

AN UPDATE TO THE 2016 PENDER COUNTY COLLECTOR STREET PLAN



ADOPTED OCTOBER 18, 2021

ACKNOWLEDGEMENTS



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The Wilmington Urban Area Metropolitan Planning Organization (WMPO), by request and in partnership with the Pender County Planning and Community Development Department (Planning Department), has commissioned an update to the 2016 Pender County Collector Street Plan (the 2016 Plan) to determine future transportation needs in southeastern Pender County.

The 2016 Plan developed recommendations for new collector street alignments and bicycle and pedestrian facilities. Upon implementation of the 2016 Plan, the rigidity and specificity of the collector street recommendations, as well as the lack of consideration for natural resources, North Carolina Department of Transportation (NCDOT) design requirements, and the realities of development in a coastal county, have created multiple requests for variances and pushback from the development community. Southeastern Pender County has seen high growth rates since 2016 and changes in regional plans and projects such as the adoption of the WMPO's 2045 Metropolitan

Transportation Plan (MTP), the NCDOT 2020-2029 State Transportation Improvement Program (STIP), an update to Pender County's land use plan in 2018, and the progression of the US 17/Hampstead Bypass, necessitates an update to the 2016 Plan that addresses future transportation needs while affording flexibility in implementation.

This report details the planning process undertaken between January 2021 and June 2021 to update the 2016 Plan and the resulting recommendations.

STUDY AREA

This 2021 Plan Update (the Update) maintains the same study area used in the 2016 Plan. The study area is bordered by NC 210 to the north, the Pender/New Hanover County boundary to the east and south, and Black River to the west. Figure 1-1 on the following page shows the study area.



Figure 1-1 | Collector Street Plan Study Area



Existing Collector Street, Sloop Point Loop Road

WHAT ARE COLLECTOR STREETS?

Collector streets are defined as streets that connect local roads and neighborhoods to arterial roadways. Examples of collector streets in the study area include Country Club Drive, Sloop Point Loop Road, NC-133, and Hoover Road. Collector streets are typically two lanes, two to three miles in length, have speed limits between 25 and 45 miles per hour, and accommodate lower volumes of traffic.

Collector streets serve a number of important functions within the street network. They are very important in reducing congestion on arterial roads by equitably distributing the traffic burden so that shorter, local trips use the collector street system and long-distance trips remain on the arterial streets. Another important benefit is providing enhanced mobility opportunities for all roadway users, including emergency service providers, pedestrians, bicyclists, and municipal services.*

*There are no municipalities within the study area.



Figure 1-2 | Functional Classification of Roadways

COLLECTOR STREETS IN THE FUNCTIONAL CLASSIFICATION SYSTEM

Roadways serve two primary functions: mobility, the ability to move from one place to another; and access, opportunities for entry to/exit from specific locations (driveways) along a route. Most roadways provide a combination of mobility and access. In terms of function, there are three general categories of roadways:

Arterials

Arterial roadways provide a high level of mobility and are used mostly for long-distance travel. Some arterials are designed as controlled access or partially controlled access facilities. These facilities, which include Interstates, freeways, and expressways, limit the number of locations where vehicles can enter or exit. Examples in the study area include I-40 and I-140. Other arterials are designed with signalized intersections to control traffic flow. In these cases, the arterial roadway receives most of the green time. Examples in the study area include US 421 and US 17.

Collectors

Collector streets provide a balance between mobility and access. For more information on collector streets, refer to the previous section on page 2.

Local Streets

Local streets provide a high level of access. With many driveways providing direct access to adjacent land uses, local streets are not designed to carry through traffic. According to the Federal Highway Administration (FHWA), often, after all arterials and collector streets have been identified, the remaining roadways are classified as Local Streets by default.

Figure 1-2 above illustrates the hierarchy of and differences between the roadway classifications.

Source: https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/section02.cfm

"To improve connectivity, inform land development, maintain acceptable levels-of-service on existing roadways, ensure conservation of natural areas, and provide a safe and high-quality transportation network for residents, businesses, and visitors using all modes of travel."

-2016 Pender County Collector Street Plan Vision

VISION AND GOALS

This Update builds upon the 2016 Plan. The analysis and recommendations incorporate new data and analysis techniques to provide better direction for obtaining the vision and goals of the 2016 Plan.

The vision for this Update, carried forward from the 2016 Pender County Collector Street Plan, is as follows:

The purpose of a collector street plan for Pender County is to guide investment in new collector streets to improve connectivity, inform land development, maintain acceptable levels-of-service on existing roadways, ensure conservation of natural areas, and provide a safe and high-quality transportation network for residents, businesses, and visitors using all modes of travel. In order to achieve this vision, the 2016 Plan established the following goals, which remain in place for this Update:

- Develop a realistic and feasible network of collector streets that support the local street and arterial system
- 2 Work with the development community to ensure proper connectivity and collector street design
- **3** Be sensitive to environmental issues and "build-in" context-sensitive design approaches where applicable
- 4 Integrate multimodal design features into the street design that support walkability and bikability





2016 PENDER COUNTY COLLECTOR STREET PLAN

The 2016 Pender County Collector Street Plan (the 2016 Plan) surveyed existing conditions, conducted public outreach, developed recommendations, and identified design requirements and policy strategies. New and existing collector street recommendations were developed based on analysis of existing land use and trip generation into a "Preferred Scenario." This "Preferred Scenario" is presented in Figure 2-1 on the following pages. Nine typical sections were identified and categorized into five groups for implementation. Each collector street recommendation was assigned to one of these five groups. The typical sections in each group vary in the multimodal facilities provided to allow flexibility in implementation.

Additionally, the 2016 Plan proposed eleven supporting policy recommendations that addressed

stormwater integration, street spacing and access, multimodal facility integration, traffic impact analyses, environmental conservation, and maintenance.

The 2016 Plan was used as the basis to begin the analysis for this 2021 Plan Update (the Update), though new data was used when available.



Medium

750 to 1,500 feet

apart

NOTE: Table included as part of Figure 2-1

Units per Acre/Activity

Nodes

High Intensity (Residential Mixed, Office

Institutional, Planned Development)



REGIONAL PLANNING DOCUMENTS

Cape Fear Moving Forward 2045 Metropolitan Transportation Plan

The WMPO's adopted Metropolitan Transportation Plan (MTP), Cape Fear Moving Forward 2045, provides a multimodal transportation framework to guide future transportation investment within the WMPO's boundary. MTPs are fiscally constrained, meaning only projects that can be constructed with expected funding are included. This differs from a collector street plan, where recommendations are made in advance of known funding and, therefore, the plan can guide future transportation projects as funding becomes available. As most collector streets will be funded and constructed as part of new developments, these streets are typically funded from private sources.

Table 2-1 on the following page presents the roadway projects identified in the 2045 MTP that are within

the study area. The recommendations made in this Update assume the implementation of these projects.

NCDOT 2020-2029 STIP

The NCDOT 2020-2029 State Transportation Improvement Program (STIP) identifies the schedule and funding of all transportation projects to be conducted by NCDOT over the next ten years. Table 2-2 below presents the roadway projects identified in the 2020-2029 STIP that are within the study area. The recommendations made in this Update assume the implementation of these projects.

Pender 2.0: Comprehensive Land Use Plan

Pender 2.0: Comprehensive Land Use Plan (Land Use Plan) was adopted in August 2018 to guide the future growth of Pender County by addressing needs related to environmental protection, community facilities and services, and future land use. The Land Use Plan identifies 12 land use classifications for parcels located in unincorporated parts of the county. (There are no incorporated areas within the study area.) These land use classifications are presented in Figure 2-2 on the opposite page.

MTP PROJECT NUMBER	PROPOSED PROJECT	PROPOSED PROJECT LIMITS	HORIZON YEAR
RW-6	Hoover Road Widening	Hoover Road from US 17 to Blue Clay Road	2030
RW-13	Godfrey Creek Road Extension	Godfrey Creek Road from Godfrey Creek to Saint Johns Church Road	2035
RW-18	Sloop Point Road Widening	Sloop Point Road from US 17 to road terminus	2040
RW-23	Sidbury Road Widening	Sidbury Road from Blue Clay Road to US 17	2045
RW-29, 30, & 31	Center Drive Extension	Center Drive from about 600' east of US 17 along Whitebridge Road to roughly 1,000' east of US 17 along Scotts Hill Lopp Road	2045
RW-35	Harrison Creek Road Extension	Harrison Creek Road from an extension of Holliday Dr to Realigned intersection of US 17 and Washington Acres Rd	2045
RW-166	Future NC417/Hamp	Future NC417/Hampstead Bypass & Sidbury Road Interchange*	

Table 2-1 | 2045 MTP Projects within the Study Area

STIP PROJECT NUMBER	PROPOSED PROJECT	PROPOSED PROJECT LIMITS	CONSTRUCTION FISCAL YEAR (FY)
R-3300	Hampstead Bypass	US 17 at Long Leaf Drive to I-140	FY 2022**
U-5732	US 17 Conversion to Superstreet	Washington Acres Road to Sloop Point Road	FY 2029**

Table 2-2 | 2020-2029 STIP Projects within the Study Area

*Project located in New Hanover County but significant for the study area **Construction Fiscal Years taken from the May 2021 STIP

PAGE 8 | EXISTING CONDITIONS



Figure 2-2 | Pender County Future Land Use Map

The majority of future land use classifications within the study area are residential. Mixed-use classifications are concentrated along US 17 and in isolated pockets along US 117 and NC 210. Rural agriculture classifications are located adjacent to US 421 and along the Northeast Cape Fear River. The only industrial classifications within the study area are located east of I-40 and along US 421 near the southern edge of the study area boundary.

Land use classifications within the study area are notably denser than in other unincorporated areas of Pender County–almost all residential and mixeduse classifications are concentrated within the study area. This is reflective of the influence of urban growth from New Hanover County. Within the study area, the densest classifications are adjacent to the arterial roadways that directly connect Pender and New Hanover Counties including US 17, US 117, the southern portion of US 421, and NC 133.

These land use classifications were used as the basis for the development of recommendations prepared in this Update.

NATURAL AND BUILT ENVIRONMENT

A review of the natural and built environment was conducted through desktop analysis and WMPO GIS shapefile data. This review was not intended to serve as a formal environmental review, but rather to guide the development of recommendations. Implementation of the recommendations made in this Update is subject to compliance with all necessary environmental reviews and/or permitting requirements.

The high-level review revealed that protected lands, including Natural Heritage Areas and state-owned lands, are located throughout the study area but concentrated west of US 421, south of NC 133 between US 421 and US 117, and west and east of the Northeast Cape Fear River (see Figure 2-3 on the following page). Data from the National Wetland Inventory and the North Carolina Flood Risk Information System were used as wetland and floodplain sources, respectively. These sources indicated that potential wetlands and 100-year floodplains are scattered throughout the study area

but are concentrated at the previously identified protected lands and between US 117 and I-40 and south of NC 210/Island Creek Road between the study area boundary and US 17. These natural resources were combined with future land use data to serve as the basis for the recommendations made in this Update.

Excluding the existing built areas east of US 17, the study area is mostly undeveloped. Concentrations of existing development include residential development between Clarks Landing Road and US 117, and small-scale residential developments along NC 210 between the Northeast Cape Fear River and US 17. Considering the extent of future residential classifications from the Land Use Plan, there is high potential for future development within the study area.

TRAFFIC CONDITIONS

Existing traffic patterns and volumes were derived from StreetLight Data and Average Annual Daily Traffic (AADT) data from NCDOT. One key difference between these two datasets is that AADT presents the traffic volumes of an average day in 2019, without accounting for seasonal or daily fluctuations. The StreetLight Data extracted for this analysis presents traffic volumes on an average day in the months of March and October of 2019, when traffic volumes are typically representative of normal traffic patterns. The chosen analysis year was 2019 due to abnormal travel patterns in 2020 related to the COVID-19 pandemic.

NCDOT AADT data indicates that the average daily traffic volume along US 17 is approximately 36,000 vehicles per day (vpd) north of Belvedere Drive; 43,500 vpd between NC 210 and Belvedere Drive; and 40,000 vpd south of NC 210. The daily traffic volume along NC 210 averages 9,300 vpd near the intersection with US 17; 2,100 vpd near the intersection with NC 133; and 15,000 vpd between I-40 and US 117. Along US 117, daily traffic volume ranges between 7,000 and 14,000 vpd. Daily traffic on NC 133 averages from 11,000 vpd at US 117 to 2,300 vpd at US 421. Average daily traffic on US 421 varies from 5,700 vpd at NC 133 to 7,600 vpd near the Pender/New Hanover County border.

As NCDOT AADT data does not indicate the distribution of traffic, StreetLight Data was used to provide this information. Figure 2-4 on the opposite page presents the study area, divided in two halves by the Northeast Cape Fear River. Based on the StreetLight Data analysis, the western and eastern



Figure 2-3 | Natural Resources in the Study Area

halves generated 21,710 and 74,850 daily trips in 2019, respectively. See Appendix A for StreetLight Data outputs.

In the western half, 24% of trips remained within this half of the study area; 60% of trips were to or from New Hanover and Brunswick Counties; and only 15% of trips traveled to and from north of the study area. There was a high volume of pass-through traffic, 38,250 vpd, in the western half due to the presence of multiple north-south routes including I-40, US 421, and US 117. In the eastern half, 38% of the trips remained within this half of the study area; 38% of trips traveled to and from New Hanover County; and 23% of trips traveled north of the study area. In addition to those trips, there were about 16,200 daily trips that traveled through the eastern half of the study area. Approximately 900 daily trips are made between the eastern and western halves of the study area, which accounts for the remaining 1% of total trips in each half.

NCDOT AADT data was used to develop future traffic projections along existing arterial roads. The historical AADT values at various locations along these roads were tabulated and projected to future year 2045 using a straight-line projection method. These values were compared to the roadway capacity and Travel Demand Model-based travel projections, which are discussed in the Methodology section of this Update.

TRAFFIC MODELING

The latest update to the WMPO's adopted Travel Demand Model (TDM) occurred in November 2020. The TDM projects travel demand based on projected population and employment levels in 2045 while assuming the infrastructure improvements in the MTP. The TDM has been an appropriate tool for forecasting needs in more urban New Hanover County, but analysis performed during this Update indicates that the population and employment projections for Pender County may not be reflective of development patterns as the rate of development is typically higher. This difference is further distorted due to the adoption of the Land Use Plan, which dedicates more land for higher density development than what was assigned in the previous land use plan and TDM. As the TDM only features major arterial roads within the study area, the TDM is unable to provide a sufficient basis for the development of collector streets.



Figure 2-4 | *StreetLight Data Traffic Distribution*

For the development of this Update, the TDM was used to determine the daily vehicle carrying capacities of each roadway classification. These capacities were compared with the traffic projections based off of AADT values and those from the TDM to determine which roadway segments may be over capacity in the future on a daily volume basis and peak-hour basis. Appendix B presents the calculations used for this comparison.

The analysis suggested the daily traffic volumes on almost all arterial roads will be lower than their daily carrying capacity. However, during peak hours, many portions of US 17 and NC 210 may experience significant congestion. The AADT projections for US 17 were highly overestimated because they did not consider the distribution of traffic related to the future Hampstead Bypass. However, even after adjusting the volumes to consider the future bypass, US 17 may still experience congestion at certain locations during peak hours. This conclusion, combined with the earlier observation that there is a significant volume of intra-zonal trips in the region, indicates collector streets parallel to US 17 may be required to address local traffic needs and alleviate congestion on US 17.



Two periods of public outreach and stakeholder engagement were held during the development of the 2021 Plan Update (the Update). Key takeaways from the engagement periods are highlighted below. Detailed summaries and findings from each engagement period are presented in Appendix C.

PHASE I (MARCH/APRIL 2021)

The first round of public engagement was held in March and April 2021 to seek feedback on the 2016 Pender County Collector Street Plan (the 2016 Plan), identify conditions that have changed since 2016, and understand current transportation and development needs and concerns. An online survey provided the opportunity for public comments and 440 responses were received. Members of the development and real estate community were included through a parallel online survey and a Stakeholder Steering Committee meeting. Responses and feedback received during this engagement period were used in the development of the draft recommendations.

PHASE I PUBLIC SURVEY RESULTS

Results of the public survey indicated most respondents experience delays during their daily travel during peak times and that seasonal travel impacts related to tourism often lead to considerable delays. Responses further indicated delayed travel times are typically experienced along US 17, specifically at the intersections of NC 210, County Club Road, Topsail Schools, Sloop Point Road, and Washington Acres Road. Seventy-seven percent of respondents also noted US 17 as a concern through a separate comment.

When asked if respondents would walk or bike more often within the study area if better, safer facilities were available, 58% of respondents answered yes, 22% answered no, and 20% answered maybe.

PENDER COUNTY STREETS PLAN 2021 !

Select your top three priorities to be addressed when new collector streets are being constructed.





Finally, respondents were asked to select their top three transportation priorities from a list of eight options. Responses to this question are shown in Figure 3-1 above.

DEVELOPER SURVEY AND STAKEHOLDER MEETING I RESULTS

The developers survey received three responses, which are recorded in Appendix C.

Stakeholder meeting participants indicated the 2016 Plan was generally not helpful for guiding development and site plan design. Further, participants indicated general infrastructure needs, such as utilities and schools, were barriers to future development in addition to transportation and traffic needs. Figure 3-2 on page 15 presents the selection of transportation elements participants saw as important for future development.

PHASE II (MAY/JUNE 2021)

In order to present the draft recommendations to the public and collect feedback on various elements of the recommendations, an ESRI Storymap website was developed. The website was available from May 17th until June 21st 2021. The website, made available at www.tinyurl.com/PenderStreets, included four sections: Overview, Methodology, Draft Recommendations, and Next Steps. An interactive map of the draft recommendations was available for users to see the recommendations in detail. Survey questions were asked throughout the website using ESRI's Survey123 tool. Eight questions were asked, in addition to 11 optional demographic questions. In total, there were 639 unique visitors to the website, and 22 individuals completed at least one survey question.

PHASE II PUBLIC SURVEY RESULTS

Questions asked respondents to rate how they felt about the proposed collector street recommendations, broken up by region, on a scale from strongly disagree to strongly agree. There was a total of 13 responses for each of the three questions. Figure 3-3 on page 15 shows the results for each region. It can be inferred from the results that most respondents agree with the collector street alignment recommendations. Another question asked respondents to rate their opinion of the proposed bicycle and pedestrian recommendations. A total of 12 responses were received, shown in Figure 3-4 on page 15. A majority of the respondents strongly agreed with the proposed recommendations.



Figure 3-2 | Development Preferences Identified in the First Stakeholder Meeting







Figure 3-4 | Survey Results – Respondent Opinions on Bicycle and Pedestrian Recommendations

STAKEHOLDER MEETING II RESULTS

A second stakeholder meeting was held on May 20, 2021 to review and discuss the draft recommendations and collect feedback from the Stakeholder Steering Committee. The purpose of the meeting was to present data collected on current travel patterns, the methodology developed to determine future collect street needs, the geographies of proposed collector streets, and recommendations for street cross sections, with multimodal facilities.

