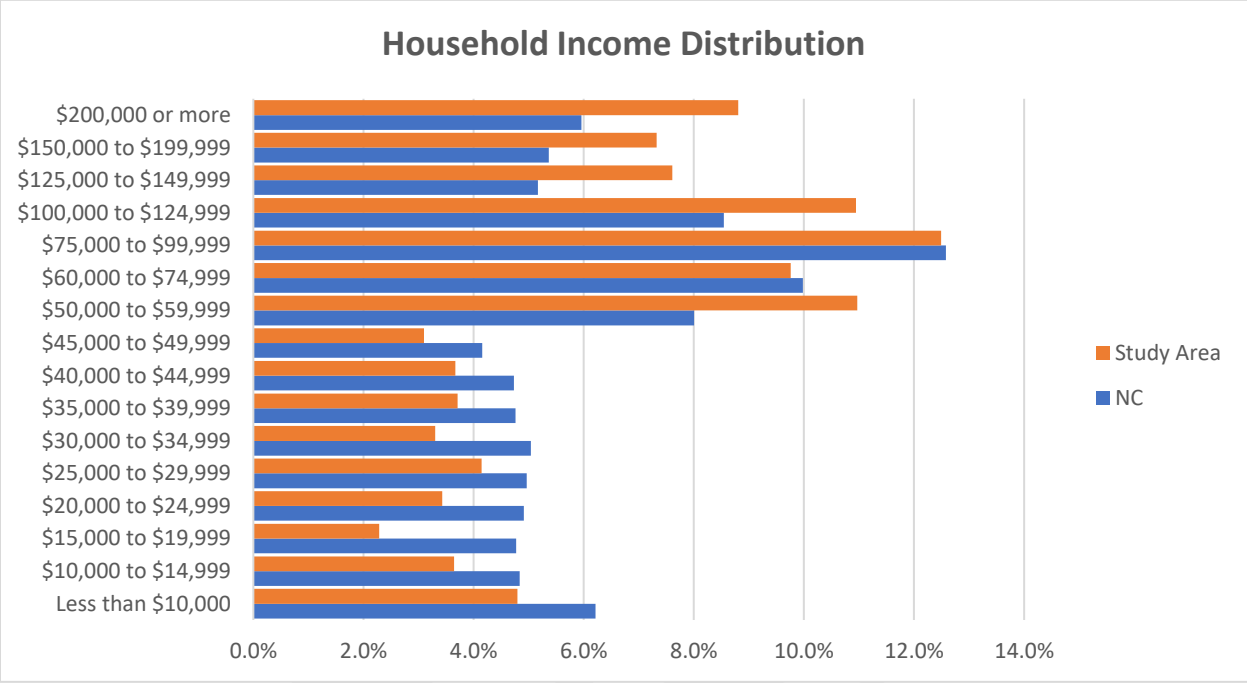

Figure 13: Household Income Distribution of the study area compared to North Carolina

The poverty figures of the study area show a similar outlook. 8.9% of the households in the study area are below the poverty line compared to 14.1% of the households in North Carolina. Figure 14 shows the regional variation between the concentration of households below poverty line. The labels show the total number of households below poverty line in each CBG in 2020.

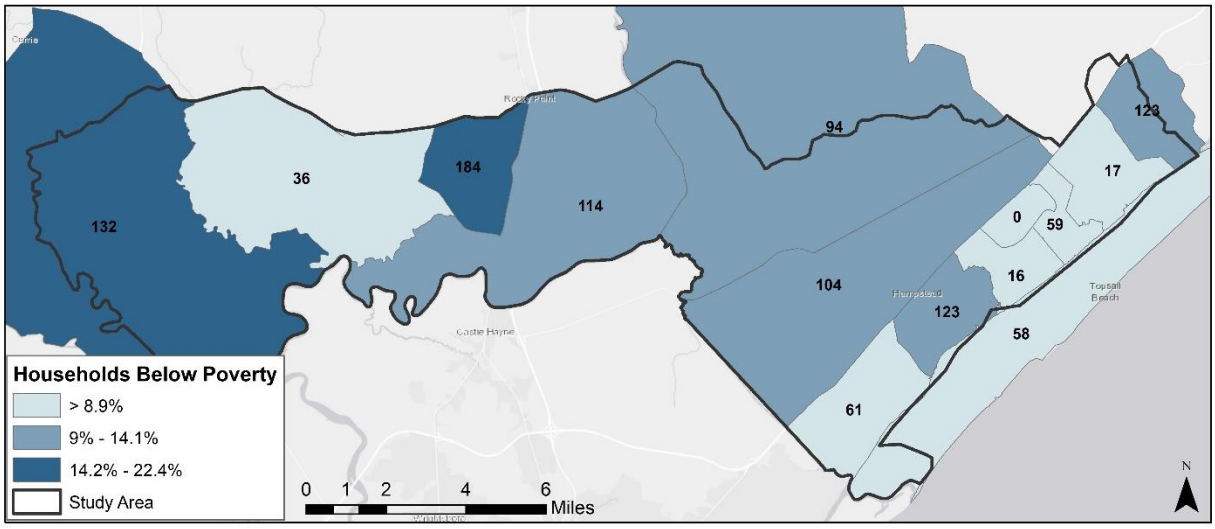

Figure 14: Households below Poverty

Environmental Justice Index

NCDOT's Environmental Justice (EJ) Index Score is comprised of 3 factors: people with low incomes, racial minorities, and ethnic minorities (Hispanic or Latino origin). Scores range from 0 to 12, with higher scores indicating higher concentrations of EJ populations. EJ Index scores are relatively low to moderate throughout the study area. Figure 15 shows the EJ Index for the study area and surrounding communities.

