



US 1 WIDENING FROM US 64 TO NC 55

SR 3977 (CARY PARKWAY) TO NC 540

WAKE COUNTY

STIP PROJECTS No. U-6066

WBS No. 47491.1.1

US 1/NC 55 (WILLIAMS ST.) INTERCHANGE

WAKE COUNTY

STIP PROJECTS No. U-5981

WBS No. 47491.1.1



TRAFFIC FORECAST REPORT



PREPARED FOR:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PREPARED BY:

PATRIOT TRANSPORTATION ENGINEERING, PLLC



AUGUST 2019

TRAFFIC FORECAST COVER LETTER

August 29, 2019

MEMORANDUM TO: Pamela Williams, PE
NCDOT Project Management Unit

FROM: Peter Trencansky, PE, PTOE, AICP
Patriot Transportation Engineering, PLLC

SUBJECT: Traffic Forecast for U-6066 & U-5981
Wake County
US 1 Widening from US 64 to NC 55 (U-6066)
US 1/NC 55 (Williams Street) Interchange Re-configuration (U-5981)

This forecast has been reviewed and approved by the NCDOT Transportation Planning Division on August 29, 2019.

Please find attached the 2019 and 2045 traffic forecast for STIP Projects U-6066 and U-5981 in Wake County. The proposed project U-6066 would increase the capacity of US 1 by widening the facility from four lanes to six lanes from US 64 to NC 55 (Williams Street). The proposed project U-5981 would convert the existing diamond interchange at US 1 and NC 55 (Williams Street) to a diverging diamond interchange (DDI). This forecast was requested for use in the project development activities associated with the project, including the environmental documentation and Preliminary Roadway Design.

This is the first known forecast for this project. The project is located within the boundaries of the Capital Area Metropolitan Planning Organization (CAMPO). The following three scenarios are provided in this forecast:

- 2019 Base Year (Existing Conditions)
- 2045 Future Year No-Build
- 2045 Future Year Build

Scott Walston (NCDOT Transportation Planning Division), Amy Niedringhaus (NCDOT Division 5 District 1 District Engineer), Chris Lukasina (CAMPO Executive Director), Alex Rickard (CAMPO Deputy Director), Mike Bruff (CAMPO Transportation Modeling Engineer), Tim Gardiner (Wake County Transportation Planner), Juliet Andes (Town of Cary Facilities Planning Manager), Luana Deans (Town of Cary Transportation Planning Engineer), Russell Dalton (Town of Apex Senior Transportation Engineer), and Shannon Cox (Town of Apex Long Range Planner Manager) were consulted during the development of this forecast.

Fiscal Constraint

The project is located within the CAMPO boundaries; therefore, the travel demand model and traffic forecast is fiscally constrained to match the assumptions of the corresponding Metropolitan Transportation Plan (MTP).

The *Connect 2045: The Metropolitan Transportation Plan for the Capital Area Metropolitan Planning Organization and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (2045 MTP)* includes the proposed projects as follows:

- MTP ID F110b – US 1 from US 64 to NC 55 – Widen from 4 lanes to 6 lanes (STIP U-6066)
- MTP ID F110a – US 1 at NC 55 Interchange – Convert to Diverging Diamond Interchange (STIP U-5981)

The following projects that may affect the proposed project are assumed to be constructed prior to 2045:

- MTP ID F5, F6 – NC 540 Triangle Expressway (Toll) – from NC 55 Bypass to I-40 (south) (2025 Horizon Year) (STIP R-2721, R-2828)
- MTP ID F3 – NC 540 Triangle Expressway (Toll) – from I-40 (south) to US 64 East Bypass (2035 Horizon Year) (STIP R-2829)
- MTP ID F15a3 – US 64 Conversion to Superstreet – from US 1 to Laura Duncan Road (2025 Horizon Year) (STIP U-5301)
- MTP ID F15a, F15a1, F15a2 – US 64 conversion to expressway – from Laura Duncan Road to NC 540 (2025/2035 Horizon Year) (partially included in STIP U-5301)
- MTP ID A166, A114a, A114b – SR 1010 (Center St/Ten Ten Road) – Widening & Interchange Improvements from Apex Peakway to Kildaire Farm Road (2025 Horizon year) (STIP U-5825)
- MTP ID 187b1, 187b2, 187b3 – Apex Peakway East – New Location – Laura Duncan Road to NC 55 (2025/2035 Horizon Year)
- MTP ID A96b, A622 – NC 55 Widening from Olive Chapel Road to Apex Peakway (2025 Horizon Year) (STIP U-2901B)
- MTP ID A449 – Perry Road Extension – New Location including interchange at US 1 – from Apex Peakway to NC 55 Bypass (2035 Horizon Year)

Travel Demand Model

The Triangle Regional Model v6 Build 403 (provided by ITRE on 06/04/2019 as authorized by NCDOT) was utilized as a tool in the development of the forecast.

Forecast Methodology

The 2019 base year no-build traffic volumes and design factors were developed based upon current counts and historic AADT trend projections. The 2045 future year no-build traffic volumes generally included the development of compound annual growth rates between two model years, while the 2045 future year build volumes generally included the development of diversion rates between like model years with different scenarios. The compound annual growth rates or diversion rates were then applied to the AADT volumes from another scenario to develop initial volumes for each scenario. Engineering judgment adjustments were applied as needed in finalizing the volumes in order to develop a balanced forecast.

Interpolation/Extrapolation

To estimate AADT volumes between 2019 and 2045, straight line interpolation between the 2019 and the 2045 scenarios is acceptable. AADT volumes may be extrapolated for up to two years immediately following 2045. If it is determined that any of these assumptions have become inconsistent with the project and surrounding area activity, please request updated projections at this location.

cc: (Final distribution for your records via e-mail as PDF attachments):
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Brenda Moore, PE, CPM (roadwaydesign@ncdot.gov)
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Scott Walston, NCDOT Transportation Planning Division (swalston@ncdot.gov)
Keith Dixon, State Traffic Forecast Engineer (trafficforecast@ncdot.gov)
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Traffic Forecasting GIS Support (trafficforecastinggissupport@ncdot.gov)