There was some concern from attendees that the cross sections presented were too limiting and that the Update should establish design minimums rather than prescribe exact cross sections. It was voiced that the decision to use a clear zone versus a curb and gutter should be left up to the developer based on site conditions and constraints. It was also noted that bicycle and pedestrian network contiguity should be taken into consideration as far as the types of facilities provided in the cross section. Finally, there was a discussion regarding the need for Pender County Planning and Community Development (Panning Department) staff to work with developers to ensure that collector streets are designed to stub out to developable and feasible locations on adjacent parcels to avoid any uncrossable environmental features regardless of the gap in time between developments.



DEVELOPMENT OF COLLECTOR STREET RECOMMENDATIONS

WMPO's Travel Demand Model (TDM) was compared against the future land use classifications identified in Pender County's 2018 future land use plan, Pender 2.0: Comprehensive Land Use Plan (Land Use Plan). As discussed in the previous section, this comparison indicated the TDM projections likely underestimate future growth, and therefore projections would need to be revised as part of this 2021 Plan Update (the Update).

Collector street recommendations were developed by calculating potential future travel demand and from input received during public outreach and stakeholder engagement. The process for developing these projections is outlined on the following pages.





STEP 1

Identify Travel Demand Zones

Since new trip projections were needed, the study area was subdivided into smaller areas to mimic how Traffic Analysis Zones (TAZs) are used in the TDM. The boundaries of the modified TAZs were identified through the existing arterial street network, parcel boundaries, and physical boundaries, such as the Northeast Cape Fear River. Trips within each modified TAZ typically feed onto a single arterial road. Using this method, 24 modified TAZs were identified within the study area and are presented in Figure 4-1 below.



NOTE

While this methodology was applied across the entire study area, the corresponding images represent the analysis done in the southeast portion only.



STEP 2

Project Future Development and Density

Residential and mixed-use classifications identified in the Land Use Plan were selected as the basis of analysis since most travel is generated from homes and typically requires the use of a collector street. Non-home-based travel is typically routed along arterials where workplaces and commercial development are usually located. Figure 4-2 shows the residential and mixed-use zones in the southeastern part of the study area.

From these residential and mixed-use areas, undeveloped or underdeveloped areas were identified for further analysis. These areas were further refined by removing natural resources likely to inhibit development such as wetlands, 100-year floodplains, and protected lands. The areas remaining (see Figure 4-3) represent the areas that could be developed in the future and would be the primary sources of new traffic.



Figure 4-2 | Residential and Mixed Land Uses



Figure 4-3 | Developable Residential Zones

These areas were subdivided into 10-acre subunits to assign projected household density. Density was expressed as the number of households within each 10-acre subunit and was assigned based on the specific residential classification from the Land Use Plan and the corresponding allowable units per acre specified in Pender County's Unified Development Ordinance (UDO). These subunits and associated densities are presented in Figure 4-4. The density assignment allowed for the potential future number of households to be projected.

STEP 3

Project Future Travel Demand and Develop Recommendations

The WMPO TDM uses various household characteristics such as household size, income, and number of vehicles to determine the number of daily trips that a given household will generate. These factors average to each household generating approximately 6.67 trips per day (see Appendix B for calculations). Although this rate pertains to the entire WMPO jurisdiction, the project team determined this rate was the most accurate local representation of travel demand. The potential daily trips from each 10-acre subunit were aggregated to determine the daily trips generated from each modified TAZ, as depicted in Figure 4-5.

A variety of factors influence the rate and pattern of development. While high rates of growth are anticipated in the study area in the upcoming decades, a full buildout would be an unrealistic expectation and could disproportionately



Figure 4-4 | *Modified Traffic Analysis Zones*



Figure 4-5 | Daily Trips Generated from Each 10-acre Subunit

STEP 3, continued

influence growth needs. Additionally, development requirements such as setbacks, open space requirements, and public infrastructure limit the buildable area of any parcel. For example, a 25-acre parcel where the Land Use Plan allows 4 units per acre can theoretically build 100 houses. But 20% of this parcel is designated wetland and the developer will need to build 5 units per acre in the remaining 20-acre land to achieve full buildout. Moreover, after adding requisite roadways, setbacks, green spaces, etc., the developer loses an additional 4 acres, which means the remaining 16 acres will need 6.25 units per acre to come up with 100 houses. However, development and real estate market research shows that, in this area, quarter-acre parcels are most in demand and will yield the highest profit. Applying this industry knowledge to the example parcel would yield only 64 homes out of the maximum permissible 100 homes, leading to 36% unrealized real estate and by extension, unrealized trip generation.

Similar situations can occur at varying degrees across all parcels in the study area, where the range of unrealized real estate can vary from 5% to 60% depending on the parcel. A cursory analysis and discussions with Pender County led to the conclusion that, overall, these land and market inefficiencies will result in approximately 25% fewer households than that permitted by the Land Use Plan. Fewer households will collectively produce 25% fewer daily trips and the collector streets plan should account for this reduction. Therefore, trip projections were reduced by 25% to take this into account. This would mean that for a TAZ where daily additional trips were calculated to be 10,000, the number of trips would be reduced to 7,500. The daily travel demand numbers shown in Figure 4-6 reflect these reductions.



Figure 4-6 | Daily Trips Aggregated to Traffic Analysis Zones

STEP 4

Identify Location of Future Collector Streets

A two-lane road posted at 35 miles per hour can carry approximately 18,000 vehicles per day (2012 FDOT Quality/Level of Service Handbook). The projected number of trips within each modified TAZ can be compared to this benchmark to determine the number of collector streets necessary for each modified TAZ. For several TAZs, the existing collector street network is sufficient to carry additional traffic, whereas the geometry of some TAZs made the addition of a collector street infeasible. Figure 4-7 shows potential alignment options in the southeastern portion of the study area.

For modified TAZs where new collector streets were warranted, parcel boundaries, natural resources, potential traffic volumes, and intersection density along arterials influenced the recommended locations of new collector streets. Additionally, several arterials warranted parallel collector streets to provide sufficient capacity. Figure 4-8 shows how the potential alignments were further refined to form polygons which denote areas with the highest probability to align a collector street.

To understand the effect that recommended collector streets would have on the existing roadway network, projected trips were assigned onto the existing network based on travel demand generation. While full analysis would require changes to the WMPO TDM, this preliminary analysis suggests existing roads perform well based on daily traffic volume. However, several sections of US 17 and NC 210 may experience significant congestion.



Figure 4-7Potential Alignment Options Showing
Collector Street Connectivity Intent



Figure 4-8 | Polygons Showing Probable Collector Street Locations

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ROADWAY

The proposed updated collector street network consists of 25 collector street recommendations within the study area. In addition to the methodology detailed in the previous section, feedback from the public; input from Pender County Planning and Community Development (Planning Department) and WMPO staffs; and comments and suggestions from stakeholders informed the selection of the proposed collector streets.

An alignment was proposed for each of the recommended collector streets, as well as a general boundary in which the collector street could be aligned. Depending on other constraints and development plans, having a proposed alignment that can then be adjusted inside a certain area provides flexibility when planning for a collector street. All proposed alignments and collector street boundaries were planned so that they avoided smaller parcels, disruptions to established neighborhoods and communities, major wetland areas, natural areas, and preserved areas. The final set of recommendations is shown in Figure 5-1 on the following pages. Details for individual collector streets are shown in Appendix D.





Figure 5-1 | Collector Streets Alignment Recommendations

These recommendations represent a significant reduction in the mileage of collector streets from the 2016 Pender County Collector Streets Plan (the 2016 Plan), shown in Figure 2-1. The 2016 Plan recommended 245 miles of collector streets while this 2021 Plan Update (the Update) recommends 63 miles of collector streets, which is a reduction of approximately 74%. This was achieved by simplification of tiers, consolidating redundant collector streets, and retaining only the most necessary collector streets based on mathematical calculation of travel demand requirements. The polygons corresponding to the collector street boundaries are dynamic and their geometries are likely to become more limited as more and more segments of a collector street are constructed. The scenarios on the following pages outline the method of interpretation of the collector street boundaries.

SCENARIO 1

A general area has been identified for where a collector street should be aligned. This is represented by the polygon showing all possible alignment options for a particular collector street. Parcels A, B and C represent the parcels through which the collector street needs to be aligned.

In this scenario, no part of the collector street has been constructed in parcels A, B, or C. Whichever parcel develops first can construct the collector street on its parcel with significant leeway in alignment selection as long as it falls within the polygon and it can be extended to the adjacent parcel where the same polygon passes through.

The other parcels will have to tie it into this determined alignment.

SCENARIO 2

The developer of Parcel A has decided to align the collector street in a certain way. Parcel A has confirmed with the Parcel B owner and the Planning Department that the extension of this street into Parcel B would NOT impact an environmental feature that could preclude the construction of the collector street in Parcel B.

Parcel B and C now have a reduced number of alignment options to locate the collector street on their respective parcels since the street will eventually have to connect to the alignment in Parcel A. This is determined by design speeds and local buildability conditions. This results in the shrinking of the polygon as one approaches Parcel A.







Figure 5-3 | Polygon Scenario 2

SCENARIO 3

In this scenario, both Parcel A and Parcel C have decided to align the collector street in a certain way within their respective parcels and the collector street polygon. The parcel owners have confirmed that extension of this street into Parcel B would not impact an environmental feature that could preclude the construction of the collector street in Parcel B.

Now Parcel B has two fixed endpoints to honor when aligning the collector street. The developer is still free to determine the internal alignment through Parcel B as long as design standards and road geometries are maintained, and the street eventually connects to the stub-outs in Parcels A and C.

Note: A stub-out is a temporary termination of a street that is intended to be extended through adjacent property in the future. Stub-outs are generally required when it is anticipated that adjacent property will need to extend the street to accommodate future development.



Figure 5-4 | *Polygon Scenario 3*

During implementation, developers should not be allowed to stub out the collector street in such a way that its extension would be burdensome to the adjacent parcels due to environmental conditions. Additional language strengthening this clause was added to the policy recommendations empowering the Planning Department to ensure overall connectivity can be achieved without disproportionate adverse impacts on any parcel.

Construction of collector streets will necessitate further strengthening of the arterial street network so that the overall roadway network will function at acceptable standards. The travel demand calculations carried out in this Update indicate the improvements listed below would be necessary to maintain acceptable levels of traffic. Detailed evaluation of these improvements should occur in a separate planning effort. Appendix E shows detailed calculations of traffic growth at key locations based on historic Average Annual Daily Traffic (AADT) data from NCDOT and a comparison with the traffic volumes in the Travel Demand Model (TDM).

- 1. Widening US 17 from 4 lanes to 6 lanes between I-140 and NC 210
- 2. Widening US 17 from 4 lanes to 6 lanes between NC 50 and US 17 Bypass
- 3. Widening NC 210 from 2 lanes to 4 lanes between US 17 and Island Creek Road
- 4. Realigning NC 210 such that it forms a T-junction with Island Creek Road*
- 5. Constructing an interchange on US 17 Bypass at Sidbury Road*
- 6. Widening Sidbury Road from 2 lanes to 4 lanes between US 17 and US 17 Bypass
- 7. Widening NC 210 from 2 lanes to 4 lanes between US 117 and I-40 interchange

*projects included in the WMPO's adopted Metropolitan Transportation Plan (MTP), Cape Fear Moving Forward 2045

BICYCLE AND PEDESTRIAN

Multi-use paths (MUPs) or sidewalks and bicycle lanes are proposed as part of all collector street recommendations. The eventual selection of a facility would depend upon several factors including the source of funding and adjacent facilities.

Bicycle and pedestrian recommendations were made for existing arterials or collector streets that feature existing residential development, are projected to have future residential development, and/or provide a connection between collector street recommendations. The implementation of bicycle and pedestrian facilities on existing roadways will depend upon future development projects, future roadway improvement projects completed by NCDOT, or the availability of dedicated funding for stand-alone bicycle and pedestrian projects. Documenting proposed facilities is important so that the County may be able to utilize NCDOT's Complete Streets Policy, where NCDOT will pay for facilities in full if the proposed facilities have been previously identified in an adopted Metropolitan Transportation Plan (MTP) or Comprehensive Transportation Plan (CTP). These draft recommendations are presented in Figure 5-5 below.




STREET CROSS SECTIONS

This Update recommends four types of street sections to guide the design of the collector streets in southeastern Pender County. These cross-sections are not intended to be prescriptive, but provide the minimum design standards in accordance with NCDOT design criteria while affording developers flexibility in design aesthetics. All collector streets recommended in this Update are divided into four main categories. These categories are based on NCDOT Typical Section 2F and should be designed at a minimum of 40 mph design speed (35 mph posted speed). Developers must select one of the types outlined in Table 5-1 below as a starting point which can then be expanded upon. The minimum requirements of each street cross section type are described in the sections following the table.

	A. WITH MULTI-USE PATH (MUP)	B. WITH SIDEWALK AND BIKE LANES
1. WITHOUT CURB AND GUTTER	1A	1B
2. WITH CURB AND GUTTER	2A	2B

Table 5-1 | Types of Street Cross Sections

TYPE 1A

Collector streets without curb and gutter with an MUP must have a minimum of:

- 1. Two (2) 11'-wide (minimum) travel lanes going in opposite directions
- 2. Two (2) 4'-wide (minimum) paved shoulders on the far sides of the travel lanes
- 3. 10'-wide (minimum) multi-use path (MUP) on one side of the roadway with additional 2'-wide paved shoulders on each side of the MUP (resulting in a minimum of 14' paved surface)
- 4. A minimum clear zone of 20' between the edge of vehicular travel lane and the interior edge of MUP This equates to a minimum clear zone of 14' between the edges of roadway pavement (including paved shoulders) and the interior edge of MUP (including paved buffer)
- 5. Additional minimum dimensions as shown in Figure 5-6



Figure 5-6 | Street Type 1A: 2-Lane Road with MUP (without Curb and Gutter)

NOTE

Developers can add medians, provide wider lanes, wider sidewalks, wider distances between the roadway and the sidewalk or MUP, transit bulb-outs and shelters, and other aesthetic and functional features to these base roadway cross sections. These enhancements are subject to NCDOT review.

Two out of 25 collector streets in this Update (#9 and #10) are recommended to be 4-lane based on the traffic projections. Converting any other roads to 4-lane roads is at the discretion of the developer and the Planning Department. Converting any of the four street cross section types to a 4-lane cross section will necessitate the additional features listed below and must adhere to NCDOT design criteria.

- 1. For Types 1A and 1B: adding a minimum 23'-wide clear zone in the median with appropriate drainage ditch and a minimum 2'-wide paved shoulder between the innermost lane and the median.
- 2. For Types 2A and 2B: adding a minimum 18'-wide raised median (with additional 2 1/2' curbs on each side of the median)

TYPE 1B

Collector streets without curb and gutter with bike lanes and sidewalks must have a minimum of:

- 1. Two (2) 11'-wide (minimum) travel lanes going in opposite directions
- 2. 6'-wide (minimum) bike lanes on both sides of the travel lanes
- 3. 6'-wide (minimum) sidewalks on both sides of the roadway
- 4. A minimum clear zone of 20' between the edge of vehicular travel lane and the interior edge of sidewalk. This equates to a minimum clear zone of 14' between the edges of roadway pavement (including bike lanes) and the interior edge of sidewalk
- 5. Additional minimum dimensions as shown in Figure 5-7



Figure 5-7 | Street Type 1B: 2-Lane Road with Sidewalks and Bike Lanes (without Curb and Gutter)

TYPE 2A

Collector streets with curb and gutter with an MUP must have a minimum of:

- 1. Two (2) 12'-wide (minimum) travel lanes going in opposite directions
- 2. 2 1/2'-wide (minimum) curb and gutter on both sides of paved roadway
- 3. 10'-wide (minimum) multi-use path (MUP) on one side of the roadway with additional 2'-wide paved shoulders on each side of the MUP (making the total width of the paved surface a minimum of 14')
- 4. 8'-wide (minimum) planting area between the curb and the MUP (including paved buffer)
- 5. 8'-wide (minimum) clear zone beyond the curb on the side of the roadway opposite the MUP
- 6. Additional minimum dimensions as shown in Figure 5-8



Figure 5-8 | Street Type 2A: 2-Lane Road with MUP (with Curb and Gutter)

TYPE 2B

Collector streets with curb and gutter with bike lanes and sidewalks must have a minimum of:

- 1. Two (2) 11'-wide (minimum) travel lanes going in opposite directions
- 2. 6'-wide (minimum) bike lanes on both sides of the travel lanes
- 3. 2 1/2'-wide (minimum) curb and gutter on both sides of paved roadway
- 4. 6'-wide (minimum) sidewalks on both sides of the roadway
- 5. 6'-wide (minimum) planting area between the curbs and the sidewalks
- 6. Additional minimum dimensions as shown in Figure 5-9



Figure 5-9 | Street Type 2B: 2-Lane Road with Sidewalks and Bike Lanes (with Curb and Gutter)

POLICY RECOMMENDATIONS

The 2016 Pender County Collector Street Plan (the 2016 Plan) included nine recommendations to be added to the Unified Development Ordinance (UDO) to ensure proper implementation of the Plan. These recommendations were evaluated in order to assess whether they should be retained, modified, or removed from this 2021 Plan Update (the Update).

1| STORMWATER RUNOFF MANAGEMENT

- **Recommendation:** Stormwater BMPs and Green Streets Policies are essential in mitigating pollution and maintaining water quality, particularly in sensitive natural areas. Pender County is home to significant natural resources, which can be negatively impacted by stormwater runoff. To avoid this type of environmental degradation, stormwater BMPs are recommended to be implemented as appropriate to local conditions.
 - Action: To be carried forward in the Update.
 - Reason: This recommendation is essential for the preservation of water quality in Pender County.
- Additional Notes: Two broad categories of street sections have been developed: one with curb and gutter, and one with a ditch section to provide flexibility to the developers based on availability of water and sewer infrastructure.

2| STREET SPACING STANDARDS

- **Recommendation:** Enact a policy that creates street spacing standards for collector streets to ensure adequate cross access between land uses.
 - Action: To be removed as a policy recommendation.
 - **Reason:** This recommendation was a result of the methodology by which the 2016 Plan was created. The methodology used in this Update does not include standard street spacing criteria, thereby rendering this policy recommendation unnecessary.
- Additional Notes: The text of the policy recommendation does not differentiate between local and collector streets. This text should also be removed from the UDO.

3 TRAFFIC IMPACT ASSESSMENT

- **Recommendation:** A Traffic Impact Assessment (TIA) shall be required if one of the following applies to a specific site plan:
 - The development generates 1,000 vehicle trips per day; or
 - 100 vehicles in the AM or PM peak hour.
 - Action: To be carried forward in the Update.
 - **Reason:** The basis of this policy recommendation was that this requirement already exists in Pender County's current UDO.
- Additional Notes: This threshold is largely consistent with other counties and municipalities throughout North Carolina.

4 NCDOT COMPLETE STREETS

- **Recommendation:** Proposed collector streets as defined by the Collector Street Plan will adhere to the NCDOT Roadway Design Manual, including the design of multimodal facilities i.e., proposed pedestrian and bicycle facilities must be designed and constructed to the applicable standard.
 - Action: To be carried over from the 2016 Plan and merged with bicycle and pedestrian facility recommendations. Bicycle and pedestrian facility design criteria will be incorporated into the updated NCDOT Roadway Design Manual anticipated to be released in Summer 2021.
 - **Reason:** This Update intends to strengthen the non-motorized network along with the collector street network and this recommendation would help to achieve that goal.
- Additional Notes: Additional language added to ascertain transition between two different types of bicycle and pedestrian facilities.