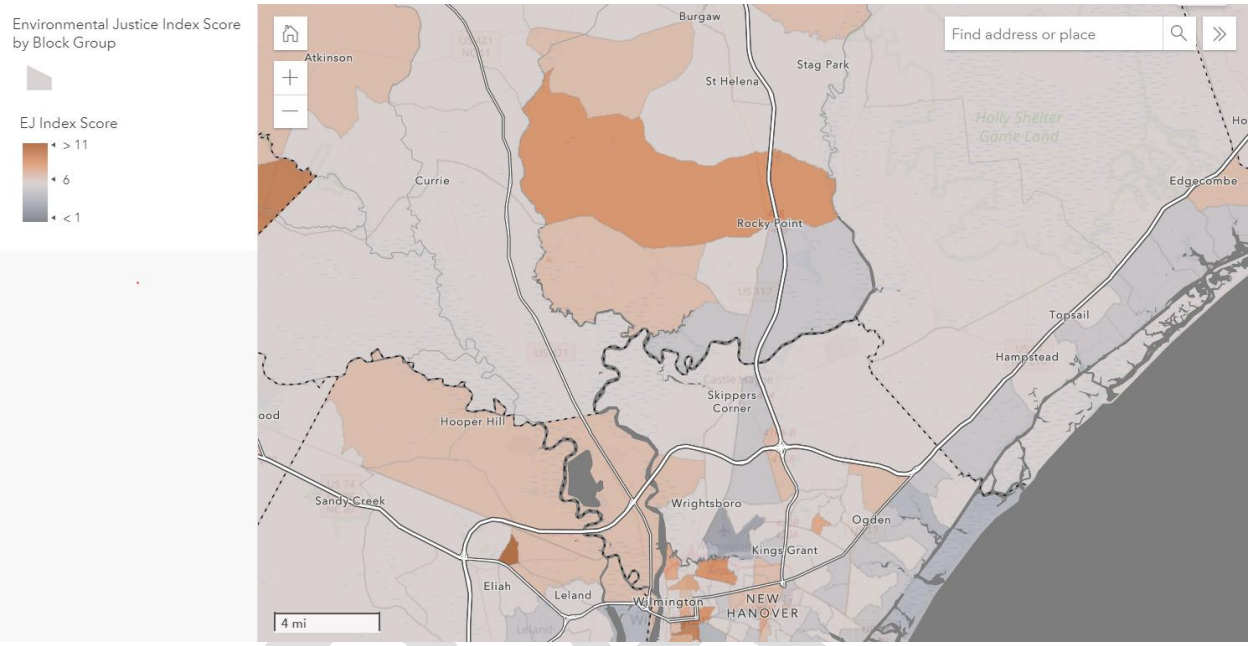

Figure 15: NCDOT's NC Equity and Transportation Disadvantage Screening Tool https://storymaps.arcgis.com/stories/7e3bbd00fe014a77b5f1620334209712

Transportation Disadvantage Index

NCDOT's Transportation Disadvantage Index (TDI) Score is comprised of six factors: car-less households, people with low incomes, youth aged 15 and under, seniors aged 65 and over, adults with mobility impairments, and Black, Indigenous, and Persons of Color (BIPOC) populations. Scores range from 6 to 18, with higher scores indicating higher concentrations of transportation disadvantaged populations. TDI scores are relatively low throughout the study area. Figure 16 shows the TDI for the study area and surrounding communities.

Figure 16: NCDOT's NC Equity and Transportation Disadvantage Screening Tool https://storymaps.arcgis.com/stories/7e3bbd00fe014a77b5f1620334209712

Education

ACS provides estimates for educational attainment for residents 25 years and over. Based on these estimates, the residents in the study area have an overall higher educational attainment than the rest of the state of North Carolina. Figure 17 shows the relative percentages of educational attainment of the residents above 25 years in the study area and the state of North Carolina. The biggest difference between the two is the number of residents with no or some school, which is 7.3% for the study area and 11.5% for North Carolina. Similarly, those with a bachelor's degree or above form 36.1% in the study area compared to 30.2% in North Carolina.

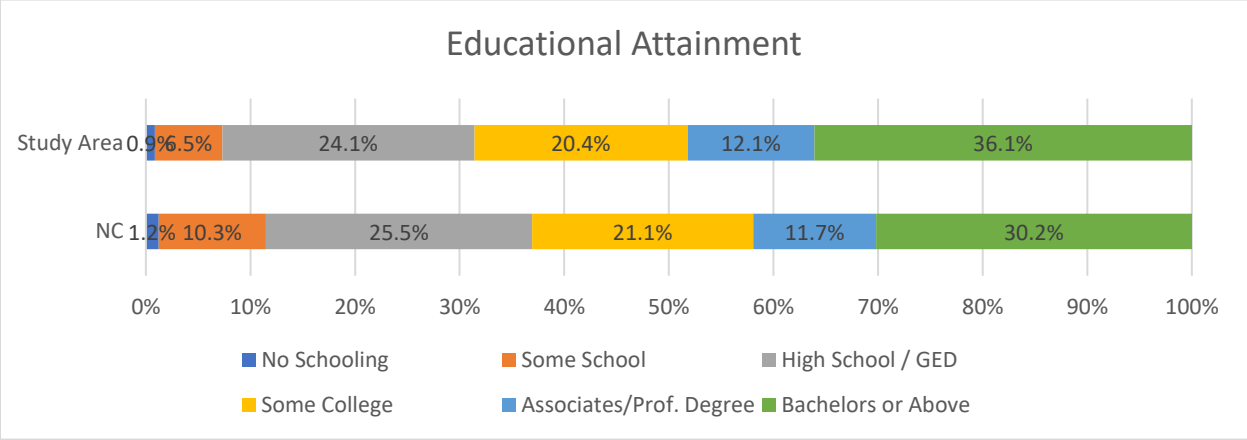

Figure 17: Educational Attainment for the study area and North Carolina

Employment

In 2020, 58.7% of the population of the study area 16 years and above was employed or in the armed forces, 4% was unemployed, and 37.3% was not in the labor force. These figures of the study area are at par with those of the state. The education, healthcare and social assistance industry employed the highest number of people while agriculture and ancillary industries employed lowest (Figure 18).