2019 NO-BUILD SCENARIO

AVERAGE ANNUAL DAILY TRAFFIC

SHEET 1 OF 1

TIP: U-6066/U-5981

WBS: 47491.1.1

COUNTY: Wake

DIVISION: 5

DATE: 08-29-2019

PREPARED BY: Patriot Transportation Engineering, PLLC

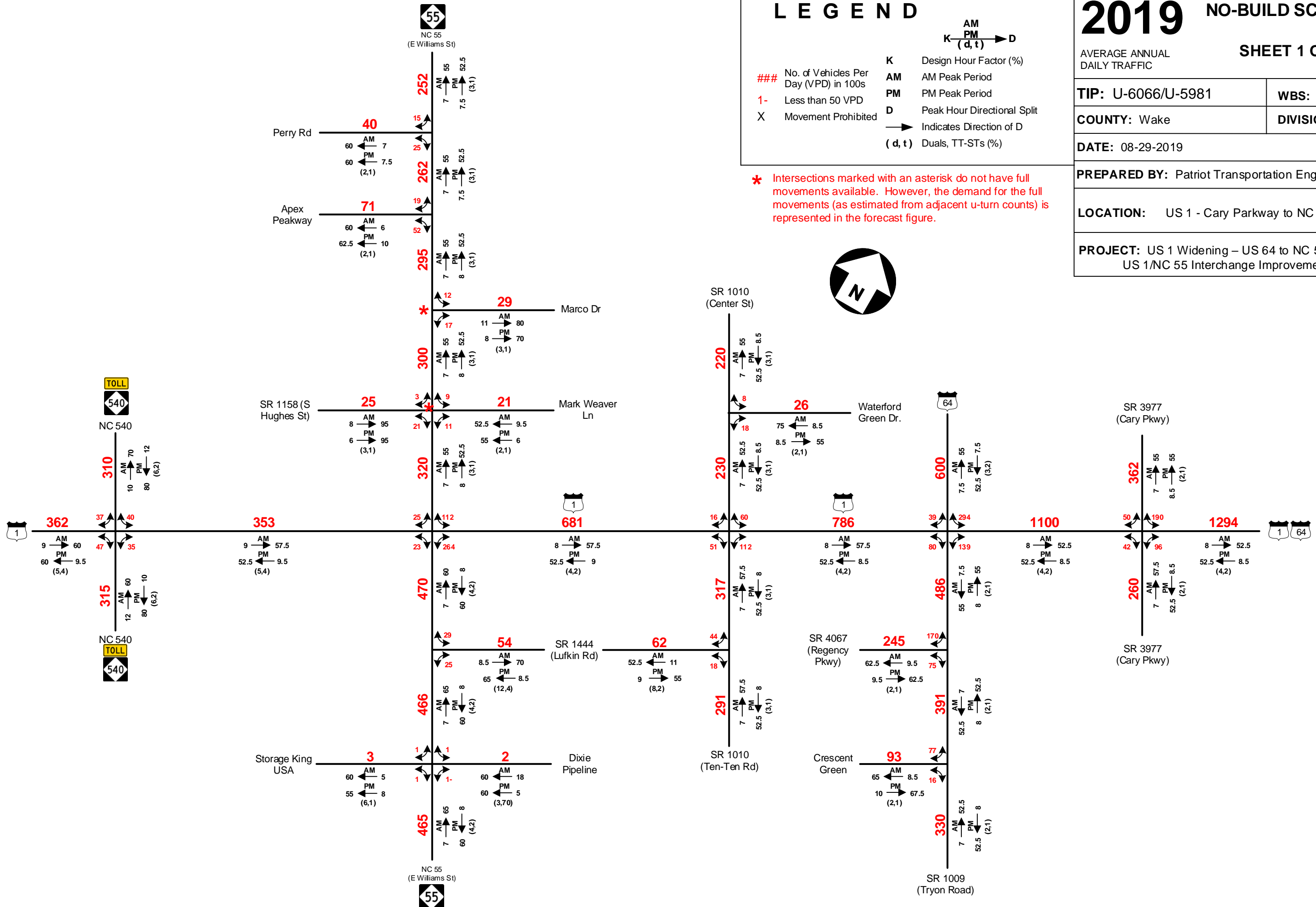
LOCATION: US 1 - Cary Parkway to NC 540

PROJECT: US 1 Widening – US 64 to NC 55 (U-6066)
US 1/NC 55 Interchange Improvements (U-5981)

LEGEND

- ### No. of Vehicles Per Day (VPD) in 100s
- 1- Less than 50 VPD
- X Movement Prohibited
- K Design Hour Factor (%)
- AM AM Peak Period
- PM PM Peak Period
- D Peak Hour Directional Split
- Indicates Direction of D
- (d, t) Duals, TT-STs (%)

* Intersections marked with an asterisk do not have full movements available. However, the demand for the full movements (as estimated from adjacent u-turn counts) is represented in the forecast figure.



2045 NO-BUILD SCENARIO

AVERAGE ANNUAL DAILY TRAFFIC

SHEET 1 OF 1

TIP: U-6066/U-5981

WBS: 47491.1.1

COUNTY: Wake

DIVISION: 5

DATE: 08-29-2019

PREPARED BY: Patriot Transportation Engineering, PLLC

LOCATION: US 1 - Cary Parkway to NC 540

PROJECT: US 1 Widening – US 64 to NC 55 (U-6066)
US 1/NC 55 Interchange Improvements (U-5981)

LEGEND

- ### No. of Vehicles Per Day (VPD) in 100s
- 1- Less than 50 VPD
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- K Design Hour Factor (%)
- AM AM Peak Period
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- D Peak Hour Directional Split
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* Intersections marked with an asterisk do not have full movements available. However, the demand for the full movements (as estimated from adjacent u-turn counts) is represented in the forecast figure.

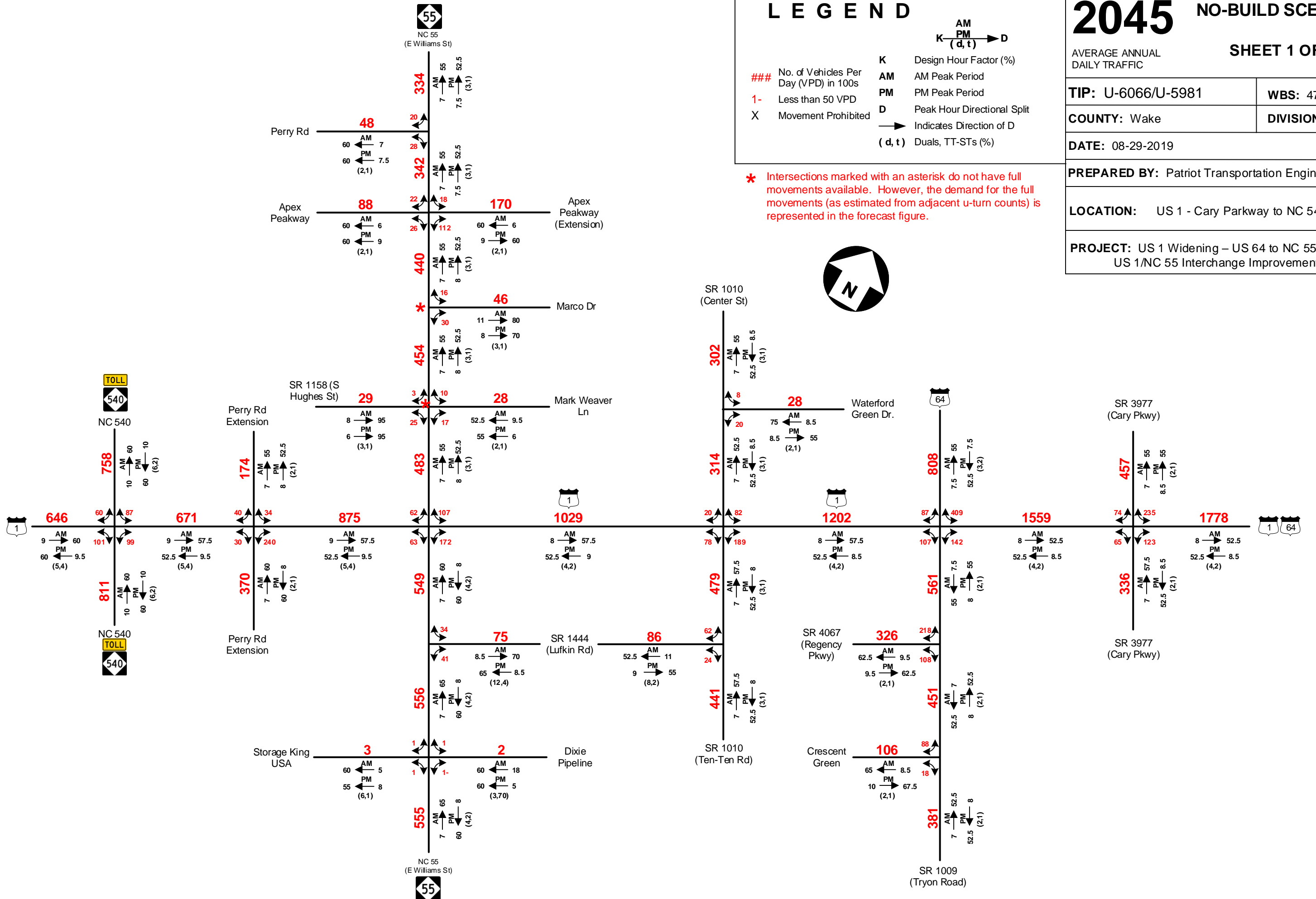


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1. PROJECT BACKGROUND

Patriot Transportation Engineering, PLLC (Patriot) has been contracted by the North Carolina Department of Transportation (NCDOT) to develop base and future year traffic forecasts for NCDOT State Transportation Improvement Program (STIP) Projects U-6066 (US 1 widening) and U-5981 (US 1/NC 55 interchange) in Wake County.