5 ENVIRONMENTAL CONSERVATION POLICY

- **Recommendation:** In order to preserve the unique natural environment in Pender County, any new development that would require the construction of a collector street as defined by the Collector Street Plan, would avoid or minimize impacts to sensitive natural areas, such as wetlands, floodplains, and areas with endangered flora/fauna.
 - Action: To be carried forward in the Update.
 - **Reason:** This recommendation furthers environmental protection, which is in line with the goals of this Update.
- Additional Notes: Additional language added to ensure alignment of collector streets on one parcel does not encroach onto environmentally sensitive areas in adjacent parcels when the street could be extended in the future.

6| TRI-PARTY AGREEMENT

Recommendation: The Tri-Party agreement is a framework for the construction and maintenance of new pedestrian and bicycle facilities along collector streets.

- Action: To be carried forward in the Update.
- **Reason:** Although this recommendation has not yet been implemented, the inclusion of this recommendation provides a pathway for it to be included in future updates of the UDO.
- Additional Notes: The inclusion of this recommendation was discussed with Pender County.

7 GENERAL CONNECTIVITY OF COLLECTOR STREETS

- **Recommendation:** Connectivity requires that private entities coordinate across different properties to anticipate future connections between adjacent properties. Providing connectivity to nearby amenities and to the arterial system is important to avoid congestion across the transportation system. This policy requires that new collector roadways be constructed to provide connections between the collector and arterial systems.
 - Action: To be carried forward in the Update with additional language describing the situations and conditions.
 - **Reason:** The basis of this Update is to improve connectivity and this recommendation promotes this.
- Additional Notes: This recommendation should be moved further up the list of policy recommendations.

8| BICYCLE AND PEDESTRIAN ACCOMMODATION

- **Recommendation:** All proposed collector streets, as defined by the Collector Street Plan, shall have accommodations for bicycle or pedestrian facilities.
 - Action: To be carried forward in the Update.
 - **Reason:** This Update looks to strengthen the non-motorized network along with the collector street network and this recommendation would help to achieve that goal.
- Additional Notes: NCDOT Complete Streets recommendation merged into this recommendation. Additional language added to ascertain transition between two different types of bicycle and pedestrian facilities within one development and across adjacent developments.

9| REDUCED PAPER STREETS

- **Recommendation:** Encourage the construction of paper streets to the greatest extent possible; reduce the number and extent of paper streets.
 - Action: To be carried forward in the Update.
 - **Reason:** There are a few paper streets in the study area which need to be honored by new developments.
- Additional Notes: Retention of this recommendation and the strengthening of it may result in developers planning subdivisions that take paper streets into consideration.

POLICY STRATEGIES

The following tables provide information for the policy measures recommended by this Update.

NOTE: The Planning Department should consult with the County's attorney before any or all of the sample language on the following pages is added to the UDO.

	CONNECTIVITY AND CONTIGUITY OF COLLECTOR STREETS	
Description/ Purpose	Connectivity requires that private entities coordinate across different properties to anticipate future connections between adjacent properties. Providing connectivity to nearby amenities and to the arterial system is important to avoid congestion across the transportation system. This policy requires that new collector streets be constructed to provide connections between the collector and arterial systems. As new development is programmed, this policy would require that collector streets are not closed off, but are "stubbed out" to ensure that future roadway construction can tie back into the public roadway network. Essentially, this policy stipulates that no collector street can dead end. In addition to the contiguity of collector streets, this policy is also designed to ensure contiguity of bicycle and pedestrian infrastructure.	
Target Performance Measure	Each new development needs to provide connections to another collector or arterial, or shall provide a signed stub-out to allow future connections as new development occurs. All practical connections must be included. No collector street should be discontinued without signage (i.e., Future Connection)	
	NOTICE THIS RIGHT-OF-WAY MAY BE EXTENDED IN THE FUTURE TO OTHER DEVELOPMENT AND TO OTHER ROADWAYS. COUNTY OF PENDER	

CONNECTIVITY AND CONTIGUITY OF COLLECTOR STREETS		
Sample Language	All recommended collector streets have been designed in anticipation of future growth and connectivity requirements of the area. For each collector street recommendation, there is a corresponding polygon representing the boundaries of possible alignments.	
	All new developments in the parcels that contain the collector street polygons are required to build collector streets unless the requirement has been waived by Pender County Planning and Community Development (Planning Department). The Planning Department shall evaluate the proposals of waiver and shall provide waivers based on their assessment keeping in mind the following criteria:	
	 Redundancy: A collector street segment located on adjacent parcel has fulfilled the connectivity intent in such a way that constructing it on the parcel in question will create a parallel redundant collector street. Discontinuity: An adjacent parcel has constructed a collector street that does not stub-out to the parcel in question and hence constructing it on the parcel in question will create a discontinuous segment of the collector street. Futility: There is no possibility of a future connection between the parcel in question and another discrete segment of the same collector street even with a bridge, or other structure and hence constructing it on the parcel in question will be futile. Impossibility: If a large portion of the parcel is unbuildable because of local environmental features, it may not be possible to appropriately route the collector street in that parcel. 	
	In cases where a section of the collector street polygon passes through multiple parcels of land in such a way that the collector street can be aligned on any of those parcels without compromising the overall connectivity intent, the Planning Department shall decide which parcel is most appropriate to route that collector street. The following criteria must be kept in mind while making that decision:	
	 Road geometry. Local environmental and buildability conditions. Relative parcel sizes and assessment of undue disadvantage to smaller parcels. 	
	A collector street shall be located within the corresponding polygon and shall connect to any one of the following:	
	 Adjacent land at a location that allows the continuation of the collector street onto the adjacent property as a temporary stub-out. Another collector street or another, higher-level (e.g., arterial) street. At least two local streets in case a collector street ends in a property without a recommended connection to either adjacent property or a higher-level street. This connection can be made using an intersection or a roundabout with 3 local streets, a Y-junction, T-junction, or a roundabout with two local streets. Collector streets cannot transition into only one local street. 	

	CONNECTIVITY AND CONTIGUITY OF COLLECTOR STREETS
Sample Language, continued	In instances where the collector street cannot be constructed in its entirety, a temporary turnaround at the end of the street, which shall be reviewed and approved by NCDOT, is required.
	Stub-outs shall be adequately signed at the time of final plat recordation, with an easement recorded to the adjacent parcel, and their existence shall be noted on all subdivision plats and deed documents.
	The alignment of a collector street shall be such that its continuation to the adjacent parcel does not encounter environmental features (floodplains, wetlands etc.) that can create a barrier for the continuation of the street in future. The Planning Department shall be empowered to disallow any collector street alignment that can cause an avoidable undue burden to the adjacent parcel (stream crossing, environmental mitigation, etc.). This may require coordination with owners of adjacent parcels and the Planning Department.
	All plat drawings shall indicate the extents of the collector street polygons if any part of a polygon is located on any of the parcels for which the plat drawings are prepared.
Additional Notes	The Planning Department should weigh the burden on each parcel against the overall goal of connectivity and make the appropriate decision. While it is easy to prescribe a roadway alignment for an area, it is impossible to evaluate each parcel at a planning level to determine exact alignment and hence, a case-by-case analysis becomes important. It is equally important to achieve connectivity goals while avoiding undue burden to small, more vulnerable parcels. This does not mean that all smaller parcels get a waiver from the requirement that collector streets be routed through them, but that all options should be evaluated before a decision is made.
	The County shall allow for improvements associated with the installation of a collector street to be phased within the construction of a development in accordance with existing performance guarantee processes.
	The County may consider development agreements for a number of reasons, including but not limited to the construction of collector streets.
	The County should consider modifying density calculations or adding a density bonus when a collector street is to be constructed as part of a development proposal. Such changes, if implemented, shall be weighted in accordance with the length of the collector street(s) to be constructed.

CONNECTIVITY AND CONTIGUITY OF LOCAL STREETS	
Description/ Purpose	When neighborhoods lack sufficient local street connectivity to adjacent parcels in all directions, they increase travel distances and force all trips through collector streets. These artificially inflated travel distances increase traffic while making it impractical to walk or bike. Higher connectivity also reduces emergency response times.
	The most effective way to improve local connectivity is to encourage smaller block sizes, which in turn can be achieved by minimizing cul-de-sacs and encouraging street connections to adjacent parcels. Cut-through traffic can be discouraged by traffic- calming and slowing measures. Cul-de-sacs must be required to provide through connections for bicycles and pedestrians.
	Current regulations stipulate that for a development with more than 30 units, at-least two access roads are required. This requirement should be expanded in such a way that for single family residential, each additional number of units of a certain multiple requires one additional access road be provided.
	Contiguity of the local streets will also ensure contiguity of bicycle and pedestrian infrastructure. Based on local conditions, if a two-way local street is not feasible, a minimum connection should be provided to ensure bicycle and pedestrian network contiguity.
Target Performance Measure	Each new development needs to provide local street connections to all adjacent parcels wherever feasible or shall provide a signed stub-out to allow future connections as new development occurs. All practical connections must be included.
	Local street connections to adjacent properties shall be provided such that a block length of 1500 feet in low density areas, 1000 feet in medium density areas and 500 feet in high density areas is maintained.
	No local street should be discontinued without signage (i.e., Future Connection)
Sample Language	A network of interconnected streets providing both external and internal connectivity is required for all types of new development. This network can be constructed with either public streets or private streets as allowed.
	All existing street stub-outs from adjacent developments shall be extended into the development with proper road geometry. Continuation of such streets through the development is encouraged, and ending these streets with a T-junction or a T-junction with a cul-de-sac across is discouraged.
	Encouraged Discouraged



CONNECTIVITY AND CONTIGUITY OF LOCAL STREETS	
Sample Language, continued	Stub-outs shall be adequately signed at the time of final plat recordation, with an easement recorded to the adjacent parcel, and their existence shall be noted on all subdivision plats and deed documents.
	In cases where the existing development in an adjacent parcel completed construction before financial year 2021, and a planned stub-out was not constructed up to the property line of the adjacent parcel, the developer must build the portion of the stub- out in the adjacent parcel up to the common parcel boundary so that there is no gap between the previous stub-out and its extension to the proposed development. The street connecting to the stub-out in the adjacent parcel should be constructed such that vehicles, and non-motorized modes, do not experience a gap in pavement while going from one development to another using the said street.
	Once the external streets are created, they should be connected internally, and a network should be created in a way that the average of the block lengths for the entire site does not exceed the recommended block length listed above.
	Cul-de-sacs should be discouraged since they increase the overall block length. The maximum permissible length of a cul-de-sac is 500 feet.
	The alignment of the local streets shall be such that its continuation to the adjacent parcel does not encounter environmental features (floodplains, wetlands etc.) that can create a barrier for the continuation of the street in future. The Planning Department shall be empowered to disallow any local street alignment that can cause an avoidable undue burden to the adjacent parcel (stream crossing, environmental mitigation, etc.). This may require coordination with owners of adjacent parcels and the Planning Department.
Additional Notes	If a collector street passes through a parcel, some of these requirements may be relaxed by the Planning Department after assessing the overall impacts to connectivity in the area.

TRAFFIC IMPACT ASSESSMENT REQUIREMENT	
Description/ Purpose	NCDOT requires that Traffic Impact Assessments (TIAs) be conducted for developments forecast to generate 3,000 vehicle trips per day (vpd). Pender County requires a lower threshold, 100 vehicle trips during the AM or PM peak hour or 1,000 vpd. This policy ensures that the arterial system in Pender County is not unduly burdened without understanding the impacts of the proposed development to the existing system.

TRAFFIC IMPACT ASSESSMENT REQUIREMENT	
Target Performance Measure	Require new developments forecasted to generate over 100 trips during the AM or PM Peak hour or 1,000 vpd to conduct a TIA.
	The TIA is a useful assessment tool that can have an expanded range and different levels of considerations to make it more suitable for use on collector streets. TIA reports are a critical part of the development review and approval process, as they are the primary tool for identifying the potential net effects from a development proposal. The standard 1,000 vpd threshold that can trigger a TIA represents a significant fraction (8%- 10%) of the total capacity of a collector street. A significant increase in traffic on a collector street can reduce functional integrity and public purpose. A traffic study should consider all modes of travel including vehicles, transit, bicyclists, and pedestrians.
Sample Language	A Traffic Impact Assessment (TIA) shall be required if one of the following applies to a specific site plan:
	 The development generates 1,000 vehicle trips per day (vpd); or 100 vehicles in the AM or PM peak hour.
	This requirement applies to all phases of a proposed development. Other stipulations regarding internal capture, trip generation, trip distribution, and peak hour factors will be part of the basic requirements of the TIA. It is recommended to assess and quantify the cumulative impact to the roadway network and establish processes to address additional traffic created as a result of additional development.
Additional Notes	With substantial development likely to occur in the study area in the next decades, establishing robust measures to ensure that back access is created to new developments along US 17 is of paramount concern. Traffic is already high on US 17 and the provision of multiple developments without adequate cross-access to other roadways in the area will only worsen existing traffic issues. This measure is a requirement.

CC	COLLECTOR STREETS DESIGN STANDARDS AND REQUIREMENTS	
Description/ Purpose	In addition to the contiguity of routing the collector streets, it is equally important that their cross section types and other design aspects be kept as consistent as possible.	
Target Performance Measure	Each collector street, despite passing though different parcels, is designed such that the user experience is not impacted.	
	Each collector street has seamless transitions between different street section designs despite being constructed over different periods of time by different developers.	
	Bicyclists and pedestrians can use long contiguous stretches of non-motorized infrastructure facilities (MUP, sidewalks, bike lanes) without the need of multiple crossovers, missing sections, etc.	
	The collector street is capable of functioning at Level of Service (LOS) E at peak hours, with better LOS at off peak hours.	
	Note: LOS is a qualitative measure used to relate the quality of motor vehicle traffic service. LOS is used to analyze roadways and intersections by categorizing traffic flow and assigning quality levels of traffic based on performance measure like vehicle speed, density, congestion, etc.	

COLLECTOR STREETS DESIGN STANDARDS AND REQUIREMENTS	
Sample Language	All collector streets must be designed at a minimum of 40mph design speed (35 mph posted speed). This includes curvatures, signage distances, lane tapers and all other engineering requirements as required by NCDOT. Additional traffic studies may be required to determine whether auxiliary turning lanes should be provided at the intersections with local, collector, or arterial roads.
	Driveways and intersections should be no less than 500 feet apart unless there is/are parcel(s) that will not have feasible access to another roadway besides the collector street. The Planning Department will review these instances on a case-by-case basis and will work with developers to ensure that the majority of driveways will primarily be accessed by local streets.
	All collector streets must meet the minimum design standards of at least one of the four street cross section types detailed in the Collector Street Plan. Should the developer choose to go beyond the minimum street cross section design criteria, the street cross sections should appropriately transition back to the minimum design standards (of the appropriate street cross section type) at the stub-outs to avoid undue burden to the adjacent parcels.
	The collector streets shall be continued from stub-outs of adjacent parcels using the same cross section design as the stub-out, which shall not deviate from one of the four street cross section types shown in the "Street Cross Sections" portion of the Collector Street Plan.
	For any collector street, the street cross section changes that necessitate transitions between MUP on one side and sidewalks and bicycle lanes on both sides shall be kept to a minimum to provide seamless access to cyclists and pedestrians with minimal crossovers. Such transitions, if required, shall be encouraged at collector-collector and collector-arterial intersections. Such transitions shall be avoided at collector-local intersections.
	High-visibility crosswalks built to NCDOT standards with proper Americans with Disabilities (ADA) accommodations shall be provided at all collector-local, collector-collector, and collector-arterial intersections.
Additional Notes	Strengthening the non-motorized infrastructure may result in people switching from cars to other modes for short trips. The key is well-maintained, seamless, and safe pedestrian and bicycle infrastructure.

BICYCLE AND PED	ESTRIAN ACCOMMODATION WITH NCDOT COMPLETE STREETS GUIDELINES
Description/ Purpose	As Pender County develops, the demand for safe, comfortable bicycle and pedestrian facilities will continue to increase. This policy requires the accommodation of non-motorized users along collector streets, particularly in areas close to residential developments, schools, or parks. The network of facilities for pedestrians and bicyclists will become a high-quality amenity in the County. Beyond health- and mobility-related benefits, one additional advantage of accommodations for bikes/pedestrians is preservation of capacity along the roadways with reduced vehicular use (active modes of transportation).
	The NCDOT Roadway Design Manual (anticipated summer 2021 release) provides guidance on the design and construction of streets that accommodate all users of the transportation system, including bicyclists, pedestrians, transit users, and motorists. This policy would require implementing a Complete Streets approach in new street design and construction in areas where bicycle and pedestrian amenities are programmed in the adopted Collector Street Plan.
Target Performance Measure	Connect key destinations, including schools, parks, commercial centers, and residential developments with pedestrian and bicycle amenities.
	Proposed collector streets should be designed to Complete Streets standards to accommodate pedestrians and bicyclists when these facilities are recommended in the adopted Collector Street Plan.
Sample Language	All recommended collector streets, as defined in the adopted Collector Street Plan, shall have accommodations for bicycle or pedestrian facilities.
	Requirements for bicycle or pedestrian facilities will be made in accordance with the design criteria outlined in the Collector Street Plan. Any deviation from the aforementioned designs shall adhere to the minimum bicycle and pedestrian infrastructure design standards specified by NCDOT. Other bicycle and pedestrian facilities will be considered if required by existing planning documents.
	Proposed collector streets as defined by the Collector Street Plan will adhere to the NCDOT Roadway Design Manual, including the design of multimodal facilities – i.e., proposed pedestrian and bicycle facilities must be designed and constructed to the applicable standard.
	The contiguity of the type of bicycle and pedestrian facilities shall be maintained in accordance to the requirements outlined in the "Connectivity and Contiguity of Collector Streets" section of the policy recommendations.

BICYCLE AND PEDESTRIAN ACCOMMODATION WITH NCDOT COMPLETE STREETS GUIDELINES	
Additional Notes	The inclusion of sidewalks/pedestrian paths/bikeways on all collector streets should be viewed as a required minimum standard.
	This measure is based on a stated desire from the public and other adopted plans in the County to include more pedestrian and bicycle facilities along roads in the Collector Street Plan study area. Construction of new roadways or upgrades to existing roadways should be to the standards indicated in the NCDOT Roadway Design Manual and in this Update.