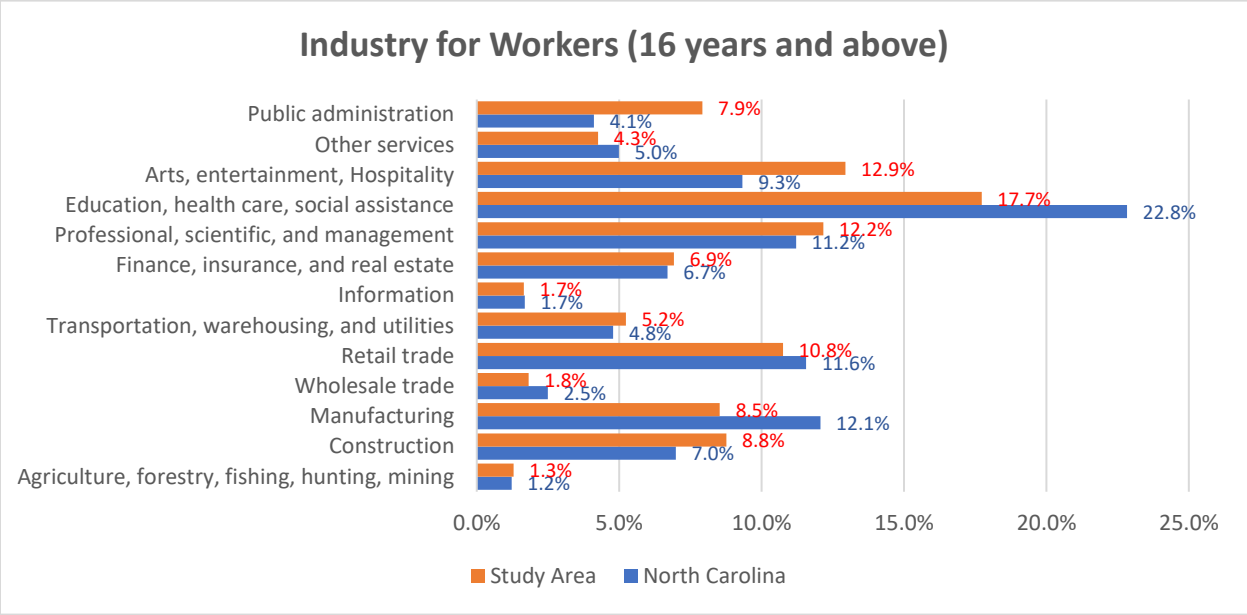

Figure 18: Industry for Workers for the study area and North Carolina

The employment data in the study area is derived from the Wilmington MPO TDM and is presented for the model's current and future years – 2015 and 2045 respectively – by TAZs in Figure 19 and Figure 20. According to this data, the total employment in the study area will reduce by approximately 10% from 6,455 in 2015 to 5,926 in 2045, which means that the employment growth will not be in line with the population growth, and more people will have longer commutes to workplaces outside the study area, primarily to the south. In addition to this reduction in overall number of jobs, they will also concentrate around US-17.