1.1 PROJECT REQUEST INFORMATION

The traffic forecast for this project was requested by the NCDOT Project Management Unit in support of project development activities, including environmental documentation and Preliminary Design for the project. The scope of work for the traffic forecast was finalized in June 2019.

For the purposes of the environmental document, it was decided through project scoping with NCDOT that Base Year scenarios would use 2019 and Future Year scenarios would use 2045. The 2019 Base Year traffic forecast includes the No-Build scenario and the 2045 Future Year traffic forecast includes No-Build and Build scenarios for a single alternative.

A kick-off meeting to discuss the forecast assumptions and methodology was held on July 15, 2019. The kick-off meeting minutes are included in Appendix B.

1.2 FORECAST HISTORY

This is the first known traffic forecast for U-6066 and U-5981.

1.3 PROJECT DESCRIPTION

NCDOT proposes to increase the capacity of US 1 by widening the facility from four lanes to six lanes (U-6066) from US 64 to NC 55 (Williams Street), a distance of approximately 3.1 miles, in Wake County.

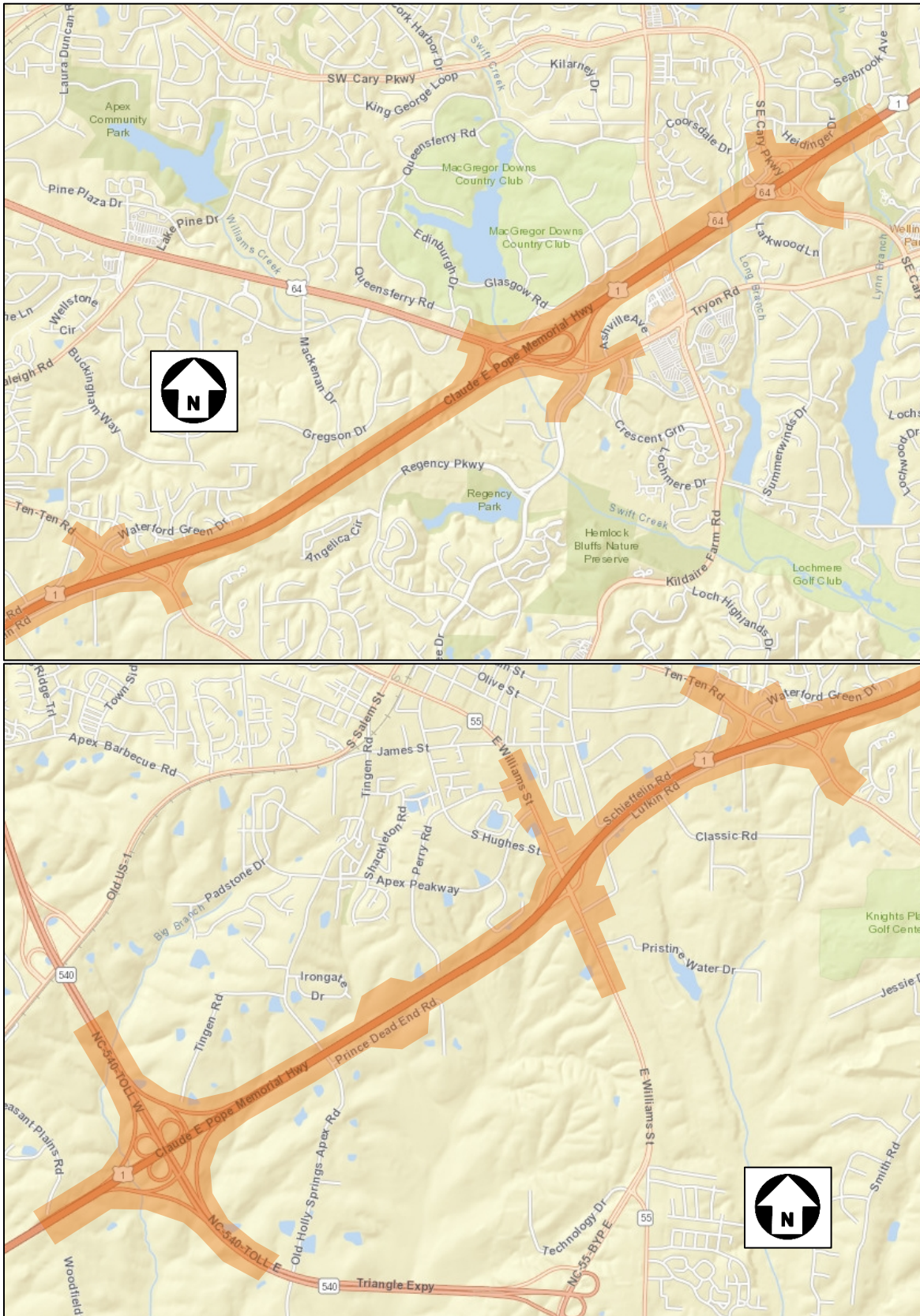
NCDOT also proposes to convert the existing diamond interchange at US 1 and NC 55 (Williams Street) to a diverging diamond interchange (DDI) (U-5981).

1.4 AREA INFORMATION

Wake County has an estimated population of 907,000 citizens based on 2010 census data and a projected 2019 population of 1,094,000 according to the North Carolina Office of State Budget and Management (NCOSBM). The county covers approximately 857 square miles and consists of several cities and towns including; Raleigh, Cary, Apex, Fuquay-Varina, Garner, Holly Springs, Knightdale, Morrisville, Rolesville, Wake Forest, Wendell, and Zebulon. Raleigh-Durham International Airport (RDU) is located on the western side of the county. Raleigh is both the county seat of Wake County and the state capital of North Carolina.

The project location map for the U-6066/U-5981 forecast is shown on Figure 1-1: Project Vicinity Map.

Figure 1-1: Project Vicinity Map



1.5 ROUTE INFORMATION

The following roadways within the study area are classified by the Federal Highway Administration (FHWA):

The **US 1** corridor is classified as an *Other Freeway* in the study area. US 1 runs from Key West, Florida, through Apex and Cary and the study area in North Carolina, to Fort Kent, Maine. Within the study area, US 1 is a four-lane divided facility with fully-controlled access. The study corridor includes grade-separated interchanges at NC 540, NC 55 (Williams Street), Center Street/Ten-Ten Road, US 64, and Cary Parkway (SR 3977). US 1 serves as a major commuting corridor between Raleigh and areas to the south and west. The speed limit in the study area is 65 mph from NC 540 to the east and 70 mph from NC 540 to the west.