	STORMWATER/GREEN STREETS POLICY REQUIREMENT
Description/ Purpose	Stormwater and Green Streets Policies can help ensure stormwater Best Management Practices (BMPs) are implemented, safeguarding precious natural resources, ensuring water quality, and preventing infrastructure maintenance issues. Both NCDOT and the North Carolina Department of Natural and Cultural Resources (DNCR) provide guidance regarding stormwater BMPs. In Pender County, shellfish habitat can be negatively affected as nutrient rich runoff from roads and other impervious surfaces enters streams, rivers, and wetlands. Safely treating stormwater runoff is important in terms of maintaining critical wildlife habitats and ensuring water quality for plant, animal, and human uses.
Target Performance Measure	Pender County will implement a community education campaign regarding the importance of stormwater mitigation; develop a stormwater management master plan with a focus on the reduction of runoff volumes (as stated in Pender 2.0: Comprehensive Land Use Plan); and explore the possibility of providing incentives to developers for providing stormwater BMPs which will enhance the standard level of treatment. All provisions should be developed and articulated in the Stormwater Management Master Plan.
Sample Language	Stormwater BMPs and Green Streets Policies are essential in mitigating pollution and maintaining water quality, particularly in sensitive natural areas. Pender County is home to notable natural resources, which can be negatively impacted by stormwater runoff. To avoid this type of environmental degradation, the implementation of stormwater BMPs is recommended to be implemented as appropriate.
Additional Notes	This measure ensures a rigorous implementation of stormwater BMPs and establishes a regulatory framework to require stormwater BMPs where appropriate. Providing stormwater BMPs around critical surface waters and watershed areas can help mitigate water quality issues.

	ENVIRONMENTAL CONSERVATION POLICY
Description/ Purpose	Extending outward from the need to create interconnected populations (streets and greenways) and a reduced footprint from water quality/quantity impacts is the desire to create interconnected ecologies. This practice is called "landscape ecology," a subset of conservation biology which requires the consideration of green space interconnectivity to provide habitat for species, green spaces for people, and the preservation of the rural character that is valued in Pender County. Large, protected areas like parks and preservation zones need to be connected with "stepping stone" areas that allow the movement of wildlife and promotion of biodiversity. It is recommended to develop a "Greenprint" that shows areas that would be preserved based on utility (or lack thereof) to private development; linkages to large, protected areas; and biologically diverse habitat (e.g., streams, older-growth forests). Future developments would incorporate these green areas into their plans as part of open space requirements; additional space provisions could be rewarded through clustering bonuses that allow a higher intensity of development elsewhere on the site.
Target Performance Measure	Avoid sensitive natural areas to the degree possible when programming new development or reserving road right-of-way (ROW).
Sample Language	In order to preserve the unique natural environment of Pender County, any new development that would require the construction of collector streets as defined by the adopted Collector Street Plan, shall avoid or minimize impacts to sensitive natural areas, such as wetlands, floodplain, and areas with endangered flora/fauna. Additional justification (i.e., Corps Delineation, etc.) or other additional resources may be necessary.
Additional Notes	In some cases, development will necessarily encroach into sensitive natural areas. Avoiding these areas is strongly recommended, but may not always be feasible or even desirable to do so.

TRI-PARTY AGREEMENT

Description/ Purpose	The Tri-Party agreement is a framework for the construction and maintenance of new pedestrian and bicycle facilities along collector streets. While NCDOT would ultimately maintain the street, all maintenance and liability costs for the construction and maintenance of pedestrian and bicycle facilities would be borne by Pender County or the Homeowner's Association (HOA) until construction was complete. At that point, maintenance would be transferred to the HOA or other qualified party, absolving both NCDOT and Pender County from any liability or maintenance relating to the pedestrian
	and bicycle amenity.
	maintenance would be transferred to the HOA or other qualified party, absolving both NCDOT and Pender County from any liability or maintenance relating to the pedestrian and bicycle amenity.

	TRI-PARTY AGREEMENT						
Target Performance	Negotiate and implement the Tri-Party agreement with NCDOT. (See Appendix F)						
Measure	Inform affected development community/HOA that this agreement may be warranted for specific situations related to the implementation of bicycle or pedestrian facilities.						
Sample Language	NCDOT may maintain the multimodal (bicycle and pedestrian) facilities if the following conditions are met:						
	 NCDOT's local Division agrees on the facility design to ensure that they are able to maintain it after construction. It is located in an unincorporated area 						
	 Developer is turning the ownership of the road with multimodal facilities over to NCDOT Multimodal facilities are within the NCDOT DOW past hands or 						
	These conditions were inferred from the NCDOT Complete Streets Implementation Guide and conversations with NCDOT. Multimodal facility maintenance on collector streets will need to be decided on a case by case basis.						
	For facilities that do not meet these conditions, details of the tri-party agreement can be seen in Appendix F.						
Additional Notes	The Tri-Party Agreement is fundamental to constructing and maintaining pedestrian and bicycle amenities in the study area. Implementing and abiding by this agreement would be a requirement in situations where bicycle and pedestrian amenities are planned to be constructed.						

	REDUCED PAPER STREETS											
Description/ Purpose	A paper street is a "street shown on a recorded plan but never built on the ground" (Shapiro v. Burton, 23 Mass. App. Ct. 327, 328, 1987). These anticipated roads are shown in planning documents or on plats currently on record.											
	This policy requires that platted ROW becomes built to NCDOT standards to ensure connectivity is implemented.											
Target Performance Measure	Encourage the construction of existing paper streets to the greatest extent possible; reduce the number and extent of new paper streets.											

	REDUCED PAPER STREETS
Sample Language	All platted site plans must honor paper streets, reserving ROW and ensuring that streets can be constructed to NCDOT standards. Paper streets must be preserved until such time as they are constructed. Changing or realigning paper streets will require the developer to obtain all required permissions from the owners of all the parcels that are affected by the changes proposed by the developer.
Additional Notes	Proper ROW preservation/width is needed to ensure implementation of an adequate street system with the appropriate non-motorized facilities.

CONCLUSION

The recommendations presented in this document are based on a thorough analysis of Pender 2.0: Comprehensive Land Use Plan, the existing built and natural environment, and stakeholder and public input. These recommendations are purposefully developed to provide flexibility to both Pender County and the development community to build a safe and efficient multimodal transportation network while recognizing the constraints present within individual parcels, adjacent development, and natural resources.







AN UPDATE TO THE 2016 PENDER COUNTY COLLECTOR STREET PLAN

APPENDICES



ADOPTED OCTOBER 18, 2021

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APPENDIX A: STREETLIGHT DATA

Streetlight Data was used to understand the existing (2019) traffic patterns within the study area. The Study area was divided into 24 TAZs and four key analyses were carried out using the TAZs and roads entering and exiting the study area. Figure A shows the location of the TAZs and access points of the study area.

- 1. Trips starting and ending within the study area (Internal-Internal trips) are shown in Table A1
- Trips starting in the study area and ending outside the study area (internal-external trips) are shown in Table A2
- 3. Trips starting outside the study area and ending inside study area (external-internal trips) are shown in Table A3
- 4. Trips starting outside the study area passing through the study area and ending outside the study area (external-external trips) are shown in Table A4



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Figure A-1 | Map of the Study Area showing Constituent TAZs and Location of Gates used for Streetlight Data Analysis

						DES	STINATI	ON ZOI	NES				
		1	2	3	4	5	6	7	8	9	10	11	12
	1	2021	1001	324	111	76	52	119	868	182	37	17	10
	2	1111	2908	691	187	140	107	174	1440	238	81	36	15
	3	350	759	1219	311	107	134	184	782	134	136	32	37
	4	126	187	317	340	93	57	61	362	39	21	5	2
	5	76	142	120	90	441	55	45	182	36	15	3	2
	6	53	100	119	58	56	31	23	50	11	25	9	4
	7	105	185	202	72	39	29	78	175	61	91	22	14
	8	763	1364	859	378	189	67	219	675	243	135	46	42
	9	176	236	121	36	41	14	59	237	363	12	1	1
	10	43	86	117	15	17	32	89	132	12	54	10	12
١ES	11	16	40	26	3	5	12	13	51	1	13	4	3
I ZON	12	12	14	36	3	2	3	10	39	1	10	3	11
lgin	13	31	58	65	13	6	13	26	101	7	18	10	5
OF	14	1	1	1	0	1	0	0	4		4		
	15	4	4	1	0	0		1	2	0	1	0	1
	16	10	9	9	4	5	1	4	7	1	4	0	4
	17	11	11	27	1	46	1	17	11	1	10	0	10
	18	14	20	20	7	20	7	13	34	2	5	0	17
	19	3	3	4	0	1	1	6	4	1	0	0	0
	20	0	5	0		0		0	0		1		
	21	0	1	0		0		0	0		0		
	22		5		0	0		0	9		0		0
	23		0	0	0			1	1				
	24	0	0	0		0		0	0	0			
T	OTAL	4926	7139	4278	1629	1285	616	1142	5166	1333	673	198	190

 Table A-1 | Daily Trips within the Study Area (Internal-Internal Trips)

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DESTINATION ZONES												
13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
31	1	2	9	9	16	2	0	0	0			4888
64	1	4	6	9	21	2	8	0	8	0	0	7251
70	1	1	9	18	18	5	0	0	0	0	1	4308
14	0	0	6	2	16	1	0		0		0	1649
10	1		5	31	15	1	0	0		0		1270
11		0	1	5	8	1	0					565
39	0	1	4	14	11	4	1	0	0	0	0	1147
113	1	2	8	8	41	2	0	0	6	16	0	5177
6		1	2	1	3	0					1	1311
25	2	0	3	10	7	2	2	0		0		670
12		0	3	0	1					0		203
4			0	8	26	0			1			183
77	0	1	4	1	6	0				0		442
	3	1	3	3	3	0			0			25
1	4	75	32	13	24	2	0	0		0		165
1	4	37	43	73	124	55	0	1	1	1	1	399
4	0	11	69	558	233	86	1	13	3	1	5	1130
7	3	19	114	269	450	172	1	9	1	3	10	1217
0	0	2	42	77	173	183	4	11	3	1	8	527
0			1	1	3	5	9	3	1	1	3	33
		0	1	10	10	16	2	30	1	4	3	78
		0	0	1	1	4	2	3	12	3	1	41
		0		1	3	3	1	3	8	18	15	54
			1	4	10	4	3	3	0	13	15	53
489	21	157	366	1126	1223	550	34	76	45	61	63	32786

Eastern Zones Western Zones Eastern Zone to Eastern Zone

Western Zone to Western Zone

			DES	TINATION	GATES (PAS	S THROUG	H LOCATIC	NS)	
		US 17 North End	US 17 South End	Sidbury Rd	Holly Shelter Rd	Shaw Hwy	l-40 North End	l-40 South End	US 117 North End
	1	2467	1828	119	75	17	109	12	87
	2	1567	2283	136	119	11	147	21	88
	3	555	1618	133	80	11	96	10	90
	4	233	1189	91	18	4	53	27	20
	5	93	1784	134	4	11	68	89	23
	6	95	527	60	18	4	19	9	14
	7	173	378	14	112	6	39	3	29
	8	821	1379	78	104	18	95	14	59
	9	297	487	15	47	0	22	4	11
	10	81	249	5	212	4	21	4	31
NES	11	30	61	0	68	2	4	3	6
ZON	12	20	25	6	239	6	10	25	23
GIN	13	49	127	1	206	2	12	2	10
ORI	14	2	1	0	2	5	9	29	7
	15	5	1		1	15	25	124	75
	16	24	12	1	11	23	173	249	250
	17	32	49	9	130	11	63	28	266
	18	24	51	17	114	25	141	202	533
	19	11	5	1	16	7	34	26	97
	20	1	2	0	3		0	1	1
	21	0	1		1	0	0	1	4
	22	1	6	1	0	1	1	1	1
	23	0	1				0	1	2
	24	2	4			1	2	3	7
Т	OTAL	6583	12068	821	1580	184	1143	888	1734

 Table A-2 | Daily Trips Starting within the Study Area and Ending outside the Study Area (Internal-External Trips)

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	DESTINATION GATES (PASS THROUGH LOCATIONS)													
US 117 South End	US 421 North End	US 421 South End	NC 210 North End	Blueberry Rd	Herrings Chapel Rd	Highsmith Rd	Little Kelly Rd	Scott Rd	TOTAL					
28	2	2	6	0	0		1	2	4755					
30	2	19	7	2	0	0	0	5	4437					
37	2	5	4	0	0	0	0	2	2643					
11	2	4	1	0	0		0	0	1653					
56	4	5	3	2			3	3	2282					
13	0	0	1		0		0	0	760					
24	0	3	3	1		0		0	785					
47	4	13	5	3	0	2	1	2	2645					
5		2	1				0		891					
16	0	3	4	0			0		630					
2							0		176					
37	0	0	1					0	392					
3			1	1		0	0	0	414					
5	0		2						62					
21		0	3		0	0	1	0	271					
214	4	2	28	2	3	2	4	16	1018					
1937	4	13	34	2	6	6	13	20	2623					
1581	13	9	78	5	10	11	41	30	2885					
585	21	66	57	3	32	53	38	42	1094					
4	23	135	2	12	0	1		0	185					
25	23	31	18	3	6	24	1	0	138					
3	30	73	2	17	0	7	0		144					
3	20	77	2	35	0	3	0	0	144					
5	40	199	9	2	5	8	0		287					
4692	194	661	272	90	62	117	103	122	31314					

Eastern Zone/Gate

Eastern Zone to Eastern Gate Western Zone to Western Gate

						DESTIN	ATION	ZONES	;			
		1	2	3	4	5	6	7	8	9	10	11
	US 17 North End	2447	1515	553	234	95	113	211	956	300	84	28
	US 17 South End	1870	2507	1892	1191	1824	396	341	1113	483	266	30
	Sidbury Rd	47	91	101	56	115	38	15	49	11	4	37
	Holly Shelter Rd	144	166	137	22	3	23	118	112	44	224	11
	Shaw Hwy	13	8	10	3	15	4	8	18		2	56
(IONS)	I-40 North End	103	139	80	47	56	10	21	76	17	20	13
LOCAT	I-40 South End	13	24	11	21	74	6	4	12	2	5	24
HDUO	US 117 North End	78	74	87	19	19	14	28	52	9	24	47
SS THR	US 117 South End	26	32	46	6	66	8	28	36	5	15	5
SC (PAS	US 421 North End	3	7	2	3	2	0		3		0	16
N GATE	US 421 South End	5	16	2	4	19	2	2	14	2	2	2
ORIGII	NC 210 North End	3	6	4	3	0	1	1	3	1	1	37
	Blueberry Rd	2	2	0		12	0		1	2		3
	Herrings Chapel Rd	0	1	0			0			0	0	5
	Highsmith Rd	0	0			0	0	0				21
	Little Kelly Rd	1	0	0	0	3	1	0	0	0	0	214
	Scott Rd	2	5	3	2	5		0	2	0		1937
	TOTAL	4757	4593	2928	1611	2308	616	777	2447	876	647	149

 Table A-3 | Daily Trips Starting outside the Study Area and Ending within the Study Area (External -Internal-Trips)
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DESTINATION ZONES													
12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
19	50	3	7	19	31	24	8	1	0	0	0	3	6700
31	138	1	2	12	47	43	12	6	1	5	2	4	12225
4	1	0	0	3	19	31	3	0		0			590
232	193	0	0	11	111	136	12	2	0	1	0		1755
9	1	6	7	36	9	23	4		0	1		0	179
11	15	7	14	131	57	133	34	2	1	0	1	3	984
26	2	27	111	280	21	246	26	1	2	1	1	4	921
24	9	4	65	270	245	563	98	1	2	2	2	6	1701
26	4	6	27	239	2017	1729	587	1	25	4	4	8	4948
		0	2	2	5	7	18	15	14	42	22	35	182
	0	0	2	3	11	13	57	167	36	83	70	223	733
0	3	0	1	22	27	65	71	1	23	5	2	2	245
	0			3	3	2	3	13	1	22	25	4	95
			0	0	4	8	28	0	5	0	0		46
	0		0	0	2	4	59	3	21	4	3	1	97
0			1	8	13	47	23	0	0	1		1	99
	0		0	15	14	19	23		0	0	0	0	90
382	416	54	239	1054	2636	3093	1066	213	131	171	132	294	31590

Eastern Zone/Gate

Eastern Gate to Eastern Zone

Western Gate to Western Zone

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		DESTINATION GATES (PASS THROUGH LOCATIONS)									
		US 17 North End	US 17 South End	Sidbury Rd	Holly Shelter Rd	Shaw Hwy	I-40 North End	I-40 South End			
	US 17 North End		6812	252	190	14	361	68			
	US 17 South End	6716		758	41	9	210	255			
	Sidbury Rd	147	839		13	3	13	17			
	Holly Shelter Rd	299	68	9		6	31	52			
NS)	Shaw Hwy	15	12	1	5		12	140			
CATIO	I-40 North End	335	178	9	34	14		11716			
H LOG	I-40 South End	79	209	14	59	157	13375				
SOUG	US 117 North End	81	53	7	34	61	55	1593			
S THR	US 117 South End	58	132	37	288	45	110	46			
(PAS	US 421 North End	7	24	2	2	0	10	7			
SATES	US 421 South End	20	68	2	3	2	14	17			
IGIN 0	NC 210 North End	20	7	3	10	7	4	8			
OR	Blueberry Rd	4	16		0	0	1	1			
	Herrings Chapel Rd	1	1	0	0	0	1	1			
	Highsmith Rd	0	0		0		2	3			
	Little Kelly Rd	1	1	3	1	9	4	8			
	Scott Rd	1	8		2		3	47			
	TOTAL	7784	8428	1097	682	327	14206	13979			

 Table A-4 | Daily Trips Passing through the Study Area (External -External Trips)

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	DESTINATION GATES (PASS THROUGH LOCATIONS)										
US 117 North End	US 117 South End	US 421 North End	US 421 South End	NC 210 North End	Blueberry Rd	Herrings Chapel Rd	Highsmith Rd	Little Kelly Rd	Scott Rd	TOTAL	
86	53	3	14	18	2	1	0	1	3	7878	
60	113	14	51	6	11	0	1	2	8	8255	
11	68	0	1	3	0	1	0	3	2	1121	
36	278	1	4	8		0	0	1	2	795	
67	36	0	1	5	0	0	0	5	0	299	
69	84	6	14	6	0	0	1	4	3	12473	
1619	58	8	19	17	0	1	4	11	17	15647	
	1096	11	12	36	4	4	6	16	12	3081	
1270		13	25	235	10	84	24	101	320	2798	
10	13		1649	71	22	7	17	2	4	1847	
20	22	1739		59	452	30	98	4	7	2557	
30	202	63	48		3	20	42	12	10	489	
6	16	15	423	1		4	3	2	0	492	
7	84	10	37	24	4		3	6	2	181	
10	29	13	96	56	5	22		9	4	249	
16	88	1	3	14	0	1	3		8	161	
12	237	2	9	5	0	8	13	16		363	
3329	2477	1899	2406	564	513	183	215	195	402	58686	

Eastern Gate Western Gate

Eastern Gate to Eastern Gate

Western Gate to Western Gate

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APPENDIX B: WEIGHTED AVERAGE DAILY TRIPS PER HOUSEHOLD

The documentation of the adopted 2045 Travel Demand Model (TDM) for Wilmington MPO included tables daily household trips by trip purpose based on the size, income and automobile availability of the household. These tables were used to calculate weighted average of daily home-based trips taken by a household in a study area thereby erasing the differences in size, income and automobile availability. The following steps were followed in the calculation.