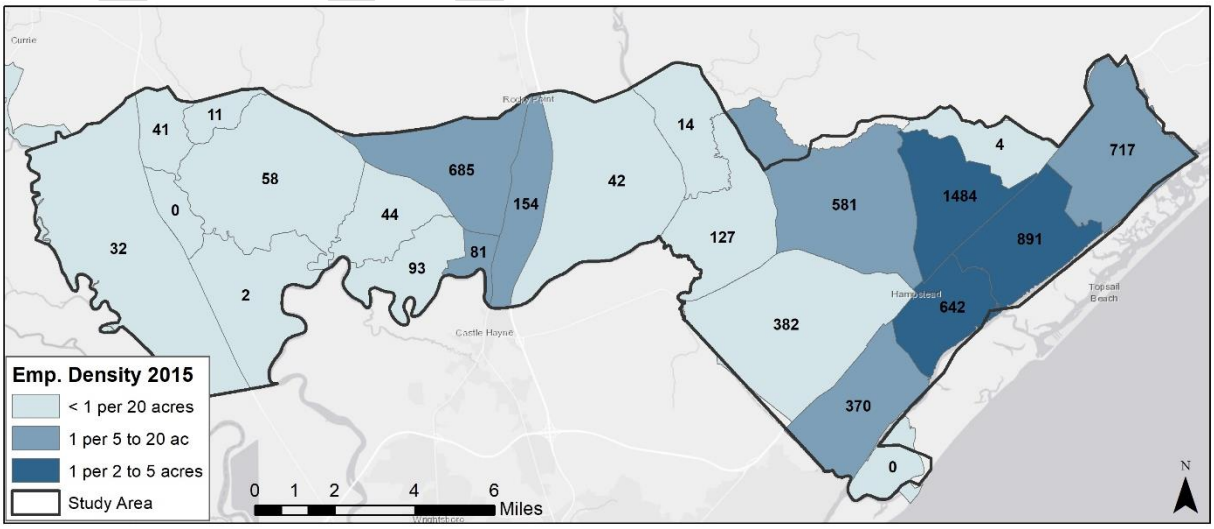

Figure 19: 2015 Employment Density

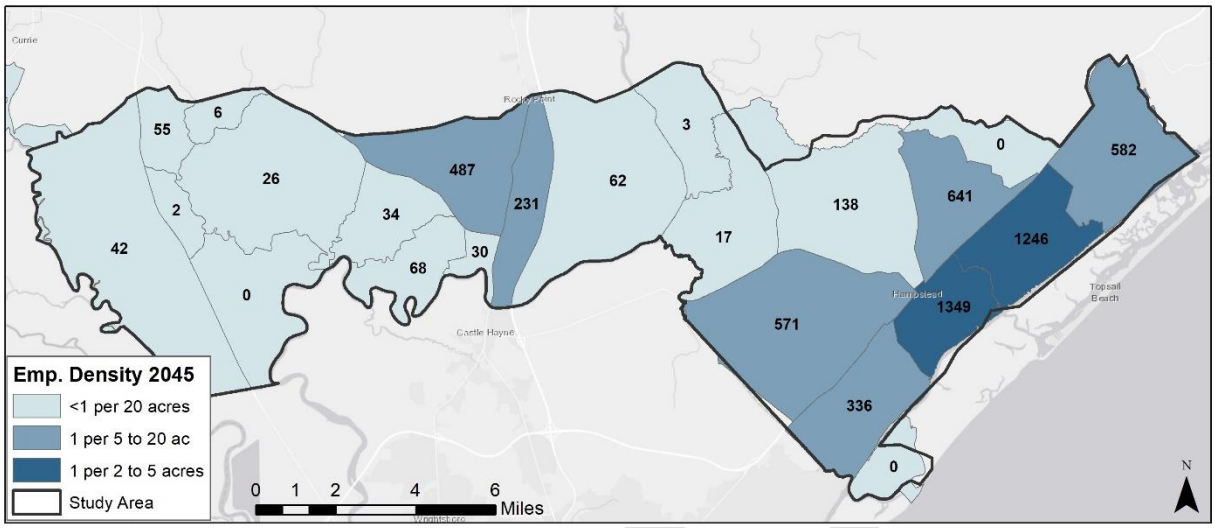

Figure 20: 2045 Employment Density

Travel Characteristics

Vehicle sufficiency

A household where there are fewer cars than workers, or that has no cars is considered a vehicle-insufficient household. This metric is reported on a Census Tract level which means that the data is not available at the level of CBGs. The Census Tract boundaries, in most cases, extend much beyond the Study Area. However, for this case, it was assumed that the vehicle-insufficient households were evenly distributed in each Census Tract.

In 2020, there were 646 vehicle-insufficient households in the study area. Compared to the statewide proportion of 8.9%, the study area had less proportion of vehicle-insufficient households (5%). The Figure 21 shows the distribution of vehicle-insufficient households in the study area. The center of the study area between US-17 and US-421 has higher than average concertation of vehicle-insufficient households in the study area, of which the area east of Northeast Cape Fear River is almost as much as the state average.

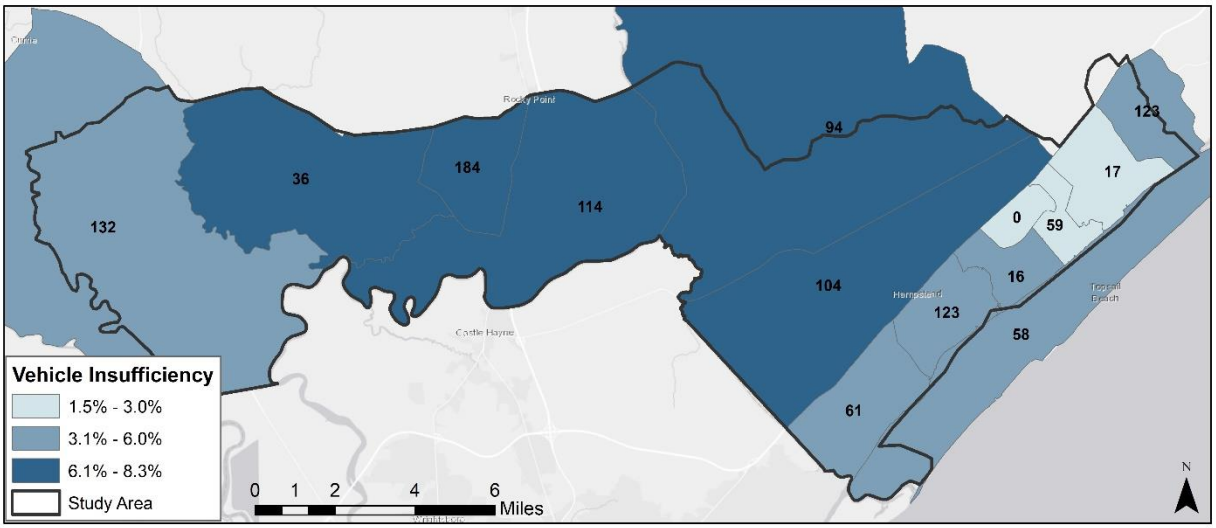

Figure 21: Vehicle Insufficient Households

Means of Transportation to Work

The study area is heavily dependent on personal vehicles as a means of transportation to work with almost 89% people driving or carpooling to work as seen in Figure 22. A significant portion or people works from home. Of the remaining 1%, 92 people walked, 9 people used a bicycle, and 23 people used other means to get to work. A combination of sufficient alternative infrastructure and distance from work may make it difficult for people to not use a car to go to work.