NC 540 is designated as an *Other Freeway* in the study area. NC 540 is a fully-access controlled tollway with a system-to-system interchange with US 1. The speed limit along NC 540 is 70 mph.

NC 55 (Williams Street) is designated as an *Other Principal Arterial* in the study area. NC 55 (Williams Street) connects to US 1 via a grade-separated interchange. The speed limit along NC 55 (Williams Street) is 35 mph north of US 1 and 45 mph south of US 1.

Center Street/Ten-Ten Road (SR 1010) is designated as a *Minor Arterial* in the study area. North of US 1 the roadway alignment is generally designated as Center Street (SR 1010), while the roadway is generally designated as Ten-Ten Road (SR 1010) south of US 1. Access to US 1 is provided via a grade-separated interchange. The speed limit along Center Street/Ten-Ten Road (SR 1010) is 45 mph.

US 64 is designated as an *Other Principal Arterial* in the study area. Access to US 1 is provided via a grade-separated interchange. From the US 1 interchange east towards Raleigh, US 64 and US 1 share an alignment. The speed limit along US 64 is 55 mph.

Tryon Road (SR 1009) is designated as a *Minor Arterial* within the study area. Access to US 1 is provided via a grade-separated interchange (shared with US 64). The speed limit along Tryon Road (SR 1009) is 45 mph.

Cary Parkway (SR 3977) is designated as a *Minor Arterial*. Access to US 1 is provided via a grade-separated interchange. The speed limit along Cary Parkway (SR 3977) is 45 mph.

Apex Parkway is designated as a *Major Collector*. The speed limit along Apex Parkway is 35 mph.

All other roadways included in the project forecast are classified as *Local Roads*.

1.6 FUTURE AREA ROADWAY IMPROVEMENTS – FISCAL CONSTRAINT

The project is located within the Capital Area Metropolitan Planning Organization (CAMPO) boundaries; therefore, the travel demand model and traffic forecast is fiscally constrained to match the assumptions of the corresponding Metropolitan Transportation Plan (MTP).

The *Connect 2045: The Metropolitan Transportation Plan for the Capital Area Metropolitan Planning Organization and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization* (2045 MTP) includes the following projects in the area which are anticipated to affect travel patterns on the subject project and are described as follows:

- MTP ID F5, F6 – NC 540 Triangle Expressway (Toll) – from NC 55 Bypass to I-40 (south) (2025 Horizon Year) (STIP R-2721, R-2828)
- MTP ID F3 – NC 540 Triangle Expressway (Toll) – from I-40 (south) to US 64 East Bypass (2035 Horizon Year) (STIP R-2829)
- MTP ID F15a3 – US 64 Conversion to Superstreet – from US 1 to Laura Duncan Road (2025 Horizon Year) (STIP U-5301)

- MTP ID F15a, F15a1, F15a2 – US 64 conversion to expressway – from Laura Duncan Road to NC 540 (2025/2035 Horizon Year) (partially included in STIP U-5301)
- MTP ID A166, A114a, A114b – SR 1010 (Center St/Ten Ten Road) – Widening & Interchange Improvements from Apex Peakway to Kildaire Farm Road (2025 Horizon year) (STIP U-5825)
- MTP ID 187b1, 187b2, 187b3 – Apex Peakway East – New Location – Laura Duncan Road to NC 55 (2025/2035 Horizon Year)
- MTP ID A96b, A622 – NC 55 Widening from Olive Chapel Road to Apex Peakway (2025 Horizon Year) (STIP U-2901B)
- MTP ID A449 – Perry Road Extension – New Location including interchange at US 1 – from Apex Peakway to NC 55 Bypass (2035 Horizon Year)
- MTP ID F110c – US 1 Widening from NC 55 to NC 540 (2035 Horizon Year)

2. SOURCES OF INFORMATION AND DATA

The following sections describe the various information and data sources used in the development of the traffic forecast.

2.1 RELATED FORECASTS

Past traffic forecasts in the vicinity of the proposed project can potentially be utilized as a tool when preparing the traffic forecast. The following recent forecasts were identified and considered in the development of this forecast:

- U-2719 – US 1/US 64 from Cary Parkway (SR 3977) to Raleigh (2017)
- U-5301 – US 64 and Tryon Road (2017)
- U-5825 – Center Street and Ten-Ten Road (2016)
- U-2901 – NC 55 (Williams Street) (2017)
- R-2721/R-2828/R-2829 – NC 540 (2016)

2.2 HISTORIC AADT

Existing traffic count data for study area roadways from 1998 to 2017 was provided by the NCDOT Traffic Survey Group (TSG). Data sources included:

- NCDOT TSG Average Annual Daily Traffic (AADT) history from 1998 to 2017

The locations of the historic traffic data counts are shown in Figure 2-1. The complete 20-year AADT history for each location is found in Appendix A.

2.3 FIELD DATA COLLECTION

New project-specific counts were taken in June 2019 by Quality Counts, LLC and included sixteen 13-hour turning movement counts, four 48-hour classification counts, and ten 14-hour manual classification counts. In addition, because the project counts were collected when school was not in session, previously-collected traffic counts in the study area were also utilized, including: nine 13-hour turning movement counts, five 48-hour classification counts, and three 14-hour manual classification counts. The traffic count locations are listed in Table 2-1 and are displayed in Figure 2-1.

The traffic count locations fall under the following TSG ATR classifications:

- ATR Group 1 (The most dominant group in the State. Mostly rural in nature and is predominantly used for count locations on nonurban primary routes and all rural and most urban secondary roads).
- ATR Group 4 (predominantly found in areas where land use is characterized as urban, with dense, mixed development. Factors from this group are predominantly applied to urban primary routes and higher volume secondary and local routes in large urban areas).
- ATR Group 11 (applies to urban interstate and some rural locations strongly influenced by nearby large urban areas).

The ATR categories for each count were confirmed through the NCDOT GIS mapping application. The 48-hour vehicle classification counts (VSCs) were converted to 24-Hour volumes by dividing the 48-Hour counts by two and then applying the correct seasonal adjustment factors. The turning movement counts (TMCs) were converted to 24-Hour

volumes by utilizing the NCDOT Traffic Survey Partial Weekday Count Expansion Factors (November 2015). The manual classification count (MCC) was used in conjunction with the VSC and nearby TMCs to calculate connecting traffic volumes (see figure). The count expansion factors were also compared to the count data from the 48-hour volume, speed, classification count and determined to be adequate.