- 1. Determine the proportion of households within the study area that fall into each category of household size, income and automobile availability. (Table B1)
- Calculate all home-based trips per household disaggregated by income, size and automobile availabity. (Table B2)
- 3. Calculate the weighted average of daily home based trips. (Table B3)

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SOCIO-ECONOMIC DATA OF THE STUDY AREA FROM WMPO 2045 TRAVEL DEMAND MODEL													
		HOUS	SEHOLE) SIZE		AL		AILABILI	ΤY	HOU	JSEHOI		OME
TAZ ID	1	2	3	4	5+	0	1	2	3+	High	Med- High	Med- Low	Low
207	1180	1450	785	523	306	179	1270	1820	977	659	1477	1582	527
206	60	156	99	81	73	21	145	200	105	73	164	175	58
205	97	200	118	90	71	27	181	244	125	89	201	215	71
204	225	362	202	145	99	49	327	435	221	160	360	385	128
201	363	585	326	234	159	49	300	736	582	0	104	554	1011
202	372	525	288	199	126	98	542	600	270	37	222	603	649
203	1023	1076	584	372	201	164	1060	1359	674	506	1133	1214	404
570	3	6	3	2	1	0	5	7	4	7	5	3	0
568	695	1118	624	448	305	98	747	1415	931	495	1110	1189	396
569	1274	1341	728	464	251	181	1251	1725	901	630	1412	1513	504
571	0	0	0	0	1	0	0	0	0	0	0	0	0
573	40	83	49	37	29	12	80	100	48	105	79	53	4
572	19	24	13	8	5	3	21	30	15	11	24	26	8
574	27	21	11	6	3	3	23	28	13	30	22	15	1
577	282	454	253	182	124	39	302	575	379	293	475	440	88
578	30	101	70	60	62	9	62	143	108	73	119	110	22
576	71	186	118	96	87	27	179	234	118	243	182	123	9
575	133	163	88	59	34	24	155	199	99	208	156	105	8
579	54	76	42	29	18	6	43	97	72	49	81	75	15
583	101	124	67	44	26	17	117	152	76	158	118	80	6
585	13	24	14	10	7	3	22	29	14	30	22	15	1
584	6	9	5	3	2	1	8	11	6	12	9	6	0
581	17	32	18	13	10	4	29	38	19	40	30	20	1
580	15	19	10	7	4	1	11	25	18	12	20	19	3
Total	6100	8135	4515	3112	2004	1015	6880	10202	5775	3920	7525	8520	3914
%	26%	34%	19%	13%	8%	4%	29%	43%	24%	16%	32%	36%	16%

Table B-1 | Number of Households by Size, Income and Automobile Availability in the TAZs within the Study Area

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CALCULATION OF HOME BASED TRIPS BY HOUSEHOLD SIZE, INCOME AND AUTO AVAILABILITY											ITY.						
		H H	IGH II OUSE	NCOM HOLE	1E DS	М	EDIUI INCO	M-HIC OME	θH	Μ	IEDIU INCO	m lo' Dme	W	LOW INCOME HOUSEHOLDS			
	HH Size	0 car	1 car	2 car	3+ car	0 car	1 car	2 car	3+ car	0 car	1 car	2 car	3+ car	0 car	1 car	2 car	3+ car
DRK	1р	1.85	1.85	1.85	1.85	0.38	0.38	1.5	1.5	0.42	0.42	0.45	0.45	0.06	0.43	0.43	0.43
M C	2p	1.46	1.46	1.46	1.76	0.42	0.42	1.74	1.74	0.5	0.5	0.85	1.61	0.06	0.33	0.33	0.45
ASE	Зр	2.83	2.83	2.83	2.83	1.85	1.85	1.85	3.72	1.69	1.69	1.69	2.72	0.31	0.31	1.07	1.07
MEB	4p	2.55	2.55	2.55	2.55	3.00	3.00	3.00	3.00	2.37	2.37	2.37	2.68	1.07	1.07	1.07	1.07
ЮН	5р	2.13	2.13	2.13	2.13	1.79	1.79	1.79	3.84	3.52	3.52	3.52	4.18	2.67	2.67	2.67	2.67
	1р	1.05	1.05	1.05	1.05	0.45	0.45	0.98	0.98	1.13	1.13	1.13	1.13	0.3	0.57	1.41	1.41
HOME BASED SHOPPING	2р	1.56	1.56	1.56	2.65	0.87	0.87	1.29	1.29	1.24	1.24	1.63	1.63	1.27	1.27	1.51	1.51
	Зр	2.04	2.04	2.04	2.09	1.21	1.21	2.02	2.27	1.06	1.06	1.62	2.81	0.79	0.79	3.1	3.77
	4р	1.86	1.86	1.86	4.88	2.58	2.58	2.58	2.58	2.47	2.47	2.47	3.79	0.99	0.99	3.14	3.14
	5р	1.53	1.53	1.53	3.18	4.47	4.47	4.47	4.47	4.94	4.94	4.94	4.94	2.67	2.67	2.58	2.58
	1р	1.05	1.05	1.05	1.05	1.92	1.92	1.92	1.92	0.59	0.59	0.59	1.9	0.96	0.96	0.96	0.99
ASED RIPS	2р	1.74	1.74	1.74	3.12	2.06	2.06	2.06	2.06	1.26	1.26	1.65	1.65	1.49	1.49	1.49	1.49
1E B/ IER T	Зр	3.4	3.4	3.4	4.42	5.62	5.62	5.62	5.62	3.78	3.78	3.78	3.78	3.85	3.85	3.85	3.85
HON OTH	4р	7.78	7.78	7.78	7.78	5.74	5.74	5.74	5.74	8.86	8.86	8.86	8.86	4.23	4.23	4.23	4.23
	5р	7.78	7.78	7.78	7.78	6.18	6.18	6.18	6.18	10.4	10.4	10.4	10.4	8.16	8.16	8.16	8.16
Q	1р	3.95	3.95	3.95	3.95	2.75	2.75	4.4	4.4	2.14	2.14	2.17	3.48	1.32	1.96	2.8	2.83
BASEI	2р	4.76	4.76	4.76	7.53	3.35	3.35	5.09	5.09	3.00	3.00	4.13	4.89	2.82	3.09	3.33	3.45
DME	Зр	8.27	8.27	8.27	9.34	8.68	8.68	9.49	11.6	6.53	6.53	7.09	9.31	4.95	4.95	8.02	8.69
- T HC	4р	12.1	12.1	12.1	15.2	11.3	11.3	11.3	11.3	13.7	13.7	13.7	15.3	6.29	6.29	8.44	8.44
ALL	5p	11.4	11.4	11.4	13.1	12.4	12.4	12.4	14.5	18.9	18.9	18.9	19.5	13.5	13.5	13.4	13.4

 Table B-2 | Calculation of Total Home-based Trips by Household Size, Income and Automobile Availabity

PENDER COUNTY STREETS PLAN 2021

HIGH INCOME HH	TRIPS	BY AUTO) AVAILAE	BILITY	HH Size	HH Size APPORTIONED			PS
TRIPS BY HH SIZE	0 car	1 car	2 car	3 car	as % or total	0 car	1 car	2 car	3 car
1 person	3.95	3.95	3.95	3.95	26%	1.01	1.01	1.01	1.01
2 person	4.76	4.76	4.76	7.53	34%	1.62	1.62	1.62	2.57
3 person	8.27	8.27	8.27	9.34	19%	1.56	1.56	1.56	1.77
4 person	12.19	12.19	12.19	15.21	13%	1.59	1.59	1.59	1.98
5 person	11.44	11.44	11.44	13.09	8%	0.96	0.96	0.96	1.10
						6.7	6.7	6.7	8.4
	29%	43%	24%						
Apportioned	Availability	0.3	1.9	2.9	2.0				
	l by an aver	age High I	ncome ho	usehold					

16.4% of the total housholds in the study area are High Income

1.17 Contribution of HI Households to average daily trips per household

MED-HI INC HH	TRIPS	BY AUTC) AVAILA	BILITY	HH Size	APPORTIONED TRIPS				
TRIPS BY HH SIZE	0 car	1 car	2 car	3 car	total	0 car	1 car	2 car	3 car	
1 person	2.75	2.75	4.4	4.4	26%	0.70	0.70	1.12	1.12	
2 person	3.35	3.35	5.09	5.09	34%	1.14	1.14	1.73	1.73	
3 person	8.68	8.68	9.49	11.61	19%	1.64	1.64	1.80	2.20	
4 person	11.32	11.32	11.32	11.32	13%	1.48	1.48	1.48	1.48	
5 person	12.44	12.44	12.44	14.49	8%	1.04	1.04	1.04	1.22	
						6.0	6.0	7.2	7.7	
		4%	29%	43%	24%					
Apportioned trips of Medium-High Income Households by Auto Availability 0.3 1.7 3.1 1.5										
6.9 number of daily trips generated by an average								Income ho	busehold	

35.7% of the total households in the study area are Medium-High Income

2.47 Contribution of MHI Households to average daily trips per household

APPENDICES

MED-LO INC HH	TRIPS	BY AUTC) AVAILAE	BILITY	HH Size	APPORTIONED TRIPS			
TRIPS BY HH SIZE	0 car	1 car	2 car	3 car	total	0 car	1 car	2 car	3 car
1 person	2.14	2.14	2.17	3.48	26%	0.55	0.55	0.55	0.89
2 person	3	3	4.13	4.89	34%	1.02	1.02	1.41	1.67
3 person	6.53	6.53	7.09	9.31	19%	1.24	1.24	1.34	1.76
4 person	13.7	13.7	13.7	15.33	13%	1.79	1.79	1.79	2.00
5 person	18.9	18.9	18.9	19.56	8%	1.59	1.59	1.59	1.64
						6.2	6.2	6.7	8.0
		% of Total	4%	29%	43%	24%			
Apportioned trips of	Availability	0.3	1.8	2.9	1.9				
	l by an aver	age Mediu	um-Low In	come hou	sehold				

31.5% of the total households in the study area are Medium-Low Income

2.15 Contribution of MLI Households to average daily trips per household

LOW INCOME HH	TRIPS	BY AUTC) AVAILAI	BILITY	HH Size	APPORTIONED TRIPS				
TRIPS BY HH SIZE	0 car	1 car	2 car	3 car	total	0 car	1 car	2 car	3 car	
1 person	1.32	1.96	2.8	2.83	26%	0.34	0.50	0.72	0.72	
2 person	2.82	3.09	3.33	3.45	34%	0.96	1.05	1.14	1.18	
3 person	4.95	4.95	8.02	8.69	19%	0.94	0.94	1.52	1.64	
4 person	6.29	6.29	8.44	8.44	13%	0.82	0.82	1.10	1.10	
5 person	13.5	13.5	13.41	13.41	8%	1.13	1.13	1.13	1.13	
						4.2	4.4	5.6	5.8	
		% of Total	4%	29%	43%	24%				
Apportioned 1	0.2	1.3	2.4	1.4						
	ed by an av	erage Lov	v Income	household	b					
	are Low I	ncome								

0.86 Contribution of LI Households to average daily trips per household

OTAL	6
------	---

.66 AVERAGE DAILY TRIPS PER HOUSEHOLD IN PENDER COUNTY

Table B-3 | Calculation of weighted average of daily home-based trips within the study area

PENDER COUNTY STREETS PLAN 2021

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APPENDIX C: PUBLIC OUTREACH AND STAKEHOLDER ENGAGEMENT

This Appendix details public outreach and stakeholder engagement that occurred as part of the 2021 Plan Update during March/April 2021 (Phase I) and May/June 2021 (Phase II) through the following exhibits:

- 1. Stakeholder Steering Committee
- 2. Public Engagement Phase I Summary
- 3. Stakeholder Meeting I Minutes
- 4. Stakeholder Meeting I Presentation Slides
- 5. Public Survey Results
- 6. Public Engagement Phase II Summary
- 7. Stakeholder Meeting II Minutes
- 8. Stakeholder Meeting II Presentation Slides

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EXHIBIT 1: STAKEHOLDER STEERING COMMITTEE

- Cameron Moore Cape Fear Homebuilders Executive Director
- Tyler Newman BASE CEO
- Allison Engebretson Landscape Architect, Paramount Engineering
- Don Mizelle Engineer, WithersRavenel
- Robert Jackson Homebuilder/Developer
- Steve Shuttleworth Developer
- Coleman Parks Developer/Landowner
- George Johnson Developer/Landowner
- Damien Buchanan Planning Board Member
- Jeff Beaudoin Planning Board Member
- Dan Cumbo, PE District Engineer for Division 3, District 1

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EXHIBIT 2: PUBLIC ENGAGEMENT PHASE I SUMMARY

INTRODUCTION

This report summarizes the public engagement Phase I activities WSP conducted for the development of the *Pender County Streets Plan Update* (*Streets Plan Update*) for the Wilmington Metropolitan Planning Organization (WMPO) and Pender County. The purpose of the *Streets Plan Update* is to guide investment in new collector streets to improve connectivity, inform land development, maintain acceptable levels-of-service on existing roadways, ensure natural areas are conserved, and provide a safe and high quality transportation network for residents, businesses, and visitors using all modes of travel.

Phase I activities included an online survey and stakeholder meeting conducted during the months of March and April 2021 to collect important feedback from citizens and land developers to ensure the *Streets Plan Update* is reflective of the community's goals and needs. The input collected will be used during the development of the draft *Streets Plan Update* recommendations.

STAKEHOLDER MEETING

PURPOSE OF THE MEETING

A stakeholder meeting was held on March 18, 2021 to solicit feedback from stakeholders in the land development and real estate community. The purpose of the meeting was to provide background and process for the study, hear observations on the 2016 *Collector Street Plan*, identify development trends and constraints, discuss the vision and goals of the *Collector Streets Update*, and allow for open dialogue about questions, comments, and concerns the stakeholders had.

The meeting was held at the City of Wilmington municipal building at 305 Chestnut Avenue and, due to state and local social distancing guidelines, an online option was offered to participate via Zoom. There were a total of 8 stakeholders who attended in-person and 3 stakeholders who attended virtually. The stakeholders included mostly representatives of development organizations and real estate agencies, as well as Pender County planning board members. The meeting minutes are included in Appendix A.

The format of the meeting included a presentation with interactive polling questions, followed by an open discussion. The presentation was given by the study team including Abby Lorenzo with the WMPO, Travis Henley with Pender County, and Will Letchworth, Shivang Shelat, and Katharine Mather with WSP. The presentation is included in Appendix B.

RESULTS FROM INTERACTIVE POLLING ACTIVITY

Interactive polling was used during the presentation through the platform PollEverywhere.com to engage with the stakeholders and collect their feedback on key issues. Stakeholders were able to join the polling session using a web browser on their phone or laptop, by texting in, or by downloading the PollEverywhere mobile application. As participants responded to each question, their responses appeared in real time through the presentation broadcast. This method allowed stakeholders participating in the meeting from Zoom and the stakeholders who attended the meeting in person to respond to each question and see the results. A total of four questions were asked, and the results are shown in Figures 1 through 3 and through summary bullets.



Did you participate in the development of the 2016 Pender Collector Street Plan?

Figure 1. Results of Stakeholder PollEverywhere Question

Please rate the connections of the proposed collector roads and proposed recommendations from the 2016 Plan in terms of how useful they are for guiding development and site plans on a scale of 1-5, with 1 being not helpful and 5 being very helpful.



Figure 2. Results of Stakeholder PollEverywhere Question

What obstacles to development do you foresee within the study area over the next 10-15 years?

- Utilities
- County keeping up with growth with investment in education, parks, and infrastructure
- Construction material costs
- The County is going to have become a partner in building infrastructure, particularly if they want to help with the cost of housing
- Water and sewer

What transportation elements do you see as most important to include in future developments to attract potential buyers/tenants?



Figure 3. Results of Stakeholder PollEverywhere Question

RESULTS FROM PUBLIC SURVEY

PURPOSE OF THE SURVEY

In order to engage a wide audience about transportation needs, the study team developed a survey that was available both online and in a paper format. The survey was also available in Spanish in both formats. The survey period began on March 11th and ended on April 8th. The online platform, SurveyMonkey, was used to collect survey responses. A full report of the survey responses is included in Appendix C.

In total, 440 individuals completed the survey. There was an 85% competition rate of all questions and the survey took an average of six minute to complete. The WMPO and Pender County advertised the survey with a press release and through social media.

The survey provided information about the purpose of the study and explained the function of collector streets. The survey then asked two questions, 'Where do you currently live primarily' and 'Where do you currently work/attend school', to understand possible travel patterns of the survey respondents. Most respondents, 90%, selected that they live inside the study area, with an additional 8% selecting outside the study area in Pender County. Similarly, 55% of respondents selected that they work/attend school within the study area, while another 25% selected they work/attend school outside the study area, in New Hanover County.

The remainder of the survey was then conditional based on if the respondent was a member of the public (resident/business owner/visitor) or a member of the development industry. Most (99%) survey respondents selected they were a member of the public. Given that the development industry was largely represented in the stakeholder meeting where they had an opportunity to provide feedback, the relatively small amount of responses for this conditional part of the survey is not a concern. The following sections present the results from the two groups separately.

RESULTS FROM PUBLIC

The survey questions for the members of the public focused on traffic concerns, connections to local destinations, and travel priorities. A total of seven questions were asked. The first question asked, 'How do you primarily travel within the study area', with the most popular choice being by car with 100% of respondents selecting it. Minimal selections for carpool, bus, other (noting motorcycle) were made, while 4.45% of respondents also selected bicycle or walking. Results from this question are presented in Figure 4.



Figure 4. Results of Public Survey Question

The next three questions addressed traffic concerns. Responses, displayed in Figure 5, show that 39% of respondents only reach their destination on time *sometimes* during peak travel hours, following by 33% of respondents for *often*. This suggests that daily traffic is likely a moderate concern to travelers. However, when asked if seasonal traffic impacts travel times within the study area, the average response was 'higher than moderate delays', as shown in Figure 6.







Figure 6. Results of Public Survey Question - "How would you rate increased travel time impacts within the study area"

The survey then asked for respondents to provide areas within the study area where they experience high congestion during the morning or evening rush hours. The most common response was along US 17, specifically at the intersections of NC 210, County Club Road, Topsail Schools, Sloop Point Road, and Washington Acres Road. Of the 281 responses received for this question, 215 or 77% of the responses noted US 17 as a concern.

Next, the survey explained that the anticipated start date of construction for the Hampstead Bypass is January 2022. Respondents were asked to provide comments on any areas where they felt additional new roadways could be constructed to provide better connections to their destinations. Figure 7 shows a map that includes the areas that were mentioned in those responses; these connections are denoted through black lines.



Figure 7. Map of Responses to Survey Question on Connections Needed

The last two questions focused on preferences and priorities. When asked if they would walk or bike more often within the study area if better, safer facilities were available, 58% of respondents said yes. Figure 8 also shows the breakdown of the responses for no and maybe, which include the remaining 43% of respondents. As most respondents said yes, this suggests that bicycle and pedestrian facilities should be considered for inclusion in the recommendations of the *Streets Plan Update*.

The final question asked respondents to select their top three priorities, from a list of eight answer choices, to be addressed when new



Figure 8. Results of Public Survey Question

collector streets are being constructed. Figure 9 shows that the top responses were 'Faster, more direct connections to destinations', 'Safety for all travelers', and 'More connections between neighborhoods.' Additional comments provided included maintaining current infrastructure, limiting development, reducing costs/not increasing taxes, improved signal lights, and increased law enforcement.