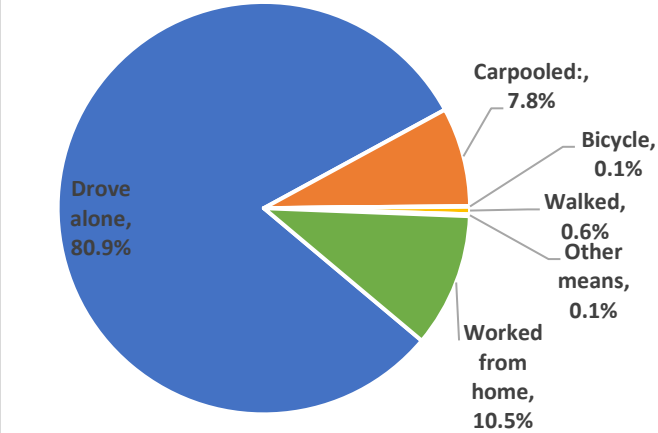

Figure 22: Means of Transportation to Work

Travel time to work

The median travel time to work for the area is approximately 31 minutes, which is at par with state and national indices. Figure 23 shows the distribution of travel time to work for non-work-from-home workers. There is a significant portion of workers (6%) that travel less than 10 minutes to work, which is about 960 workers that work close enough to their residence that if provided a viable alternative, could potentially switch to non-motorized modes.

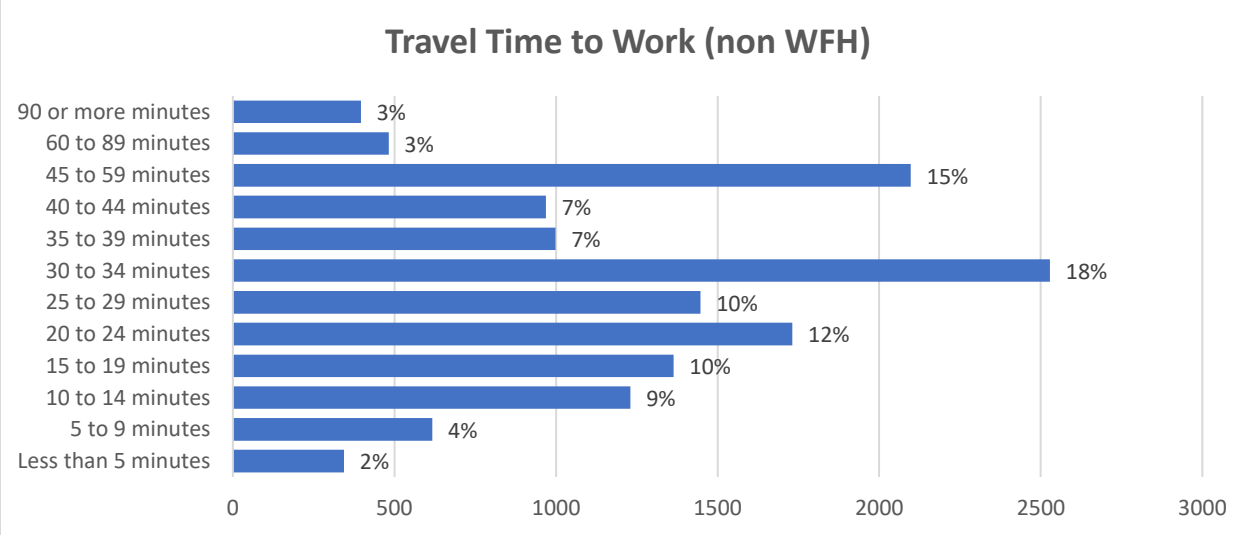

Figure 23: Travel Time to Work

Wilmington MPO TDM data suggests that, on an average, only 22% of the daily household trips are Home-based Work (HBW) trips. That means a majority of trips are not work trips and may or may not have a similar modal and travel time distribution as HBW trips. These trip types include home-based social trips (HBS), home-based other (HBO) trips and non-home-based (NHB) trips. It may be challenging to convert any HBS and NHB trips to non-motorized trips because of carpooling and trip-chaining that occurs more often during those trips, but HBO trips may have a higher probability of a mode-change to non-motorized modes.

Community Resources

A key part of this analysis is to identify popular destinations in the study area. Figure 24 shows the distribution of key destinations – businesses, schools, churches and government buildings. This data was obtained from the address points dataset provided by Pender County. Businesses and government buildings were further filtered based on the type of location that the customers would typically be able to walk to if proper infrastructure existed (e.g., Stores, pharmacies, restaurants, medical facilities, etc.). Most destination locations in the study area are situated along US 17 and NC 210.