Figure 2-1: Traffic Volume Data Locations

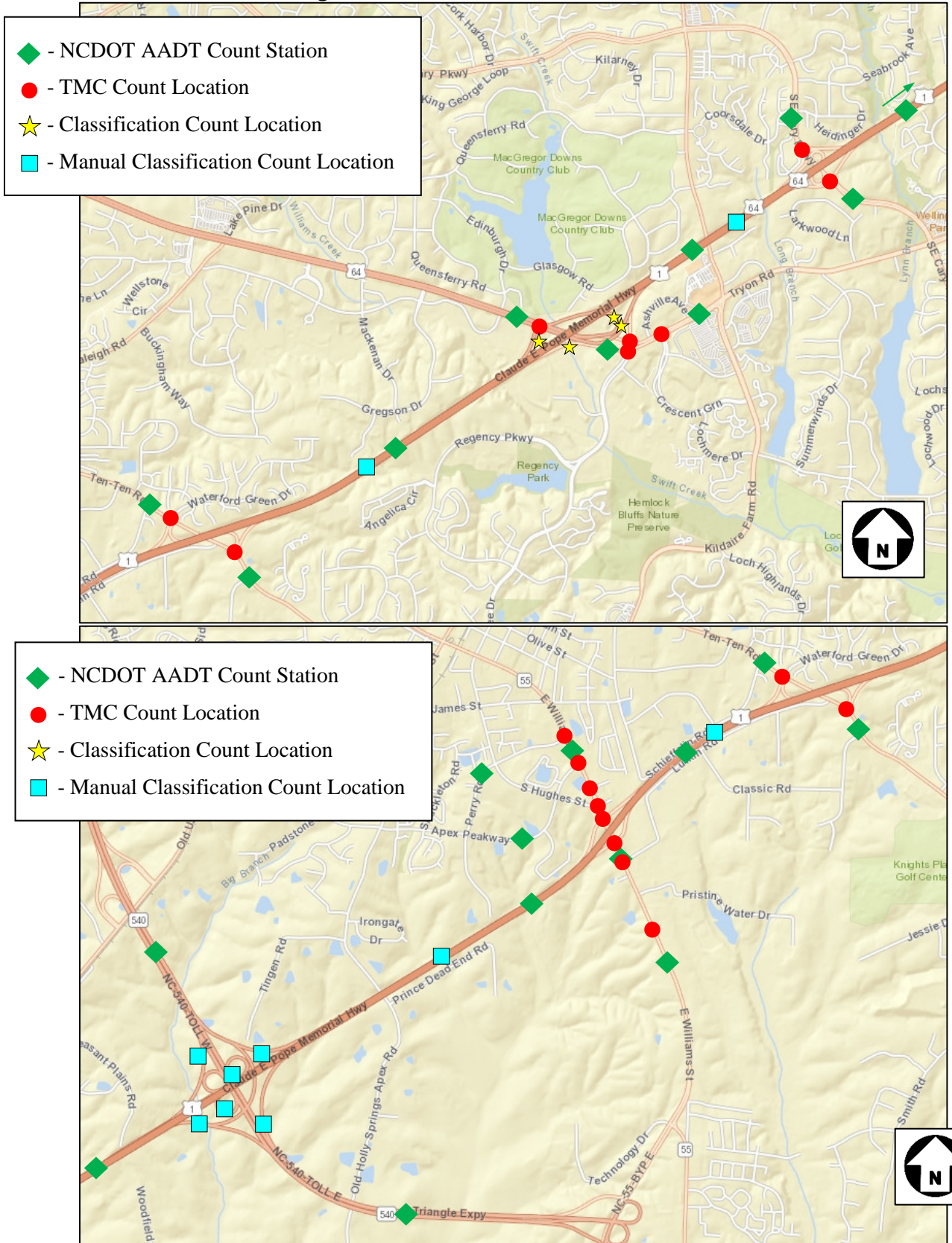


Table 2-1: Collected Traffic Count Locations

Location	Count Type	Date(s)	County	Count ID	Count Firm	ATR Group	Seasonal Adjustment Factor
Project Specific Counts							
US 1 at NC 540	13-hr TMC (Complex)*	6/26/2019	Wake	15013728	Quality Counts LLC	1,11	0.97/0.96
US 1 at NC 55	13-hr TMC (Complex)*	6/26/2019	Wake	15013726	Quality Counts, LLC	1	0.97
US 1 at SR 1010 (Center St/Ten-Ten Rd)	13-hr TMC (Complex)*	6/26/2019	Wake	15013710	Quality Counts, LLC	4,1	0.97/0.97
US 1 at US 1/64/SR 1009 (Tryon Road)	13-hr TMC (Complex)*	6/26/2019	Wake	15013704	Quality Counts, LLC	4,1	0.97/0.97
US 1/64 at SE Cary Parkway	13-hr TMC (Complex)*	6/26/2019	Wake	15013702	Quality Counts, LLC	4,1	0.97/0.97
NC 55 at Perry Road	13-hr TMC	6/26/2019	Wake	15013719	Quality Counts, LLC	1	0.97
NC 55 at Apex Peakway	13-hr TMC	6/26/2019	Wake	15013712	Quality Counts, LLC	1	0.97
NC 55 at Marco Drive	13-hr TMC	6/26/2019	Wake	15013713	Quality Counts, LLC	1	0.97
NC 55 at Hughes St/Mark Weaver Ln	13-hr TMC	6/26/2019	Wake	15013714	Quality Counts, LLC	1	0.97
NC 55 at Lufkin Rd	13-hr TMC	6/26/2019	Wake	15013717	Quality Counts, LLC	1	0.97
NC 55 at Storage King/Dixie Pipeline	13-hr TMC	6/26/2019	Wake	15013718	Quality Counts, LLC	1	0.97
SR 1010 (Center St) at Waterford Green Dr)	13-hr TMC (Complex)*	6/26/2019	Wake	15013710	Quality Counts, LLC	1	0.97
SR 1010 (Ten-Ten Rd) at SR 1444 (Lufkin Rd)	13-hr TMC (Complex)*	6/26/2019	Wake	15013710	Quality Counts, LLC	1	0.97
SR 1009 (Tryon Rd) at Regency Parkway	13-hr TMC (Complex)*	6/26/2019	Wake	15013706	Quality Counts, LLC	1	0.97
Tryon Road at Crescent Green	13-hr TMC	6/26/2019	Wake	15013707	Quality Counts, LLC	1	0.97
US 1 at NC 55	13-hr TMC (Complex)*	5/18/2017	Wake	17-10597	Quality Counts LLC	1	0.97
US 1 - East of Cary Parkway	14-hr MCC	6/26/2019	Wake	15013724	Quality Counts, LLC	4	0.97
US 1 - East of SR 1010	14-hr MCC	6/26/2019	Wake	15013724	Quality Counts, LLC	4	0.97
US 1 - West of NC 55	14-hr MCC	6/26/2019	Wake	15013724	Quality Counts, LLC	1	0.97
US 1 - West of NC 55	14-hr MCC	6/26/2019	Wake	15013724	Quality Counts, LLC	1	0.97
Historic Traffic Counts							
US 1 at NC 55	13-hr TMC (Complex)*	3/7/2019	Wake	1184	Burns Service Inc.	1	0.99
US 1 at US 64/SR 1009 (Tryon Road)	13-hr TMC (Complex)*	6/8/2017	Wake	17-14653	The Traffic Group	4,1	0.95/0.93

Location	Count Type	Date(s)	County	Count ID	Count Firm	ATR Group	Seasonal Adjustment Factor
Historic Traffic Counts							
SR 1010 at Waterford Green Drive/US 1 Ramp	13-hr TMC	8/17/2017	Wake	17-02471/17-02472	Davenport	1	0.93
SR 1010 at Lufkin Road/US 1 Ramp	13-hr TMC	8/17/2017	Wake	17-02471/17-02472	Davenport	1	0.93
SR 1009 (Tryon) Road at Regency Parkway	13-hr TMC	10/12/2016	Wake	16-14493	The Traffic Group	1	0.96
US 1/64 - West of Cary Parkway	14-hr MCC	9/5/2018	Wake	18-10280	Quality Counts, LLC	4	0.89
US 1/64 - East of Cary Parkway	14-hr MCC	10/19/2017	Wake	17-10886	Quality Counts, LLC	4	0.89
US 1/64 - East of US 64/Tryon Road	14-hr MCC	10/19/2017	Wake	17-10885	Quality Counts, LLC	4	0.89
Regency Parkway - West of Tryon Road	48-hr VSC	12/5/17-12/6/17	Wake	17-14076	The Traffic Group	1	0.98/0.99
SR 1010 - South of Lufkin Road	48-hr VSC	11/28/17-11/29/17	Wake	17-14075	The Traffic Group	1	0.95/0.96
NC 55 - South of Lufkin Road	48-hr VSC	1/9/18-1/10/18	Wake	17-14074	The Traffic Group	1	1.12/1.10
US 64 - North of US 1	48-hr VSC	10/11/16-10/12/16	Wake	16-14456	The Traffic Group	4	0.98/0.91
US 1 - South of NC 540	48-hr VSC	3/8/16-3/9/16	Wake	13724942	Quality Counts, LLC	1	1.05/1.05
US 1 East of NC 540	48-hr VSC	3/8/16-3/9/16	Wake	US 1 N of NC 540	Quality Counts, LLC	1	1.05/1.05

Note: TMC = turning movement count; MCC = manual classification count; VSC = volumes, speed, classification count

* Denotes complex interchange count that includes manual classification count on the freeway ramps combined into a single count that is displayed in the same manner as a TMC.