Figure 9. Results of Public Survey Question

RESULTS FROM DEVELOPERS

The survey questions for the members of the development industry focused on making improvements from the previous 2016 *Collector Street Plan* and understanding development needs. A total of six questions were asked. It should be noted that there were only three to four respondents for the following questions. This is too small of a sample size to make inferences about the needs of the development industry. The results from the stakeholder meeting, which was attended by representatives from the development industry, provide more robust information in which to develop recommendations for the *Streets Plan Update*.

The first question asked respondents to rate the connections of the proposed collector roads and proposed recommendations from the 2016 *Plan* in terms of how useful they are for guiding development and site plans on a scale of 1 to 5, with 1 being not helpful/a hindrance to 5 being very helpful. All three respondents for this question selected 1 - indicating that the 2016 *Plan* is not useful to them. The Table 1 shows the responses collected from the next question, which asked to provide any additional comments about the previous plan they found helpful or unhelpful. Note that responses have not been edited to correct grammar or spelling. These comments show that the 2016 *Plan* was difficult to use in terms of the proposed collector road network, both in location and number of proposed roads, and that the Hampstead Bypass causes the need for updated recommendations.

Table 1. Comments about Previous Pender County Collector Street Plan

Connection between Dan Owen Drive and Factory Road was a great idea... taking huge undeveloped properties and squiggling roads all over them willy nilly is nonsense. Most miles of presented "connector street" will never be built as shown.

Need to revisit traffic impact studies after all phases of the Hampstead By-pass has been completed and the new traffic patterns and counts have taken effect.

The plan has too many collector roads. Focus on a few and figure out how to do them with respect to existing conditions, primarily presence of wetlands.

The next question asked respondents to select areas of the study area where they see the best opportunity for development within the next 10-15 years. Respondents had the option to select all answer choices that applied and were given a choice of three areas. Figure 10 shows the total responses, with East of Northeast Cape Fear River area receiving votes from three respondents, and the remaining two choices receiving one vote each.



Cape Fear River West of the NC 210/NC 133 intersection to the Pender County western boundary 0% 20% 40% 60%

Figure 10. Results of Public Survey Question

80%

100%

The following two questions were open-ended, the first asking what obstacles to development respondents foresee within the study area over the next 10-15 years. The comments, shown in Table 2, generally noted that the water and sewer system needs to be improved for future development, the Hampstead Bypass needs to be built, and that zoning poses an issue.

Table 2. Comments about Obstacles to Development for the next 10-15 years

Surf City Sewer system is out of capacity. Development in that area is about to come to a screeching halt if new solutions are not developed... Also, build the BYPASS.

Zoning is horrible. Hampstead is not a pretty town due to lack of zoning.

Availability of water and sewer. Amount of potential wetlands in that area.

Existing development needing to be worked around and all the burden, not only of cost, but of overregulation, being on anyone who comes in to develop property

The second open-ended question asked 'what kind of information, and at what level of detail, would the respondents require from the *Pender County Streets Plan Update* recommendations to ensure successful implementation in future development.' The three comments received are shown in Table 3. The comments generally suggest the need for a more flexible plan, better justified reasoning for collector streets, and no additional detail than what the 2016 *Plan* provided.

Table 3. Comments about Information Required from the Pender County Collector Streets Plan Update

I would keep it broad, especially when it comes to the 1,000 foot level of the maps drawn by non-engineers who have never walked the lines they are drawing. Build in flexibility so when professional engineers come in with well thought out plans that the code can accommodate them.

Justified reasoning for collector streets. Some seem unnecessary. Too many collector streets.

It only needs to be the level of detail offered in the existing Collector Street Plan User Guide

The final question for the members of the development industry was the same as the final question for the members of the public, with the same answer choices. Due to the low response rate, these results do not provide much insight, however, the top three priorities were 'more connections between neighborhoods,' 'safety for all travelers,' (both choices also were in the top three from the public responses) and 'availability of bike lanes or multi-use paths.' The remaining choices all received one selection.

RESPONDENT DEMOGRAPHICS

The final 11 questions asked respondents to optionally provide their demographic information to help the WMPO and Pender County better understand the makeup of survey participants. The first question asked participants for their home zip code. Figure 11 shows participation both in and outside of the study area based on the zip codes received. The final question asked respondents to provide their email if they would like to sign-up for future transportation updates from the WMPO, and 181 emails were provided. The remaining demographic information is shown in Figures 12 - 19.



Figure 11. Map of Survey Respondents by Zip Code



Figure 12. Results of Public Survey Question



Figure 13. Results of Public Survey Question



Figure 14. Results of Public Survey Question



Figure 15. Results of Public Survey Question



Figure 16. Results of Public Survey Question



Figure 17. Results of Public Survey Question



Figure 18. Results of Public Survey Question



Figure 19. Results of Public Survey Question

EXHIBIT 3: STAKEHOLDER MEETING I MINUTES

The following pages contain meeting minutes for the first Stakeholder Steering Committee meeting held on March 18, 2021.

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PENDER COUNTY STREETS PLAN MEETING MINUTES



DATE:	March 18, 2021
MEETING TYPE:	Stakeholder Engagement Meeting
SUBJECT:	Preliminary Findings

ATTENDEES:

Travis Henley	Pender County	Allison Engebretson	Paramount Engineering
Sam Shore	Pender County	Don Mizelle	WithersRavenel
Abby Lorenzo	WMPO	Robert Jackson	Homebuilder/Developer
Mike Kozlosky	WMPO	Steve Shuttleworth	Developer
Will Letchworth	WSP	Coleman Parks	Developer/Landowner
Shivang Shelat	WSP	George Johnson	Developer/Landowner
Katharine Mather	WSP	Damien Buchanan	Planning Board Member
Cameron Moore	Cape Fear Homebuilders	Jeff Beaudoin	Planning Board Member
Tyler Newman	BASE CEO	Chris Bullard	Cape Fear Realtors

MATTERS DISCUSSED

1) Observations on 2016 Collector Streets Plan

- a. 83% of respondents did not participate in the 2016 Pender County Collector Streets Plan.
- b. The scope of this plan is limited to determine the tentative location of Collector Streets. The intent is to identify points that need to be connected without specifying the exact path.
- c. The 2016 Collector Streets Plan needs to be updated because
 - i. the 2019 Comprehensive Plan impacted the Future Land Use plan based on which the 2016 Collector Streets Plan was created.
 - ii. 2045 MTP was adopted which added more projects in the study area.
- d. Collector Streets Plan is too inflexible. Developer community suggests ordinance changes that provide higher degree of flexibility and incentivizes creativity.
- e. Developers have difficulty getting through DOT for hydraulics and stormwater review (specifically the dry pipe standard), they are OK with constructing to DOT standards and having public streets that are privately maintained

WSP USA Suite 1500 434 Fayetteville Street Raleigh, NC 27601 f. General sentiment is the current plan has too many collectors, collector roads are not needed through every subdivision. There needs to be a balance between ROW requirements (particularly as it relates to multimodal facilities), the funding, and flexibility in design and location.

2) Cost and Funding discussion

- Developers are very concerned about the cost for collector roads and how to recover those costs.
 Suggested a separate group meeting on funding opportunities and a discussion on how greater densities can be allowed to recover those costs.
- b. Infrastructural limitations in terms of utilities (viz. water and sewer), and other infrastructure such as schools and parks impede development especially in the western part of the study area.
- c. Sewer is a limiting factor west of I-40, but there is an opportunity for workforce housing along and west of 40, assuming development costs can be kept low.
- d. Infrastructure funding may need a separate discussion as it is outside the scope of this study.
- e. There may be an overhaul of transportation funding in North Carolina at the state legislature level which may empower local jurisdictions to collect transport related taxes and fund their infrastructure. This may address some of the funding related points raised during the meeting.

3) Other Discussions

- a. It was requested while developing this plan that every development be looked at as different, especially based on its size and location. Smaller developments could seldom make up for the right of way lost to collector streets.
- b. Essential collector roads from the previous plan should be identified and retained.
- c. An East-West direct connection in southern Pender County may be required based on the current development patterns.
- d. In case of proposed Major Collector Streets, they should be paired with higher density Land Use around them.
- e. The capacity of existing collector streets should be optimized.
- f. A Comprehensive utility plan may be required in the future.
- g. Incorporating the US 17 Bypass in the Collector Streets Plan, along with the additional interchange not currently in the proposed Bypass

EXHIBIT 4: STAKEHOLDER MEETING I PRESENTATION SLIDES





2









Why the update?			
	Fiq	Feedback from the industry	
		Difficulties in implementation	
	Livit	Certain recommendations very prescriptive	
	<u>lılı.</u>	High number of variance requests	
		Account for changes in growth and transportation funding environment	
PENDER COUNTY STREETS PLAN 2021			
7			





9



10



11




13



14



15













EXHIBIT 5: PUBLIC SURVEY RESULTS

All Pages All Pages Image: All Pag		QUESTION SUMMARIES D	ATA TRENDS	INDIVIDUAL RESPONSES	
PA C Where do you currently live primarily? uswered: 440 Skipped: 2 Uside the Study area, Inside the Study area, Outside the Study area, Inside the Study area, Outside the Study area, Inside the Study area, Issewhere Inside the Study area Outside the Study area, Inside the Study area Inside the study area, Inside the Study area, Inside the study area, Inside the Study area, Inside the study area, in Pender County 773% Inside the study area, in New Hanover County 114% Issewhere 0.00% 0 Inside the study area, in Onslow County 0.68% 3 Issewhere 0.00% 0	All Pages 🔻				
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ANSWER CHOICESRESPONSESInside the study area90.45%398Outside the study area, in Pender County7.73%34Outside the study area, in New Hanover County1.14%5Outside the study area, in Onslow County0.68%3Elsewhere0.00%0TOTAL440					
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Outside the study area, in Pender County7.73%34Outside the study area, in New Hanover County1.14%5Outside the study area, in Onslow County0.68%3Elsewhere0.00%0TOTAL440	Inside th	e study area		90.45%	398
Outside the study area, in New Hanover County1.14%5Outside the study area, in Onslow County0.68%3Elsewhere0.00%0TOTAL440	Outside	he study area, in Pender County		7.73%	34
Outside the study area, in Onslow County0.68%3Elsewhere0.00%0TOTAL440	Outside	he study area, in New Hanover Count	.y	1.14%	5
Elsewhere 0.00% 0 TOTAL 440	Outside	he study area, in Onslow County		0.68%	3
TOTAL 440	Elsewher	е		0.00%	0
	TOTAL				440

Pender County Streets Plan Update Survey



ANSWER CHOICES	RESPONSES	
Inside the study area	55.16%	230
Outside the study area, in Pender County	7.43%	31
Outside the study area, in New Hanover County	24.70%	103
Outside the study area, in Onslow County	3.84%	16
Elsewhere	8.87%	37
TOTAL		417

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Which of the following statements best describes you?

Q3



 Q4
 Image: Comparison of the study area? Select and the s

Lar		100.00%	382
Carpool		0.79%	3
Bus		0.52%	2
Paratransit		0.00%	0
Bicycle		4.45%	17
Walk		4.45%	17
Other (please specify)	Responses	0.52%	2
Total Respondents: 382			

Q5 \bigcirc Thinking about your average travel time during peak hours (between 7:00 - 10:00 a.m. or 4:00 - 7:00 p.m.), how often do you reach your destination on time? Answered: 380 Skipped: 62 Always Often Sometimes Rarely Never 90% 100% 0% 10% 20% 50% 70% 80% 30% 40% 60%

ANSWER CHOICES	RESPONSES	
Always	7.11%	27
Often	33.68%	128
Sometimes	39.47%	150
Rarely	17.63%	67
Never	2.11%	8
TOTAL		380

Q6QDuring seasonal months with increased traffic from
tourists, how would you rate increased travel time impacts
within the study area on the scale, with the left-side being
no delays and the right-side being significant delays

Answered: 348 Skipped: 94



Q7

Within the study area, are there any areas where you experience high congestion during morning rush hours (between 7:00 to 10:00 a.m.) or evening rush hours (between 4:00 to 7:00 p.m.)? Please provide detail as to specific intersections, streets, or destinations.

 \bigcirc

 \bigcirc

Answered: 281 Skipped: 161

evening rush our - traffic light Food Lion Intersection and Country Club intersection	

4/8/2021 11:01 AM

Hwy 17 and Deerfield or Headwaters Dr intersections. Hwy 17 and Hwy 210 intersection traffic light. During summer beach season Hwy 50 and 210.

4/7/2021 10:33 AM

Any given portion of Hwy 17 through Hampstead.

4/7/2021 7:31 AM

Highway 17 is a traffic nightmare. Adding more development without proper infrastructure is why we are in this mess. Continuing to allow more building until the infrastructure can be redesigned will only bring more chaos & accidents and standstill traffic.

4/6/2021 10:06 PM

Q8

The anticipated start date of construction for the Hampstead Bypass is January 2022. Apart from Hampstead Bypass, are there any areas where you feel new roadways could be constructed to provide better connections to your destinations?

Answered: 183 Skipped: 259

Connect Dan Owens with Deerfield, Mill Creek Ridge, the Manor, Majestic Oaks, and Waters Edge communities for better access to Food Lion and Hampstead post Office.

4/7/2021 10:33 AM

We need more backstreets or the bypass right away if there is an accident, there is ZERO way to go around it 4/6/2021 7:34 PM	
No 4/6/2021 8:58 AM	

Q9 ♀ Would you walk or bike more often within the study area if better, safer facilities were available?



Q10

Select your top three priorities to be addressed when new collector streets are being constructed.



 ∇

Other (please specify)										
	0% 10%	20%	30%	40%	50%	60%	70%	80%	90% 100%)
ANSWER CHO	ICES								RESPON	SES
Availability of	sidewalks								33.51%	127
Availability of	bike lanes oı	multi-us	e paths						34.83%	132
Availability of	marked/sign	alized cro	sswalks						14.51%	55
Lighting and la	Indscaping								15.30%	58
Faster, more d	irect connec	tions to d	estinatio	ns					64.64%	245
More connecti	ons between	neighbor	hoods						40.37%	153
Safety for all t	ravelers								53.83%	204
Avoiding envir	onmental se	nsitive are	eas, such	as wetl	ands an	d preserv	ved lands		35.36%	134
Other (please	specify)						Respo	nses	6.33%	24
Total Respond	ents: 379									

Q11

Please rate the connections of the proposed collector roads and proposed recommendations from the 2016 Plan in terms of how useful they are for guiding development and site plans on the scale, with the left-side being not helpful/ a hindrance and the right-side being very helpful.

 \mathcal{Q}

 \mathcal{Q}



Q12

Please provide any additional comments about the previous Pender County Collector Streets Plan that you found helpful or unhelpful.

Answered: 3 Skipped: 439



Q13

Which of these areas of the study area do you see the best opportunity for development within the next 10-15 years? Select all that apply.



Q14 \bigtriangledown What obstacles to development do you foresee within the study area over the next 10-15 years? Answered: 4 Skipped: 438

Surf City Sewer system is out of capacity. Development in that area is about to come to a screeching halt if new solutions are not developed... Also, build the BYPASS.

3/26/2021	4:25	ΡM
-----------	------	----

Availability of water and sewer. Amount of potential wetlands in that area.

3/20/2021 9:50 AM

Existing development needing to be worked around and all the burden, not only of cost, but of overregulation, being on anyone who comes in to develop property

3/18/2021 1:45 PM

Q15

What kind of information, and at what level of detail, would you require from the Pender County Collector Streets Plan Update recommendations to ensure successful implementation in your future developments?

 ∇

Answered: 3 Skipped: 439

I would keep it broad, especially when it comes to the 1,000 foot level of the maps drawn by nonengineers who have never walked the lines they are drawing. Build in flexibility so when professional engineers come in with well thought out plans that the code can accommodate them.

4/9/2021 12:43 PM

Justified reasoning for collector streets. Some seem unnecessary. Too many collector streets.

3/26/2021 4:25 PM

It only needs to be the level of detail offered in the existing Collector Street Plan User Guide

3/18/2021 1:45 PM

Q16♀What transportation elements do you see as most
important to include in future developments to attract
potential buyers/tenants? Select all that apply.

Answered: 4 Skipped: 438

Availability of sidewalks



ANSWER CHOICES		RESPONS	ES
Availability of sidewalks		25.00%	1
Availability of bike lanes or multi-use paths		50.00%	2
Availability of marked/signalized crosswalks		25.00%	1
Lighting and landscaping		25.00%	1
Faster, more direct connections to destinations		25.00%	1
More connections between neighborhoods		50.00%	2
Safety for all travelers		50.00%	2
Avoiding environmentally sensitive areas, such as wetlands and preserve	d lands	25.00%	1
Other (please specify)	Responses	25.00%	1
Total Respondents: 4			

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Q17

Home zip code

Answered: 366 Skipped: 76

28443
4/11/2021 10:04 AM
28443
4/9/2021 3:46 PM
28411
4/9/2021 12:45 PM
28443
4/8/2021 11:02 AM









No	88.49%	323
Other	0.00%	0
Prefer not to answer	5.48%	20
TOTAL		365







ANSWER CHOICES		RESPONSES	
White		78.45%	284
Black/African American		0.83%	3
Asian		0.83%	3
American Indian/Alaskan Native		0.55%	2
Native Hawaiian/Pacific Islander		0.00%	0
Hispanic/Latinx		2.49%	9
Prefer not to answer		15.75%	57
Other (please specify)	Responses	1.10%	4
TOTAL			362







How would you like to be informed about future updates and engagement opportunities?

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	40.06%	137
	36.55%	125
	2.05%	7
Responses	2.05%	7
		342
	Responses	40.06% 36.55% 2.05% Responses 2.05%

Q27 Please provide your email if you would like to sign-up for future transportation updates from WMPO Answered: 181 Skipped: 261 amyrado@hotmail.com 4/11/2021 10:04 AM Nrrdgrrl3@gmail.com 4/9/2021 3:46 PM jholdstein@gmail.com 4/7/2021 10:34 AM Momoftag@sbcglobal.net 4/6/2021 8:59 AM

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EXHIBIT 6:

PUBLIC ENGAGEMENT PHASE II SUMMARY

INTRODUCTION

This report summarizes the public engagement Phase II activities WSP conducted for the development of the *Pender County Street Plan Update* (*Street Plan Update* or *Update*) for the Wilmington Metropolitan Planning Organization (WMPO) and Pender County. The purpose of the *Street Plan Update* is to guide investment in new collector streets to improve connectivity, inform land development, maintain acceptable levels-of-service on existing roadways, ensure natural areas are conserved, and provide a safe and high quality transportation network for residents, businesses, and visitors using all modes of travel. Previously, Phase I of public engagement included an online survey and stakeholder meeting to inform the goals and needs of the *Street Plan Update*.

Phase II activities included a website, survey questions, and stakeholder meeting conducted during the months of May and June 2021 to collect important feedback from citizens and land developers on the draft recommendations developed for the *Street Plan Update*. The input collected will be used to refine and finalize the development of the *Street Plan Update* recommendations.

STAKEHOLDER MEETING

PURPOSE OF THE MEETING

A stakeholder meeting was held on May 20, 2021 to share the draft recommendations and collect feedback from stakeholders in the land development and real estate community. The purpose the meeting was to present data collected on current travel patterns, the methodology to determine future collect street needs, the geographies of proposed collector streets, and recommendations for bicycle and pedestrian facilities and street sections.