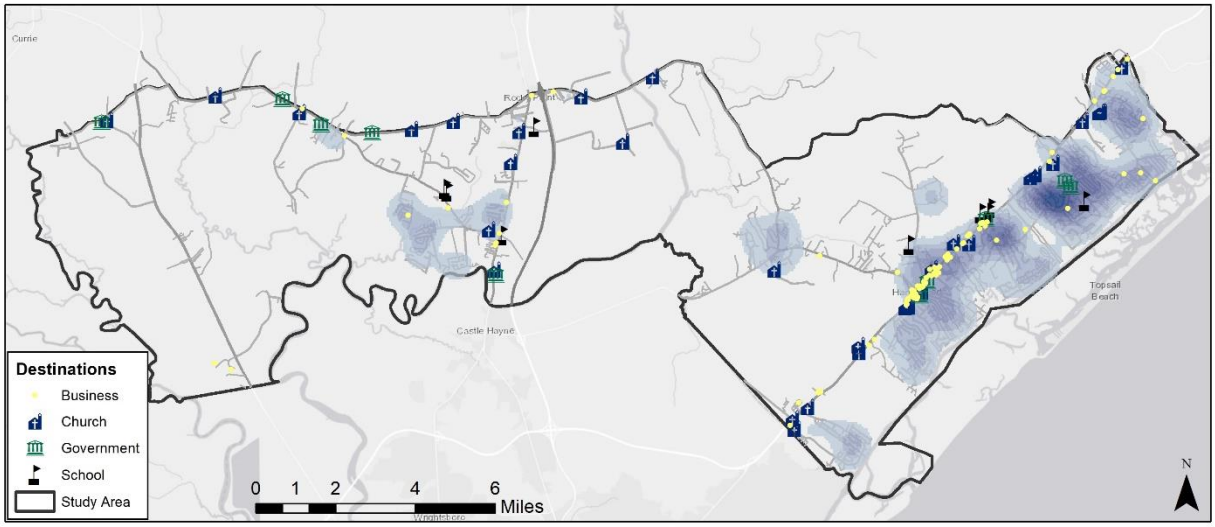

Figure 24: Community Resources

The shaded regions on the map correspond to density of dwelling units weighted on their propensity to use non-motorized transport. A single-family dwelling (SFD) units within half mile radius to a destination point was considered to have twice the propensity of farther SFDs. Multi-family dwelling (MFD) units were considered to have four times the base propensity (SFDs farther than ½ mile) regardless of their distance to a destination. This analysis combines the locations of potential origin-destination pairs of short Home-Based Other trips which have a high propensity to shift from motorized to non-motorized travel modes.

According to this analysis, portions of central and northern US-17 corridor and parts of US-117 display a high proportion of origin-destination pairs of a shorter, more walkable length. These areas should ideally get priority in phasing for the bicycle and pedestrian infrastructure projects that will be recommended as a part of this study.

Land Use

The future land use plan mirrors the future population and employment densities presented in the previous sections. The study area is primarily residential, with pockets of commercial and mixed-use land uses concentrated around US-17 and US-117. The development patterns suggest a higher propensity of north-south movements that could potentially consist of non-motorized trips, and a lower propensity of similar east-west movements.

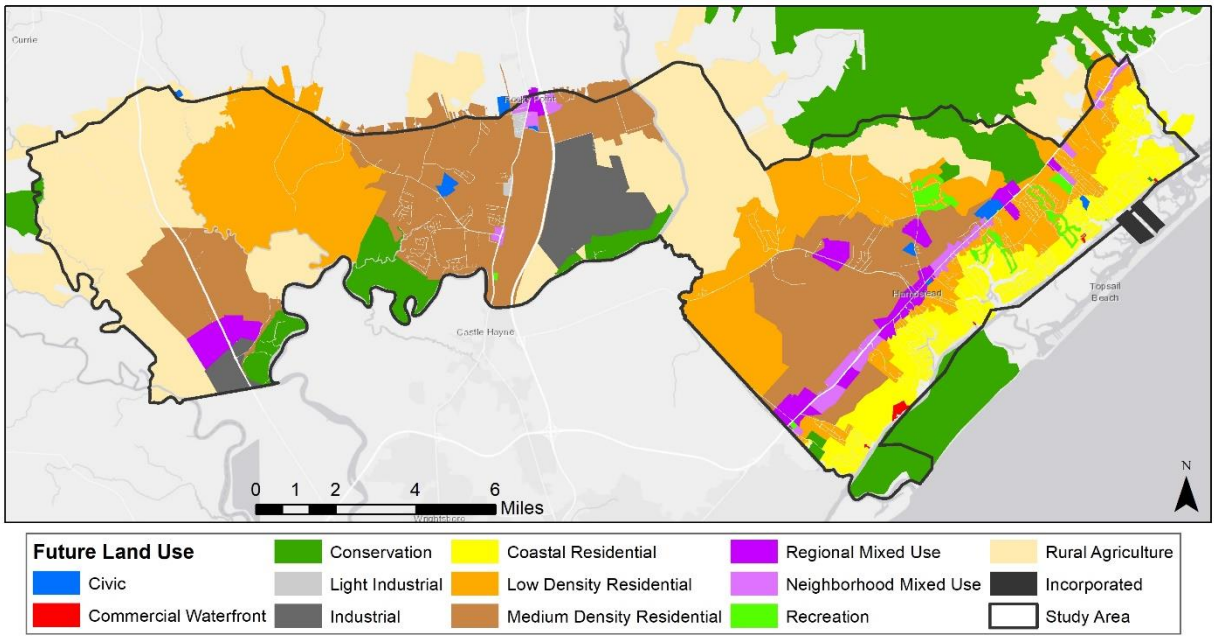

Figure 25: Future Land Use

Recent Developments

Several developments were under planning or construction phase at the time of writing this report. The Figure 26 shows the location of the recent developments in the study area. Most developments are concentrated along US-17. Overall, 27 commercial developments, 12 master development plans, and several other subdivisions.