2.4 FIELD INVESTIGATION

An orientation field trip was taken as part of the traffic forecast initiation process. The field trip was taken on August 6th, 2019. The following observations were noted:

- The area is highly developed with high traffic volumes. Queuing was observed at most of the study intersections.
- The primary direction on US 1 appeared to be eastbound in the AM peak period and westbound in the PM peak period, although the volumes looked fairly balanced east of US 64.
- Traffic in the peak directions drops noticeably west of NC 540.
- There is heavy congestion in the peak directions on US 1.
- Congestion in the eastbound direction east of Cary Parkway (SR 3977) affects the study corridor.

- Heavy traffic was observed on NC 55 (Williams Street) on both sides of US 1.
- North of US 1, the peak direction of travel on NC 55 (Williams Street) was difficult to determine and appeared to be nearly balanced in each direction.
- South of US 1, the peak direction of travel on NC 55 (Williams Street) was northbound in the AM peak period and southbound in the PM peak period.
- In the AM peak period, in the northbound direction of travel on NC 55 (Williams Street), south of US 1, there is a heavy lane imbalance in favor of the right lane (the outside lane of the two travel lanes). This appears to be so drivers can access the eastbound on-ramp to US 1. The lane imbalance continues past the interchange to the north side of US 1 so drivers can avoid the left lane drop at the double-left turn to Apex Peakway. In the PM peak period, this lane imbalance was also observed at both locations, but with less intensity on the south side of US 1.

2.5 INFORMATION FROM LOCAL PLANNERS

Questionnaires were sent to, completed by or discussed with the following individuals to assist in understanding the project and traffic forecast study area:

- David Keilson, NCDOT Division 5, Division Planning Engineer
- Ron Garrett, NCDOT Division 5, Assistant Division Traffic Engineer
- Tracy Parrott, NCDOT Division 5, Division Project Delivery Engineer
- *Amy Neidringhaus, NCDOT Division 5, District 1 District Engineer
- *Scott Walston, NCDOT Transportation Planning Division (Eastern Piedmont Group)
- *Chris Lukasina, Capital Area MPO, Executive Director
- *Alex Rickard, Capital Area MPO, Deputy Director
- *Mike Bruff, Capital Area MPO, Transportation Modeling Engineer
- *Tim Gardiner, Wake County, Transportation Planner
- *Juliet Andes, Town of Cary, Facilities Planning Manager
- *Luana Deans, Town of Cary, Transportation Planning Engineer
- *Russell Dalton, Town of Apex, Senior Transportation Engineer
- *Shannon Cox, Town of Apex, Long Range Planner Manager

Individuals who provided a response are denoted with an *. Detailed information from the questionnaires is included in Appendix B.

2.6 OTHER SOURCES

Data sources used that are not listed in Sections 2.1 through 2.5 include:

North Carolina Department of Transportation. *State Transportation Improvement Program*. July 2019. Available: <https://connect.ncdot.gov/projects/planning/STIPDocuments1/NCDOT%20Current%20STIP.pdf>

Capital Area Metropolitan Planning Organization. *2045 Metropolitan Transportation Plan*. Adopted February 21, 2018 and amended on June 28, 2018. Available: http://files.www.campo-nc.us/transportation-plan/2045-metropolitan-transportation-plan/Final_Report/January_2019_Adopted/2045_Joint_MTP_v2_Full_Report_01.16.2019.pdf

NCDOT Functional Classification Maps. Available:

<http://ncdot.maps.arcgis.com/home/webmap/viewer.html?layers=029a9a9fe26e43d687d30cd3c08b1792>

NCDOT AADT Mapping Application. Available:

<http://ncdot.maps.arcgis.com/apps/webappviewer/index.html?id=5f6fe58c1d90482ab9107ccc03026280>

3. BASE YEAR 2019 NO-BUILD TRAFFIC FORECAST

3.1 METHODOLOGY

A review of previous traffic forecasts, field-collected traffic counts, area AADT history, and engineering judgment serve as the basis for the 2019 Base Year No-Build traffic forecast. After careful review for reasonableness checks, the 48-Hour classification counts, 14-Hour MMCs, and 13-Hour TMCs were first converted to AADT volumes by using the appropriate NCDOT TSG seasonal adjustment factors based on the month and day of the week the counts were collected.

A variation of the NCDOT Traffic Forecast Utility (TFU) spreadsheet was also a major tool used in the determination of the traffic forecast volumes. The NCDOT TFU spreadsheet includes an evaluation of the input design factors, balanced turn volumes, and resultant AADTs for each intersection. All factors, turns, and AADTs were determined to be valid. Ultimately, the approach volumes and factors were selected based on engineering judgment such that the AADTs and turning movements can be converted to peak hour volumes.

The data from the field-collected traffic counts were incorporated into the spreadsheet to replicate volumes as closely as possible for each intersection in the traffic forecast. The traffic forecast volumes in the 2019 Base-Year traffic forecast mimic the observed patterns as closely as possible. Once the traffic forecast volumes were determined, they were compared to historic AADT trends and interpolated model volumes for reasonableness. Table C1 found in Appendix C provides a comparison of historic AADT trends, field collected data, interpolated model volumes, and the selected traffic forecast volumes for all locations within the study area.

3.2 DESIGN FACTORS

Design factors are a very important aspect of traffic forecasting. The truck percentages, peak hour factor (or K-Factor), and directional distribution are all used along with forecasted traffic volumes when designing a roadway. The methodology and chosen values for each of the factors are described below.

3.2.1 TRUCK PERCENTAGES

Truck Percentages were determined using the 48-Hour mainline classification count data, the 14-MMC data, and the 13-Hour TMC data. Overall truck percentages were then separated into the two NCDOT standard classifications: Duals (single-unit trucks with at least one dual-tire axle) and TTSTs (multi-unit trucks with single or twin trailers). Attempts were made to maintain consistent truck percentages along a roadway facility unless circumstances warranted a change. Data used to determine the truck percentages and the chosen values are found in Table C2 in Appendix C. A discussion of the truck percentages for the project is also included as follows:

- Truck percentages from the count data were fairly consistent along US 1, with three to five percent duals and two to four percent TTSTs; and with all the higher truck percentages west of NC 55 (Williams Street). The forecast utilizes either five percent duals and four percent TTSTs or four percent duals and two percent TTSTs on US 1.
- Truck percentages were consistent along NC 540, with six percent duals and two percent TTSTs. These truck percentages show a slightly higher percentage of trucks than those found in the NCDOT AADT mapping resource, although they are similar to the previous U-5304 forecast. However, given the on-going construction to complete the NC 540 tollway and the evolving travel patterns, the truck percentages from the manual classification count were used for this forecast. The forecast utilizes six percent duals and two percent TTSTs.