The meeting was held at the City of Wilmington municipal building at 305 Chestnut Avenue and via Zoom. There were a total of six stakeholders who attended in-person and four stakeholders who attended virtually. The stakeholders included mostly representatives of development organizations and real estate agencies, as well as a Pender County planning board member. The meeting minutes are included in Appendix A.

The format of the meeting included a presentation, followed by an open discussion. Maps of the draft recommendations were also available to the attendees who attended the in-person meeting. The presentation was given by the study team including Abby Lorenzo with the WMPO, Travis Henley with Pender County, and Will Letchworth, Shivang Shelat, and Sarah Parkins with WSP. The presentation is included in Appendix B.

Plan Website & Survey

PURPOSE OF THE WEBSITE

In order to present the draft recommendations to the public and collect feedback on various elements of the recommendations, an ESRI Storymap website was developed. The website was available from May 17th until June 21st 2021. The website, made available at <u>www.tinyurl.com/PenderStreets</u>, included four sections: an *Update* overview, methodology, draft recommendations, and next steps. An interactive map of the draft recommendations was available for users to see the recommendations in detail. Survey questions were asked throughout the website using ESRI's Survey123 tool. There was a total of eight questions asked, as well as 11 optional demographic questions. In total, there were 639 unique visitors to the website, and 22 individuals completed at least one survey question.

SURVEY RESULTS

The first question asked "Which of the two options for bicycle and pedestrian infrastructure would you prefer to have along collector streets?" This question received the most responses, with a total of 22 responses. Figure 1 shows the results, with the majority of respondents choosing Type 2.

The following three questions asked respondents to rate how the felt about the



Figure 1. Results of Public Survey Question 1

proposed collect street recommendations, broken up by region, on a scale from strongly disagree to strongly agree. The South Eastern region includes neighborhoods south of NC 210 and north of Sidbury Road on the eastern side of Cape Fear River. The North Eastern region includes neighborhoods north of NC 210 and south of Sloop Point Road on the eastern side of Cape Fear River. The Cape Fear River. The Western region includes neighborhoods on the western side of Cape Fear River. Figure 2 shows the results for each region. There was a total of 13 responses for each of these three questions.



Figure 2. Results of Public Survey Questions 2 - 4

PAGE 66

Question five asked respondents to rate their opinion on the proposed bicycle and pedestrian recommendations. A total of 12 responses were received, shown in Figure 3. A majority of the respondents strongly agreed with these proposed recommendations.

Question six asked respondents if the four priorities selected as most important in the Phase I survey were addressed in the *Update* recommendations. Those four priorities were "Faster, more direct connections to destinations," "Safety for all travelers," "More connections between neighborhoods," and "Avoiding environmentally sensitive areas." Respondents were asked to rate on a scale from strongly disagree to strongly agree, and 12 responses were received as shown in Figure 4. A majority of the respondents strongly agreed that the recommendations address these four priorities.

Question seven asked "Are there any additional connections that you think should

0 1 1 0 Strongly Disagree Neutral Agree Strongly No Disagree Opinion

10





Figure 4. Results of Public Survey Question 6

be considered that are not in the set of recommendations?" This question provided an interactive map for participants to provide specific locations by drawing a line on the map. However, no responses were received for this question.

12

10

8

6

4

2

0

The last question asked participants if they had any additional comments for the study team to consider. A total of four responses were received, as shown in Table 1. Please note the comments have not been edited to reflect changes to spelling or grammar.

Table 1. Responses to Question 8

The only way for the eastern part of Pender to grow safely is to add alternative transportation options as new homes are proposed. People may not think they would take a bike or walk to a store. But once these options are available, communities all over the country find residents embracing their use.

The last thing people need in this area is more congestion; faster pace, and tax payers flipping the bill for this plan. It is great that Pender County is planning ahead for better connectivity and safer travel for all modes of transportation. Bicycling will become a much more prevalent way to make short trips in the future. People moved to the country to get away from development. Peace and quiet Leave it alone.

RESPONDENT DEMOGRAPHICS

The final 11 questions were optional and asked respondents for their demographic information to help the WMPO and Pender County better understand the makeup of survey participants. The first two questions asked participants for their home zip code and work/school zip code. Figure 5 shows participation both in and outside of the study area based on the zip codes received for work/school. No zip codes were received for home zip code.



Figure 5. Map of Work/School Zip Codes Received

The final question asked respondents to provide their email if they would like to sign-up for future transportation updates from the WMPO, and 5 emails were provided. The remaining demographic information is shown in Figures 6 - 13.



Figure 6. Results of Public Survey Question 11



Figure 7. Results of Public Survey Question 12



Figure 8. Results of Public Survey Question 13



Figure 9. Results of Public Survey Question 14



Figure 10. Results of Public Survey Question 15



Figure 11. Results of Public Survey Question 16







Figure 13. Results of Public Survey Question 18

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EXHIBIT 7: STAKEHOLDER MEETING II MINUTES

The following pages contain meeting minutes for the second Stakeholder Steering Committee meeting held on May 20, 2021.

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PENDER COUNTY STREETS PLAN MEETING MINUTES



DATE:	May 20, 2021
MEETING TYPE:	Stakeholder Engagement Meeting
SUBJECT:	Preliminary Recommendations

ATTENDEES:

Travis Henley	Pender County	Sarah Parkins	WSP
Vanessa Lacer	Pender County	Cameron Moore	Cape Fear Homebuilders
Abby Lorenzo	WMPO	Allison Engebretson	Paramount Engineering
Rachel McIntyre	WMPO	Robert Jackson	Homebuilder/Developer
Will Letchworth	WSP	George Johnson	Developer/Landowner
Shivang Shelat	WSP	Damien Buchanan	Planning Board Member
Katharine Mather	WSP	Chris Bullard	Cape Fear Realtors

MATTERS DISCUSSED

1) Presenting the methodology and recommendations

- a. WSP presented the agenda, schedule and public engagement results
- b. The current travel patterns to and from the study area were explained.
- c. The methodology to determine collector streets was explained. The streets were planned to be 2-lane in most areas, with 4-lane roads in higher density areas where multiple 2-lane roads feed in to before intersecting with an arterial street.
- d. Various implementation scenarios for constructing the collector streets were laid out
- e. Overall recommendations for collector streets, bicycle and pedestrian network and street sections were presented.
 - i. Only 2 lane street sections were presented, with the understanding that auxiliary turn lanes will need to be provided at intersections wherever necessary.
 - ii. The future US 17 Bypass is taken into consideration when developing the collector street recommendations

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- iii. The minimum distance between two intersections is 500' with local exceptions at the discretion of Pender County Planning Division. This rule is also applicable on individual driveways.
- iv. The policy recommendations to include text to empower the planning staff to interpret the intent of the plan based on additional local and site specific knowledge.
- v. Bicycle and pedestrian infrastructure will be required on all collector streets.

2) Questions and concerns raised

- a. Concern was expressed about the collector street recommendations in Zones 9 and 10 and that the cross sections were very specific and limiting. It was said the current land use plan was too ambitious and dense than the County would allow. Pender County said that the Land use plan is realistic, but it will need some time for the residents to get used to higher densities and it is a slow process.
- b. Question was asked regarding how WSP came up with 25% average reduction in land development potential. WSP suggested 25% reduction in total land yield based on previous experience and this was concurred by the County based on their experience in the region. This reduction accounted for design inefficiencies and other local conditions.
- c. Concerns were raised regarding determination of cross-section in the plan. Many were of the opinion that the plan should not establish exact cross sections, but should rather establish design minimums beyond which the developer community should be allowed to include components not included in the plan. It should be left to the developer to use a clear zone or a curb and gutter to separate the vehicular traffic from the active travel modes based on local conditions and other site specific constraints.
- d. It was brought to notice that in certain cases, if a collector street in one parcel stubs out to an uncrossable environmental feature on the adjacent parcel, the contiguity of collector street as intended by the plan may not be achieved. To avoid such situation, the planning staff should be empowered to ascertain that when a developer designs a collector street within the prescribed polygon, it must stub out to a developable and feasible location on the adjacent parcel regardless of the gap in time between the two developments.
- e. The contiguity of collector street will be not only based on the location, but also the cross section of the collector street on the adjacent parcel. This means that if one developer builds a collector street with MUP on one side, the adjacent developer cannot connect to that collector street with bike lane and sidewalk on both sides. Bicycle and pedestrian network contiguity and transition (if required) will have to be taken into consideration.

EXHIBIT 8: STAKEHOLDER MEETING II PRESENTATION SLIDES





Study Process



PENDER COUNTY STREETS PLAN 2021

Schedule

Task No	Tasks	J	1	February March			April				May				June					July						
	Week of	25	1	8	15	22	1	8	15	22	29	5	12	19	26	3	10	17	22	31	7	14	21	28	5	12
В	Monthly Check-in calls																									
В	Client Coordination Meetings																									
с	Stakeholder Engagement												W	e ai	re h	ere	5									
с	Public Survey																									
с	Presenting to Pender County Board of Commissioners																									
D	Review of existing plans and documents																									
D	Planning and Environmental Analysis																									
E	Transportation Analysis																									
E	Development of Recommendations																									
F	Final Report																									



PENDER COUNTY STREETS PLAN 2021

Public Engagement Results



Current Public Engagement Opportunities

Recommendations Website open until June 1st

Provide feedback via survey questions on website

www.tinyurl.com /PenderStreets



PENDER COUNTY STREETS PLAN 2021


Analysis and Methodology

Needs Statement
Starting Point: 2018 Future Land Use Plan
Step 1: Extract Residential Land Uses
Step 2: Remove Undevelopable Areas
Step 3: Convert to Household Density
Step 4: Establish Travel Zones
Step 5: Determine Collector Streets
Step 6: Internal Alignment options
Step 7: Parcel Concerns
Step 8: Impact on Arterial Roads

PENDER COUNTY STREETS PLAN 2021

Needs Statement

- The Travel Demand Model underestimates growth corresponding to the 2018 Land Use Plan
- Need to calculate additional potential daily trips based on the 2018 Land Use Plan
- Get a fair sense of origin-destination distribution of these trips
- Assess how many Collector streets will be needed to address these trips
- Assess the effect of these trips on Arterial streets



Starting Point • Pender 2.0 Comprehensive Land Use Plan

PENDER COUNTY STREETS PLAN 2021

Step 1: Extract Residential Land Uses

- Most travel is generated from Homes
- Non-Home Based travel is mostly routed through Arterials where most commercial / workplaces are located
- Residential Land Use Density information is retained



Step 2: Remove Undevelopable Areas

- Remove areas where real estate developments Wetlands and Flood Plains
- Remove areas under environmental protection (State Owned lands, Natural Heritage Areas, Protected Open Spaces)
- Remove parcels that are already developed



PENDER COUNTY STREETS PLAN 2021

Step 3: Convert to Household Density

- Developable Residential Land Uses divided into 10 acre pixels
- Each pixel shade represents number of units allowed in that 10 acre pixel
- 6.67 trips per household (TDM)
- Convert pixels to dots representing the number of daily trips generated from that pixel.



Step 4: Establish Travel Zones

- Create Travel Zones based on logical geographical and Arterial road boundaries
- Sum trips from the Dots located within a travel zone. 75% considering inefficiencies.
- All these trips will need to be routed to the nearest Arterial road using Collector Streets



PENDER COUNTY STREETS PLAN 2021

Step 5: Set Collector Street Endpoints

- 2 Lane Collector at 35 mph can carry 18K vehicles per day
- Determine logical endpoints for collector streets to connect to arterials
- Consider connections to other collectors and reducing intersection density at the arterials



Step 6: Internal Alignment Options

- Away from endpoints, the possibility of routing is to be determined based on 35-40 mph road geometry, local conditions and other development concerns
- Additional Collector Streets based on connectivity, alternate routing requirements



PENDER COUNTY STREETS PLAN 2021

Step 7: Parcel Concerns

- Polygons determine the area within which collector street should be routed.
- More flexibility to developers within the property, while maintaining overall connectivity goals.
- Polygons are dynamic if collector street route is established in one parcel, the adjacent parcels must connect to that street.



Step 8: Impact on Arterial roads

- Growth extrapolated from NCDOT's daily traffic historical data.
- Compared with daily roadway capacity in the Travel Demand Model
- Most roads function well overall, but may be congested in peak hours.



PENDER COUNTY STREETS PLAN 2021

Implementation Scenarios

Scenario 1

- A general area has been identified for where a collector street should go
- No part of the collector street has been constructed in parcels A, B, or C.
- Parcels A, B, and C have the freedom to construct the collector street however they would like on their parcel.
- The other parcels will have to tie it into where the first one chooses to build their portion



PENDER COUNTY STREETS PLAN 2021

Scenario 2

- The collector road has been constructed in Parcel A
- The developers in parcels B and C have to connect to where the collector road ends in parcel A
- There are still option on how to route the collector, however, there is a fixed point that it has to connect to now



Scenario 3

- The collector road has been constructed in Parcel A and C
- The developers in Parcel B have limited options since they have to finish connecting the collector road.
- There are two fixed points to connect to, which limit options on how they can route the collector in their parcel



PENDER COUNTY STREETS PLAN 2021



Collector Street Recommendations





Street Section Options

- 2 Key alternatives –
 1) MUP on one side
 2) Bike Lanes and
 Sidewalks on both
 sides
- Auxiliary turning lanes wherever necessary
- Curb and Gutter sections at high density areas



PENDER COUNTY STREETS PLAN 2021

Questions?

Next Steps

- Review and distribute meeting notes from today's meeting Next week
- Consolidate Public Comments First week of June
- Refine recommendations Second and Third weeks of June
- Submit report- Last week of June

PENDER COUNTY STREETS PLAN 2021



Additional Comments: shivang.shelat@wsp.com

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APPENDIX D: DETAILS OF RECOMMENDED COLLECTOR STREETS

The following pages contain details about the collector streets recommended by this Update. Unless otherwise stated, all recommended collector streets are planned to be a minimum of two lanes.



PROJECT DETAILS	
From (Cross Street)	Scotts Hill Loop Road
To (Cross Street)	Collector Street #3
Length	Approximately 1.1 miles
Description	This proposed two-lane collector road would connect to Ebb Drive to provide access between Scotts Hill Road to other proposed collector streets. This undeveloped area has the potential to generate 33,000 trips based on future land uses.
Purpose	Internal connection required for this currently undeveloped area.



PROJECT DETAILS	
From (Cross Street)	US 17
To (Cross Street)	1 mile east of US 17
Length	Approximately 1.5 miles
Description	This proposed two-lane collector road would run perpendicular to US 17 and would intersect collector streets 1 and 4 to create a comprehensive roadway network in this undeveloped area that will soon experience growth. This undeveloped area has the potential to generate 33,000 trips based on future land uses.
Purpose	Collector Street to distribute part of 33,000 potential daily trips between local neighborhoods and US 17.



PROJECT DETAILS	
From (Cross Street)	US 17
To (Cross Street)	1 mile east of US 17
Length	Approximately 1.3 miles
Description	This proposed two-lane collector road would run perpendicular to US 17 and would intersect collector streets 1 and 4 to create a comprehensive roadway network in this undeveloped area that will soon experience growth. This undeveloped area has the potential to generate 23,000 trips based on future land uses.
Purpose	Collector Street to distribute 23000 potential daily trips between local neighborhoods and US 17.



PROJECT DETAILS	
From (Cross Street)	Oakvale Drive
To (Cross Street)	Corcus Ferry Road
Length	Approximately 4 miles
Description	This proposed two-lane collector street would provide a parallel roadway to US 17 and would provide a thoroughfare for several neighborhoods along US 17. By making this collector street, less strain would be placed on congested US 17. The first round of public engagement concluded that there was a major need for parallel routes to US 17.
Purpose	Local alternatives parallel to US 17 requested in the first round of public engagement.



PROJECT DETAILS	
From (Cross Street)	Collector Street No. 17
To (Cross Street)	NC 210
Length	Approximately 1.75 miles
Description	This proposed two-lane collector street would be part of a collector street to provide another connection from NC 210 to US 17. This route would serve as a parallel route to the planned Hampstead Bypass for more local traffic. The area has the potential to generate 48,300 trips based on future land uses. The segment would connect to collector street 16 and collector street 17.
Purpose	Part of a collector street to connect NC 210 to US 17 north of the future Bypass.



PROJECT DETAILS	
From (Cross Street)	Collector Street # 10
To (Cross Street)	Collector Street # 7
Length	Approximately 2.5 miles
Description	This proposed two-lane collector street would provide an additional parallel roadway to US 17 on the northern side and would provide a thoroughfare for several neighborhoods along US 17. It would connect to collector streets 7 and 8, which would ultimately tie into Hoover Road on the east side. By making this collector street, less strain would be placed on congested US 17. The first round of public engagement concluded that there was a major need for parallel routes to US 17.
Purpose	Part of a collector street forming local alternatives parallel to US 17 as requested in the first round of public engagement.



PROJECT DETAILS	
From (Cross Street)	Collector Street # 6
To (Cross Street)	NC 210 W
Length	Approximately 1 mile
Description	This proposed two-lane collector street would provide an additional parallel roadway to US 17 on the northern side and would provide a thoroughfare for several neighborhoods along US 17. It would connect to collector streets 6 and 8, which would ultimately tie into Hoover Road on the east side. By making this collector street, less strain would be placed on congested US 17. The first round of public engagement concluded that there was a major need for parallel routes to US 17.
Purpose	Part of a collector street forming local alternatives parallel to US 17 as requested in the first round of public engagement.



PROJECT DETAILS	
From (Cross Street)	NC 210 W
To (Cross Street)	Sparrows Bend on Hoover Rd
Length	Approximately 0.85 miles
Description	This proposed two-lane collector street would provide an additional parallel roadway to US 17 on the northern side and would provide a thoroughfare for several neighborhoods along US 17. It would connect to collector streets 6 and 7, which would ultimately tie into Hoover Road on the east side. By making this collector street, less strain would be placed on congested US 17. The first round of public engagement concluded that there was a major need for parallel routes to US 17.
Purpose	Continuing the alternative route parallel west of US 17 to connect to Sparrows Bend.



PROJECT DETAILS	
From (Cross Street)	US 17
To (Cross Street)	Collector Street #10
Length	Approximately 0.75 miles
Description	This proposed four-lane collector street would connect with collector street 11 to provide a parallel route to Sidbury Road from US 17. The area has the potential to generate 117,600 daily trips based on future land uses.
Purpose	Internal collector street alternative to Sidbury Road – 4 Lane Section.



PROJECT DETAILS	
From (Cross Street)	Sidbury Road
To (Cross Street)	US 17
Length	Approximately 1.75 miles
Description	This proposed four-lane collector street would provide an additional connection between US 17 and Sidbury Road in a high-density area. The area has the potential to generate 117,600 daily trips based on future land uses and will need more connections between the major roadway network. This collector street will also connect to a larger network of proposed collector streets.
Purpose	Collector Street surrounding the high-density zone with connections to other collector streets in this area.