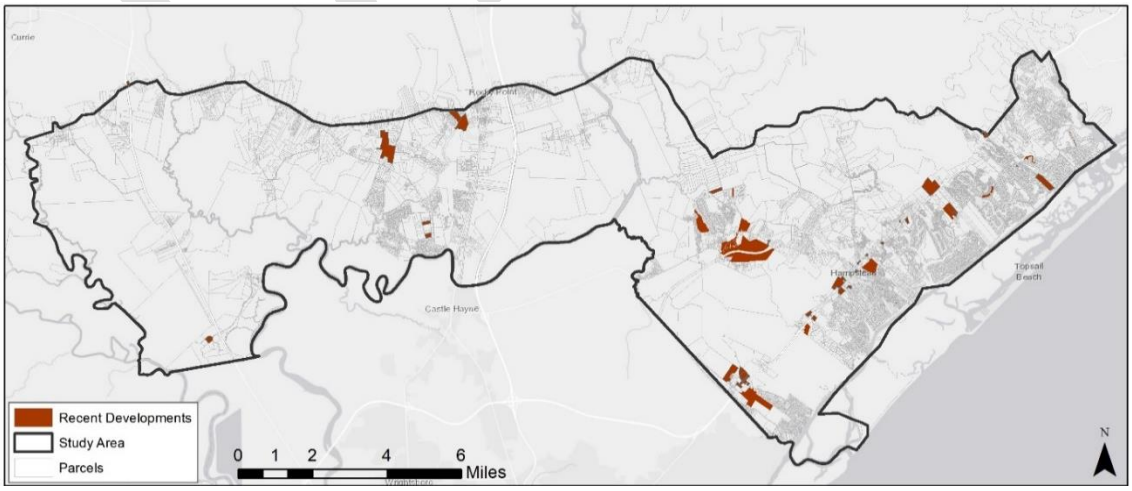

Figure 26: Recent Developments

Current and Proposed Transportation Network

Roadway

Major roadways throughout the study area include I-40, US-117, US-17, US-421, NC-133, and NC-210. Secondary and private roads are scattered throughout with the majority being located between US-17 and Topsail Beach. The planned Hampstead Bypass will terminate in the study area along US-17. Construction is ongoing with a completion date of 2030. Figure 27 also shows the collector streets recommendations derived from the PCCSP.

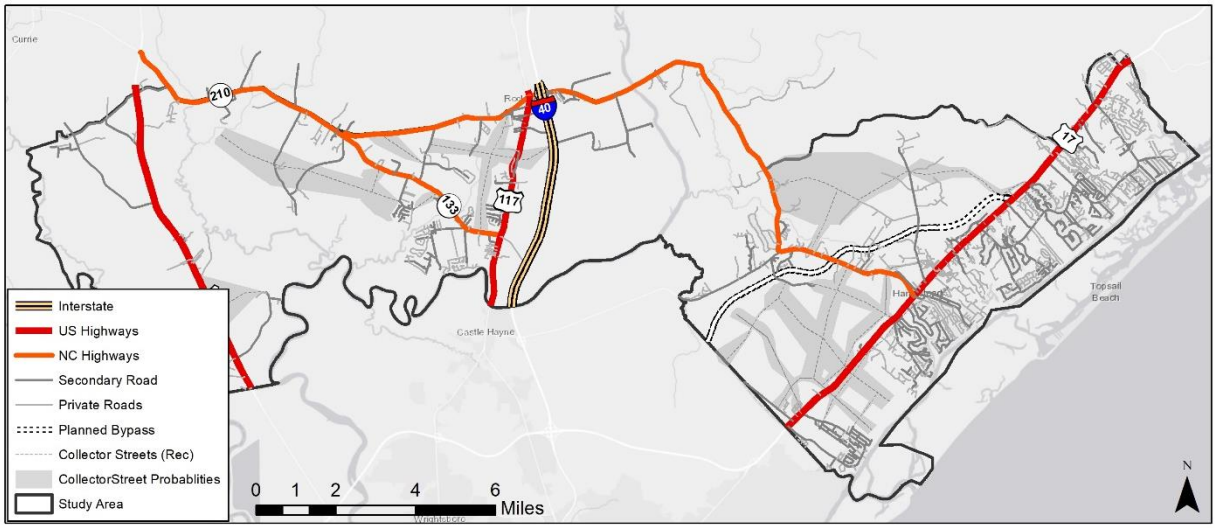

Figure 27: Collector Street Recommendations

Bicycle & Pedestrian

Existing sidewalks with the project area include small sections within recent neighborhood developments. Alignments for the East Coast Greenway are proposed in the western and eastern half of the study area. Other bicycle and pedestrian recommendations draw from the PCCSP and other area transportation plans. Most recommendations for bicycle and pedestrian facilities occur in the eastern half of the study area near US 17, demonstrating a strong desire for facilities here.