- Y-lines – Most of the truck percentages collected for the Y-lines showed truck percentages that ranged from two to seven percent. Lufkin Road (SR 1444) has elevated truck percentages given its local land uses, and the Dixie Pipeline entrance is primarily only truck traffic. The forecast utilizes truck percentages that are consistent with the count percentages as much as possible, although engineering judgment was used to determine the final truck percentages.

3.2.2 DIRECTIONAL DISTRIBUTION

The directional distribution (D) provides information on the direction of traffic flow in the peak period and is a percentage (rounded to the nearest 2.5 percent) based on the percent of traffic traveling in each direction along the roadway. In addition to the directional distribution percentage, the direction of the peak travel during the AM and PM peak periods are selected and included on the forecast figures. For US 1, D ranged from 50% to 63% primarily eastbound in the AM peak period, and from 53% eastbound to 62% westbound in the PM peak period. The D values for the y-lines varied greatly by location and land use. The D values were measured from as low as 50% (several locations) to as high as 100% (Dixie Pipeline). Table C3 in Appendix C provides the D value information used for this traffic forecast. A discussion of the D values for the project is also included as follows:

- US 1 Corridor – the directional distribution for US 1 ranged from 50.4% WB to 62.8% EB in the AM peak period and from 53.4% EB to 62.0% WB in the PM peak period. The locations of the interchanges along US 1 and the densely developed land in the area has led to several areas of directional distribution at or close to fifty percent. Wherever possible the selected directional distributions were in line with the turning movement count percentages and were selected to maintain continuity along the corridor and such that reasonable peak period volumes could be developed. The forecast utilizes a primary direction of EB in the AM peak hour and WB in the PM peak hour; and a D factor that increases toward the western end of the study corridor.
- NC 540 – the directional distribution along NC 540 was highly directional, with directional percentages of 57% NB to 69% NB in the AM peak period and 80% SB to 84% SB in the PM peak period. The directional distribution was determined to be 60% and 70% NB in the AM peak and 80% SB in the PM peak.
- NC 55 (Williams Street) – the primary direction of travel along NC 55 (Williams Street) is NB in both the AM and PM peak hours north of US 1. South of US 1, NC 55 (Williams Street) displays more standard commuting behavior, with the AM peak in the NB direction and the PM peak in the SB direction.
- Y-lines along study area – the directional distributions for Y-lines along the study area ranged from 50 to 100 percent. Wherever possible the selected directional distributions were in line with the turning movement count percentages.

3.2.3 PEAK HOUR FACTOR

The peak hour factor (K) is the percentage of AADT that occurs during the peak time period of the day. The K-factor is meant to approximate what percentage of daily traffic would be present during the 30th highest peak hour of a given year, which is commonly referred to as K30. To determine the K-value for the classification counts the highest hourly volume was divided by the daily average of the 48-Hour counts. For turning movement counts the K-factor was developed by dividing the peak hour of the count by the daily volume. The K-factors in this traffic forecast range from 5% to 13%. The K-factor information used for this forecast is found in Table C4 in Appendix C. A discussion of the K values for the project is also included as follows:

- US 1 Corridor – the peak hour factor along US 1 ranged from 7.5 to 9.5 percent in the AM peak period and 8.5 percent to 10.0 percent in the PM peak period and were higher at the western end of the corridor. Wherever

possible the selected peak hour factors were in line with the turning movement count data and were selected to maintain continuity along the corridor as much as possible.

- NC 540 – the peak hour factors for NC 540 averaged 11.5 percent in both the AM peak period and the PM peak period, although the factors varied on either side of US 1. The chosen K factors for the forecast matches the measured values.
- Y-lines along the corridor – at the Y-lines, all peak hour factors were measured between 5 percent and 10 percent, except for locations on Marco Drive, Mark Weaver Lane, Lufkin Road (SR 1444), and Dixie Pipeline. The K factors selected for the forecast were largely in line with the turning movement count percentages.

3.3 TRAFFIC FORECAST VOLUMES

Based on the methodology described in Section 3.1, traffic forecasts for the 2019 Base Year No-Build Scenario were calculated. Adjusted counts were compared to trend line analyses and the extrapolation of data to 2019 during the process. Utilizing a variation of the NCDOT Traffic Forecast Utility spreadsheet, bidirectional turning movements were also forecasted at intersections to replicate observed daily turning movement volumes as closely as possible. Comparisons of trend line analyses, volume extrapolation, observed counts, and selected forecast volumes are shown in Table C1 in Appendix C. A discussion of the traffic forecast volumes is included as follows:

- The traffic forecast does not include a connection of Lufkin Road (SR 1444) from west of NC 55 (Williams Street) to Ten-Ten Road (SR 1010). It was determined that the volumes along the roadway between the subject intersections were affected substantially enough by intervening side streets and driveways (including those for Lufkin Road Middle School) that a single link volume was not representative of the volume between the two intersections
- On US 1 from NC 55 to US 64, the difference in volumes between the historic AADT data and the recent counts is substantial; however, project specific counts collected at the same time for adjacent segments are consistent with the AADT data. Therefore, a higher reliance was given to the TMC and manual classification counts.
- The forecast includes two intersections with turn restrictions: NC 55 (Williams Street) at Marco Drive; and NC 55 (Williams Street) at Hughes Street (SR 1158)/Mark Weaver Lane. Left-turns from Marco Drive are prohibited by a median (although left-turns from NC 55 (Williams Street) are permitted). Both Hughes Street (SR 1158) and Mark Weaver Lane are right-in/right-out only side streets. At these locations, although there are turn restrictions, the demand for the full movements, as estimated from nearby u-turn counts, are represented in the forecast figures.

4. MODEL DATA

The study area for the forecast is included the Triangle Regional Travel Demand Model (TRM). The study area is located in the western-central area of the model and has good connectivity, with the model including all of the major roadways (US 1, NC 540, NC 55 (Williams Street), Center Street/Ten-Ten Road (SR 1010), US 64, Tryon Road, and Cary Parkway (SR 3977)), and several of the minor y-line roadways. The Triangle Regional Model v6 Build 403 (provided by ITRE on 06/04/2019 as authorized by NCDOT) was utilized as a tool in the development of the forecast.

The TRM was developed in TransCAD (version 6 Build 9195) and was calibrated based on a base year of 2013, and has models for intermediate years of 2025 and 2035 and a future year of 2045.