PROJECT DETAILS	
From (Cross Street)	Collector Street #10
To (Cross Street)	0.75 miles west of Collector Street #14
Length	Approximately 2.5 miles
Description	This proposed two-lane collector street would connect with collector street 9 to provide a parallel route to Sidbury Road from US 17. The area has the potential to generate 117,600 daily trips based on future land uses.
Purpose	Internal collector street alternative to Sidbury Road.



PROJECT DETAILS	
From (Cross Street)	Collector Street #10
To (Cross Street)	NC 210 W
Length	Approximately 3 miles
Description	This proposed two-lane collector street would be part of a series of collector roads to add an additional connection between NC 210 and US 17.
Purpose	Diagonal Collector Street connecting high density zones directly to NC 210 near the future interchange with US 17 Bypass.



PROJECT DETAILS	
From (Cross Street)	Collector Street #14
To (Cross Street)	US 17
Length	Approximately 2.5 miles
Description	This proposed two-lane collector street would be part of a series of collector roads to add an additional roadway in an area that is projected to experience high growth.
Purpose	Collector Street to connect the central part of two mid-density TAZs to US 17.



PROJECT DETAILS	
From (Cross Street)	Sidbury Road
To (Cross Street)	Harrison Creek Road
Length	Approximately 2.6 miles
Description	This proposed two-lane collector street would provide a vital connection from Sidbury Road to Harrison Creek Road and would serve current and planned surrounding neighborhoods in the area.
Purpose	Collector Street connecting Sidbury Road to Harrison Creek Road to serve the low- density neighborhoods closer to the proposed US 17 Bypass.



PROJECT DETAILS	
From (Cross Street)	Harrison Creek Road
To (Cross Street)	US 17
Length	Approximately 2.5 miles
Description	This proposed two-lane collector street would start at Harrison Creek Road and would extend it so that it connects to US 17. This area has the potential to generate 117,600 trips daily, so utilizing Harrison Creek Road to create a perpendicular route to US 17 would help with alleviate some congestion.
Purpose	Extension of Harrison Creek Road to connect to US 17. Parallel alternative to US 210.



PROJECT DETAILS	
From (Cross Street)	Hoover Road (near Wolf Pond Road)
To (Cross Street)	0.5 miles south of Sloop Point Road South at US 17
Length	Approximately 3.4 miles
Description	This proposed two-lane collector street would provide an alternative route parallel to US 17 to better connect Hoover Road and Sloop Point Road. The area has the potential to generate 17,250 trips based on future land uses and therefore could help better serve capacity needs and prevent backup along US 17.
Purpose	Part of a collector street to connect NC 210 to US 17 north of the future Hampstead Bypass.



PROJECT DETAILS	
From (Cross Street)	Collector Street No. 16
To (Cross Street)	NC 210
Length	Approximately 3.75 miles
Description	This proposed two-lane collector street would be part of a collector street to provide another connection from NC 210 to US 17. This route would serve as a parallel route to the planned Hampstead Bypass for more local traffic. The area has the potential to generate 48,300 trips based on future land uses. The segment would connect to collector street 16 and would be the northern alternative to provide this linkage.
Purpose	Part of a collector street to connect NC 210 to US 17 north of the future Bypass.



PROJECT DETAILS	
From (Cross Street)	US 117 (at Collector St 25)
To (Cross Street)	2 miles east of US 117
Length	Approximately 2 miles
Description	This proposed two-lane collector street would provide additional capacity for adjacent neighborhoods along US 117. This segment would connect to collector street 25 on the east and Cheshire Road on the west side and would provide another indirect link to NC 210. The area has the potential to generate 64,200 trips based on future land uses.
Purpose	Intermediate traffic distributor from adjacent neighborhoods to US 117.



PROJECT DETAILS	
From (Cross Street)	NC 210 (1/2 to 3/4-mile W of US 117)
To (Cross Street)	NC 133 (1/2 to 3/4-mile W of US 117)
Length	Approximately 3.1 miles
Description	This proposed two-lane collector street would provide additional capacity to adjacent neighborhoods along US 117. The collector street would be a parallel roadway to US 117 and would therefore decrease the strains on that highway. The area has the potential to generate 64,200 trips based on future land uses and would need another parallel roadway to US 117.
Purpose	Internal collector street parallel to US 217 Connecting mid-density region between NC 133 to NC 210.



PROJECT DETAILS	
From (Cross Street)	Cheshire Rd at Arvida Spur Road
To (Cross Street)	NC 210
Length	Approximately 1.3 miles
Description	This proposed two-lane collector street would provide additional connectivity between NC 210 and US 133. The street would begin at NC 210 and bisect with Cheshire Road which then feeds into US 133. The area has the potential to generate 64,200 trips based on future land uses.
Purpose	Internal connection required to distribute traffic from mid-density land use to US 210.



PROJECT DETAILS	
From (Cross Street)	Collector Street No. 23
To (Cross Street)	NC 133
Length	Approximately 0.75 miles
Description	This proposed two-lane collector street would provide an additional link between Willows Bay Drive and NC 133. There is a need for more connectivity to the neighborhoods surrounding this area and is part of a larger proposed collector network that would converge with collector streets 22 and 23.
Purpose	Part of a collector street parallel to NC 133 to connect internal neighborhoods.



PROJECT DETAILS	
From (Cross Street)	Collector Street No. 23
To (Cross Street)	Parallel to NC 210 (1.5 to 1.75 miles) for about 5.5 miles
Length	Approximately 5 miles
Description	This proposed two-lane collector street would provide an alternative route parallel to NC 133 in conjunction with other planned collector streets. This segment would help connect existing neighborhoods surrounding Willow Bays Drive and future planned neighborhoods that will in turn ease congestion on NC 133 and provide an alternative route for local/residential traffic.
Purpose	Part of a collector street parallel to NC 133 to connect internal neighborhoods.



PROJECT DETAILS	
From (Cross Street)	NC 210
To (Cross Street)	1.5 miles south of NC 210
Length	Approximately 0.75 miles
Description	This proposed two-lane collector street would connect a proposed collector street to NC 133. Part of a larger network of new collector streets, this segment would help provide a more direct access to NC 133 for existing residential and future planned residential.
Purpose	Local access collector street to connect mid-density area directly to NC 133.
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COLLECTOR STREET #24

	PROJECT DETAILS
From (Cross Street)	US 421
To (Cross Street)	1.5 to 2 miles East of US 421
Length	Approximately 1.30 miles
Description	This proposed two-lane collector street would provide another outlet onto US 421 from Cowpen Landing Road. The area has the potential to generate 24,900 trips based on future land uses and would provide current and future housing developments a complete road with two access points to US 421.
Purpose	Internal direct connection to US 421.



COLLECTOR STREET #25

	PROJECT DETAILS
From (Cross Street)	US 117
To (Cross Street)	W of I-40 at Rebecca Kennedy Road
Length	Approximately 1.20 miles
Description	This proposed two-lane collector street would help serve surrounding neighborhoods and provide greater connectivity to US 217. This collector street would connect with collector street 18 and would run perpendicular to collector street 19.
Purpose	Intermediate traffic distributor from adjacent neighborhoods to US 217.

APPENDIX E: TRAFFIC GROWTH FORECASTS

The adopted 2045 Travel Demand Model (TDM) for the WMPO does not correctly estimate the growth within the study area. This leads to under-projection of traffic and its impact on the roads in the study area.

In order to bridge the gap, annualized straight line projections were carried out for key locations within the study area using NCDOT's historical AADT data. This was a rudimentary method to understand the gap between TDM and AADT based projections. This analysis was used as a shorthand to understand the impact of additional traffic on the arterial road network. Additionally, the projected volumes were compared to the corresponding roadway capacity to determine whether capacity exceeds traffic volumes or not. (See Table E-1)

Further studies and model runs with realistic socio-economic data is required to add veracity to this method.

C	COMPARISON BETWEEN TDM ANI	N BETWEEN TDM AND NCDOT AADT BASED TRAFFIC GROWTH				
NCDOT AADT Location ID	Road Names	Last Recorded AADT	Year Recorded	Annualized Growth Rate ¹	Projected 2045 AADT	2045 MTP Projected AADT
710000088	NC 133 E of Clarks Landing Loop	4200	2018	0.84%	5154	1774
710000119	NC 133W OF US 117	11000	2018	3.70%	21989	7744
710000006	NC 210 E of Reverend Andre Carr Rd	6600	2018	1.41%	9106	9144
710000015	NC 210 N of Dallie Futch Rd	5500	2018	9.67%	19856	8086
710000022	NC 210 E of Moore Town Rd	5700	2019	4.53%	12409	8242
710000062	NC 210 W of Futch Creek Rd	3800	2018	0.60%	4413	1682
710000078	NC 210 W of Sawdust Road	5900	2018	1.52%	8325	512
710000095	NC 210 W OF US 117	5900	2017	4.55%	13409	512
710000103	NC 210 E of Little Kelly Rd	2100	2019	3.88%	4220	735
710000111	NC 210 E OF US 117	15000	2019	3.22%	27548	13589
710000117	NC 210 W of Clarks Landing Loop	4600	2018	0.40%	5096	2508
710000122	NC 210 W OF US 17	9300	2019	3.51%	17784	6067
710000131	NC 210 E of Island Creek Rd	8700	2017	7.59%	27183	17843
710000041	Island Creek Road S OF NC 210	4300	2013	20.95%	33130	8992
710000037	Highway 117 N OF NC 133	8200	2019	0.47%	9201	14754
710000083	Highway 117 S OF NC 210	7500	2018	0.45%	8419	9976
710000104	Highway 117 N of Camelia Dr	7500	2018	0.62%	8747	13288
710000032	Highway 117 S of Oak Hills Dr	14500	2019	0.68%	17048	21290
710000060	Highway 17 E of Sidbury Rd	40000	2017	4.07%	85553	23840
710000132	Highway 17 S OF NC 210	39000	2018	3.25%	73204	31031
710000014	Highway 17 N of Hoover Rd	43500	2017	4.28%	95597	30471
710000120	Highway 17 S of Factory Rd	44000	2017	3.19%	83249	35807
710000121	Highway 17 N of John Wilson Rd	43500	2017	3.81%	89886	30471
710000127	Highway 17 N of Sloop Point Rd	34500	2018	5.04%	81429	70413
710000338	Highway 17 W of Sloop Point Rd	36000	2012	1.65%	55651	64975

Notes:

- 1. Annualized growth rate was calculated based on the observed year on year traffic growth for the years where the data was available.
- 2. Difference between 2045 MTP projections and projections calculated using the aforementioned method.

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COMPARISON BETWE	BETWEEN TDM AND NCDOT AADT BASED TRAFFIC GROWTH						
Road Names	Difference ²	LOS E 2045 Capacity	V/C ratio <1	Peak hour volume	Peak Hr Vol MTP	Peak Hr capacity	Peak V/C ratio <1
NC 133 E of Clarks Landing Loop	-3380	49248	yes	464	160	2052	yes
NC 133W OF US 117	-14245	24932	yes	1979	697	1039	no
NC 210 E of Reverend Andre Carr Rd	38	24932	yes	820	823	1039	yes
NC 210 N of Dallie Futch Rd	-11770	24932	yes	1787	728	1039	no
NC 210 E of Moore Town Rd	-4167	24932	yes	1117	742	1039	no
NC 210 W of Futch Creek Rd	-2731	12565	yes	397	151	524	yes
NC 210 W of Sawdust Road	-7813	49248	yes	749	46	2052	yes
NC 210 W OF US 117	-12897	24932	yes	1207	46	1039	no
NC 210 E of Little Kelly Rd	-3485	24932	yes	380	66	1039	yes
NC 210 E OF US 117	-13959	24932	yes	2479	1223	1039	no
NC 210 W of Clarks Landing Loop	-2588	17670	yes	459	226	736	yes
NC 210 W OF US 17	-11717	24932	yes	1601	546	1039	no
NC 210 E of Island Creek Rd	-9340	24932	yes	2446	1606	1039	no
Island Creek Road S OF NC 210	-24138	24932	yes	2982	809	1039	no
Highway 117 N OF NC 133	5553	51166	yes	828	1328	2132	yes
Highway 117 S OF NC 210	1557	53188	yes	758	898	2216	yes
Highway 117 N of Camelia Dr	4541	24932	yes	787	1196	1039	yes
Highway 117 S of Oak Hills Dr	4242	49248	yes	1534	1916	2052	yes
Highway 17 E of Sidbury Rd	-61713	15903	no	7700	2146	663	no
Highway 17 S OF NC 210	-42173	15903	no	6588	2793	663	no
Highway 17 N of Hoover Rd	-65126	12565	no	8604	2742	524	no
Highway 17 S of Factory Rd	-47442	17670	no	7492	3223	736	no
Highway 17 N of John Wilson Rd	-59415	12565	no	8090	2742	524	no
Highway 17 N of Sloop Point Rd	-11016	12565	no	7329	6337	524	no
Highway 17 W of Sloop Point Rd	9324	12565	no	5009	5848	524	no

Table E-1 | Cursory Calculations of Traffic Growth on Key Routes within the Study Area Using Historic NCDOT AADT

Based on the calculations, it can be observed that most roads function well during off-peak hours. During the peak hours, parts of NC 210 and NC 133 exhibit congestion and may require improvements.

It should be noted that this method does not account for the shift in traffic from US 17 to future US 17 Bypass. However, despite the shift in traffic, US 17 volume projections consistently show over capacity which may necessitate a comprehensive set of improvements along US 17 in addition to building the bypass.

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APPENDIX F: TRI-PARTY AGREEMENT

The following three-party agreement was created to serve as a template for NCDOT, a North Carolina county/ municipality, and (legal entity) private third-party to enter into an arrangement whereby construction (city/county) and maintenance (private party) would be undertaken to NCDOT standards. This document is intended to serve as a starting point for a final agreement, and was derived from the NCDOT three-party agreement for a right-ofway encroachment. Separate agreements for ROW encroachment, construction, or a more detailed maintenance schedule may supplement this sample agreement. In the event that only two parties (e.g., DOT and HOA) are involved, minimal text changes would be required, as noted in the margins.

Any and all agreements should be reviewed by legal authorities prior to signing. It may also be the case that the city/county wishes to hold a surety bond provided by the third party in the eventuality that the private third party is unable or unwilling to meet their maintenance responsibilities. Additional comments are provided in the margins of this template.

A Tri-Party agreement between Pender County, Developers, and Home-Owners Associations (HOAs) was developed as part of this plan. The following flow chart provides further information about this agreement.



DEPARTMENT OF	TRANSPORTATION			
-A	ND-	TH AGR	IREE PARTY REEMENT FOR ACTIVE	Text in the prelude sections would need to be modified in the event that there are
-A	ND-	TRANSPORTATION FACILITY ON OR NEAR		only two parties signing; remove second set of fields at left and
		PRIMARY AND SECONDARY ROAD		the third-party description lines below.
THIS AGREEMENT	, made and entered into this the	day of	, 20, b	y and between the Departme
		party of the second	part; and	
			F	party of the third part,
THAT WHEREA sidewalk/greenway/trail], Route(s) vith the construction and	S, the party of the second part des hereafter referred to as the Facilit	sires to develop a p y, on or near the rig , located	ublic <mark>[sidewalk/greer</mark> ht-of-way of the pub	<mark>nway/trail</mark>] named <mark>[name of</mark> lic road designated as:
THAT WHEREA sidewalk/greenway/trail], Route(s) with the construction and WHEREAS, it effect the Facility, and upon it by statute, is w way as indicated, subj NOW, THERE grants to the party of t	S, the party of the second part des hereafter referred to as the Facilit l/or erection of:	the party of the second the limits of the second the limits of the second the	ublic [sidewalk/greer ht-of-way of the pub econd part to rity conferred s of the right of part hereby ct the Facility as	Party of the First Part: NCDOT Party of the Second Part: County/City that is constructing the facility Party of the Third Part:
THAT WHEREA sidewalk/greenway/trail], Route(s) with the construction and WHEREAS, it effect the Facility, and upon it by statute, is w way as indicated, subj NOW, THERE grants to the party of t shown on attached pla a part hereof upon the	S, the party of the second part des hereafter referred to as the Facilit l/or erection of:	the party of the second authors for the party of the second authors for the second authors for the second authors for the first party of the first privilege to construct special provisions	ublic [sidewalk/green ht-of-way of the pub econd part to prity conferred s of the right of part hereby ct the Facility as which are made	Party of the First Part: NCDOT Party of the Second Part: County/City that is constructing the facility Party of the Third Part: HOA or other licensed, legal entity that will assume maintenance
THAT WHEREA sidewalk/greenway/trail], Route(s)	S, the party of the second part des hereafter referred to as the Facilit d/or erection of:	the party of the se exercise of author nt within the limits eement; party of the first p ivilege to construct special provisions the first part's late revisions and am . Information as to pon Engineer of the	ublic [sidewalk/green ht-of-way of the pub econd part to writy conferred s of the right of part hereby ct the Facility as which are made scribed facility will est policies, endments thereto to these policies e party of the first	Party of the First Part: NCDOT Party of the Second Part: County/City that is constructing the facility Party of the Third Part: HOA or other licensed, legal entity that will assume maintenance upon completion

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any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest <u>Manual on</u> <u>Uniform Traffic Control Devices for Streets and Highways</u> and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of Facility.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on or within the right-of-way of a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

a. <u>Compliance with Regulations</u>: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal City/County is responsible for demolition and removal of the Facility if it ever fails to meet requirements

City/County is responsible for damages or disturbances to the natural environment incurred during construction

NCDOT can stop work in the event of noncompliance

City/County has to start work within one year of the date of the agreement

City/County agrees to comply with regulations for procurement of services

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Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

- b. <u>Nondiscrimination</u>: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations.
- c. <u>Solicitations for Subcontracts, including Procurements of Materials and</u> <u>Equipment</u>: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation [or the Federal Highway Administration] to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation [or the Federal Highway Administration] and shall set forth what efforts it has made to obtain the information.
- e. <u>Sanctions for Noncompliance</u>: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,

(1) withholding of payments to the contractor under the contract until the contractor complies, and/or

(2) cancellation, termination or suspension of the contract, in whole or in part.

f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation [or the Federal Highway Administration] may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States.

That when title to the subject that constitutes the aforesaid Facility passes from the party of the second part and vests in the party of the third part, the party of the third part agrees to assume all responsibilities and rights and to perform all obligations as

City/County agrees to comply with regulations for procurement of services (continued)

The contractor, which is presumably familiar with NCDOT [or FHWA, if appropriate] regulations and requirements, has to adhere to those requirements as do subcontractors.

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replacement of signage, materials, benches, marki appropriate signage installed for the Facility shall in Second Party's participation, by name, in the Facili R/W (166) : Party of the Second Part certifies that is copy of the form R/W (166) incorporating all revisions to date. IN WITNESS WHEREOF, each of the parties to the same to be executed the day and year first above.	, trash/litter removal, and repain ings, and other appurtenances.] All nclude acknowledgement of the ity. this agreement is true and accurate his agreement has caused the written.	turned over to the Thir Party (HOA or other entity) including all maintenance; this paragraph is revised in the event that there ar only two parties in the agreement.
	DEPARTMENT OF TRANSP	ORTATION
WITNESS:	DIVISION	ENGINEER
WITNESS:	Second F	Party
	- <u></u>	
	Third P	arty

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