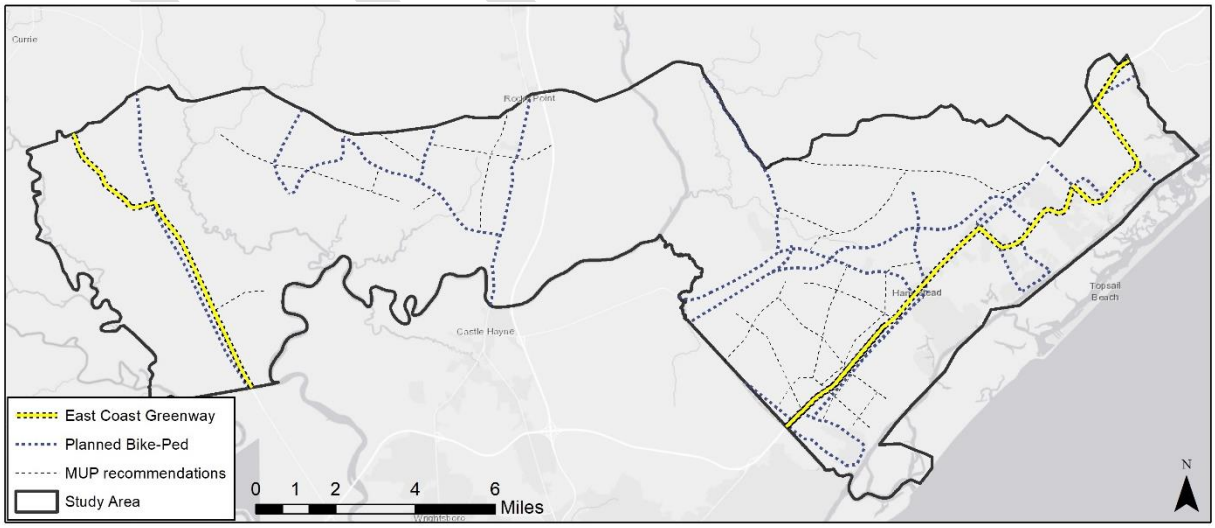

Figure 28: Planned Bicycle and Pedestrian Facilities

Bicycle and Pedestrian Crash Assessment

Safety is one of the key priorities for designing proper bicycle and pedestrian infrastructure. Data for the location and severity of pedestrian and bicycle infrastructure is maintained by NCDOT. Figure 29 and Figure 30 show the locations of all pedestrian and bicycle crashes respectively between 2007 and 2021 in the study area, with a heatmap created using the location and severity data.

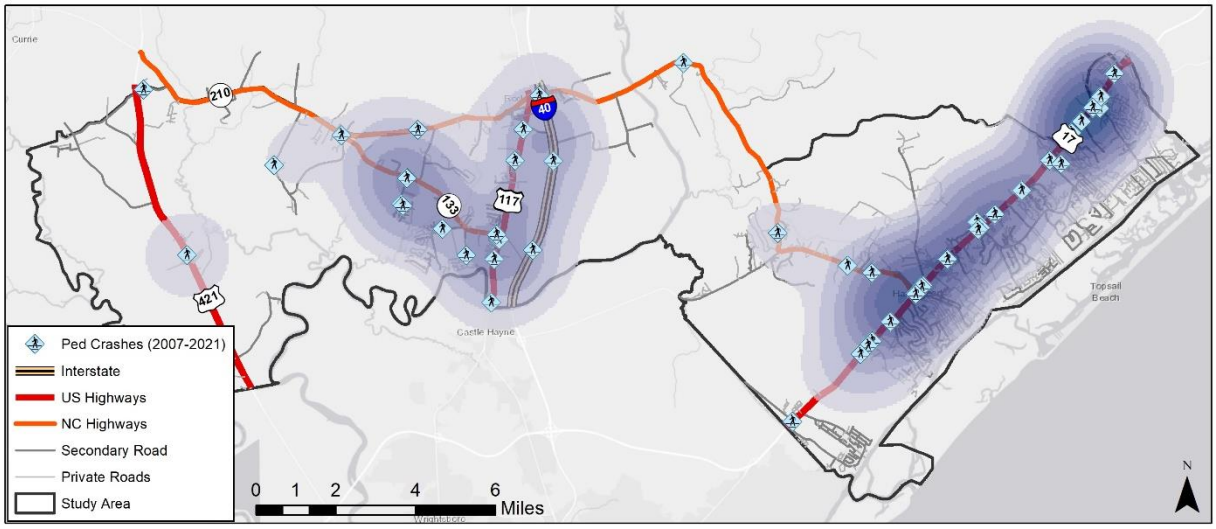

Figure 29: Pedestrian Crashes

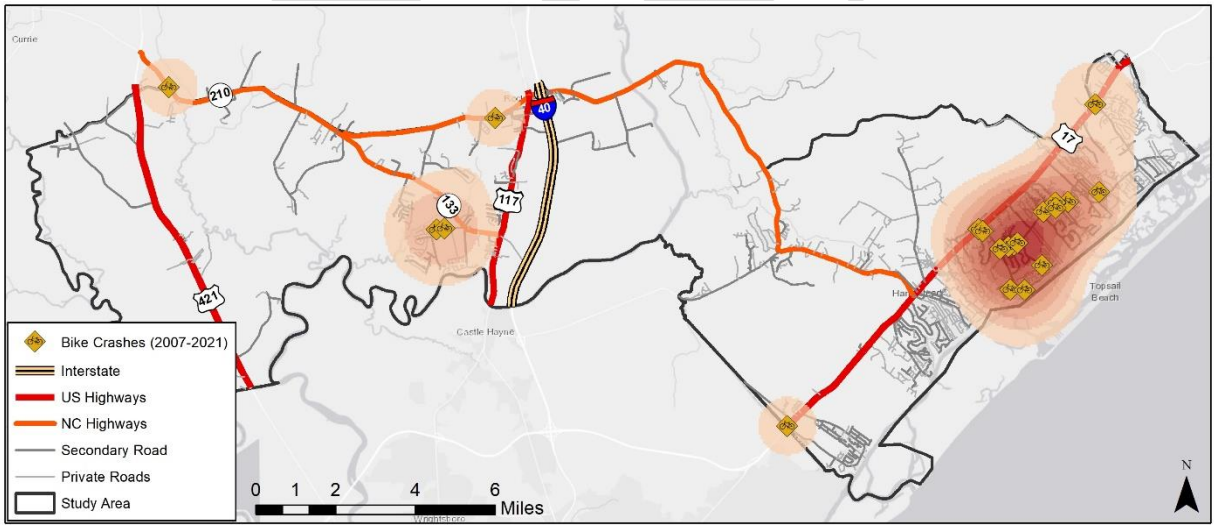

Figure 30: Bicycle Crashes