Table C5 can be found in Appendix C and displays the model performance for the 2013 model against 2013 AADTs, the 2045 model volumes, and an extrapolated volume for 2019 based on the 2013 and 2045 model output. A discussion of the model performance for the project study area corridors is included as follows:

- US 1 Corridor – the 2013 model volumes match the 2013 AADT counts fairly well on the western end of the study corridor, but the model over-predicts traffic on the eastern end of the study corridor by 8,000 to 20,000 vehicles per day (vpd). The 2019 interpolated model volumes varied from the extrapolated AADT counts in a similar way.
- NC 540 – the 2013 model volumes match the 2013 AADT counts fairly well south of US 1, but the model volumes on NC 540 north of US 1 were higher than the corresponding AADT (by about 9,000 vpd). The 2019 interpolated model volumes were closer to the corresponding AADTs than for the 2013 base year.
- NC 55 (Williams Street) – the 2013 model volumes for NC 55 (Williams Street) match the 2013 AADT count almost exactly on the north side of US 1. South of US 1, the model volumes on NC 55 (Williams Street) were higher than the corresponding AADTs (by about 5,000 to 8,000 vpd). The 2019 interpolated model volumes varied from the extrapolated AADT counts in a similar way.
- Center Street/Ten-Ten Road (SR 1010) – north of US 1, the 2013 model volume was higher than the corresponding AADT by about 1,000 vpd. South of US 1, the 2013 model volume was lower than the corresponding AADT by about 13,000 vpd. The 2019 interpolated model volume varied from the extrapolated AADT in a similar way on the north side of US 1. South of US 1, the 2019 interpolated model volume was much closer to the extrapolated AADT (being lower by about 4,000 vpd).
- US 64 – the 2013 model volume is lower than the corresponding AADT (by about 10,000 vpd). The 2019 interpolated model volume varied from the extrapolated AADT in a similar way although closer (being lower by about 6,000 vpd).
- Tryon Road (SR 1009) – the 2013 model volume is lower than the corresponding AADT (by about 13,000 vpd). The 2019 interpolated model volume varied from the extrapolated AADT count in a similar way. The model network around Tryon Road (SR 1009) was altered between the Base Year and the 2045 Future Year. Several centroid connectors that connected to Tryon Road (SR 1009) and Regency Parkway (SR 4067) in the Base Year were eliminated from the Future Year network. Therefore, vehicles traveling in that part of the network would not be able to load directly onto Tryon Road (SR 1009) or Regency Parkway (SR 4067).
- Cary Parkway (SR 3977) – the 2013 model volumes match the corresponding 2013 AADTs fairly well (higher on the north side of US 1 by about 3,000 vpd and lower on the south side of US 1 by about 4,000 vpd). The 2019 interpolated model volumes varied from the extrapolated AADTs count in a similar way.
- Lufkin Road (SR 1444) – the model network around Lufkin Road was altered between the Base Year and the 2045 Future Year. Specifically, a centroid connector was added from the TAZ (travel analysis zone) southwest

of the US 1/Ten-Ten Road (SR 1010) interchange to load directly to the intersection of Ten-Ten Road (SR 1010) and Reliance Avenue. This change in the network means that vehicles traveling to that TAZ can bypass Lufkin Road and use the new centroid connector directly. The ultimate result is that the model volumes on the eastern end of Lufkin Road are much lower in the Future Year than in the Base Year.

5. BASE YEAR 2019 BUILD TRAFFIC FORECAST

During the scoping process for this forecast, it was determined that a base year 2019 build traffic forecast would not be prepared. The proposed project would not substantially alter the overall roadway network. Therefore, no diversion of traffic is anticipated and a Build forecast would not be required. The 2019 Base Year No-Build volumes can be used as a proxy for 2019 Base Year Build volumes for analysis purposes.

6. FUTURE YEAR 2045 NO-BUILD TRAFFIC FORECAST

6.1 ASSUMPTIONS

A Future Year of 2045 was chosen for the U-6066/U-5981 traffic volume examination as it is the latest year available in the Triangle Regional Travel Demand Model (TRM) and to correspond with the horizon year of the 2045 MTP. All 2045 fiscally-constrained projects, with the exception of U-6066 and U-5981, listed in the *Connect 2045: The Metropolitan Transportation Plan for the Capital Area Metropolitan Planning Organization and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization* (2045 MTP) were included in the 2045 No-Build alternative model run.

The modeling aspects for the 2045 No-Build scenario include utilizing the TRM fiscally constrained model. The first step was to review the model and determine if the changes included in the fiscally constrained MTP have been properly included in the model. Based on this review, no revisions were made to the future year model network.

6.2 METHODOLOGY

The TRM was utilized as a tool in the development of the 2045 Future Year No-Build traffic volumes.

2045 Future Year No-Build model runs were completed without the proposed project in place. The Compound Annual Growth Rate (CAGR) for each traffic volume location was calculated using the following equation:

$$((2045 \text{ Model Value} / 2013 \text{ Model Value}) ^{1/32}) - 1$$

Additionally, the raw model volumes were compared to determine the total change in model volume between 2013 and 2045. The CAGR rates and total volume changes were reviewed and adjusted during this phase using engineering judgment where needed. The selected CAGR rates were then determined and applied to the 2019 No-Build traffic volumes and extrapolated to determine the 2045 traffic volumes.

6.3 DESIGN FACTORS

The 2045 model network was reviewed to see if any of the corridors experienced changes in the percent of traffic occurring in the peak hour, direction of peak travel, or directional split. Based on a review of the model data it was determined that most of the 2019 Base Year factors were still adequate and that these design factors would not change from those included in the 2019 Base Year forecast. Changes to the 2019 Base Year factors were based around additions to the roadway network:

- NC 540 – the design factors for NC 540 were modified based on engineering judgment to reflect the likely operations once the remainder of the toll road is completed.
- Perry Road Extension – the future Perry Road Extension accesses US 1 via a proposed grade-separated interchange. The design factors chosen for the Perry Road Extension match those for NC 55 because the new road would serve a similar function as NC 55 in the same area, and it was judged that the traffic at US 1 would be of a similar nature.
- Apex Peakway Extension – with the extension of Apex Peakway, forming the new east leg of the existing intersection at NC 55 (Williams Street) and Apex Peakway, the design factors were altered from the 2019 Base Year based on engineering judgment to reflect the changes in travel patterns that will likely occur due to the completion of the Peakway.

6.4 TRAFFIC FORECAST VOLUMES

Based on the methodology described in Section 6.2, traffic volumes for the 2045 Future Year No-Build Scenario were calculated. Table C6 in Appendix C shows the comparisons of historic growth rates, model output, CAGRs, and selected volumes. Some of the volumes were modified slightly to allow for the development of a balanced network.

A brief summary of the key observations and considerations from the development of the 2045 No-Build volumes are as follows:

- The model CAGRs for US 1 were all between 1.2% and 3.8%. West of NC 55 (Williams Street), the CAGRs were all over 3%. East of NC 55 (Williams Street), the CAGRs were all less than 2%. The chosen growth rates along US 1 were all consistent with the model rates and were between 1.2% and 3.6%; and produced changes in volume are consistent with the change in volume shown between model scenarios.
- The model CAGRs for NC 540 were between 4.2% and 6.8%. The selected growth rates were lower than the model growth rates, although the changes in volume were close to the model volume deltas.
- The forecast volume for the Perry Road Extension was developed by proportioning the travel demand model volumes based on a factor developed by dividing the model volume by the forecast volumes for adjacent segments.
- The forecast volume for the existing Apex Peakway showed a reduction in volume as traffic would either use the NC 55 interchange or the Perry Road Extension interchange and bypass this segment of roadway. Based on the nature of the Peakway being a circumferential roadway, it is not likely that this degree of diversion will occur; therefore, a minor increase in volume was forecast for this location.
- The forecast volume for the Apex Peakway Extension was developed by proportioning the travel demand model volumes based on a factor developed by dividing the model volume by the forecast volumes for adjacent segments.
- The change in model volumes along Lufkin Road is due to a change in the centroid connector connectivity in the model between the base year and future year model network; therefore, a growth rate that was consistent with growth for the area TAZs was used instead.
- The travel demand model shows very little growth along US 64 and the future year volumes are substantially lower than in previous forecasts. Based on the opinions of local planners and engineers, and the strong historic growth along the corridor, a higher growth rate was selected for US 64 than was shown in the model.
- The change in model volumes along Tryon Road are due to a change in the centroid connector connectivity in the model between the base year and future year model network; therefore, a growth rate that was consistent with growth for the area TAZs and along the entire corridor was used instead of growth rates taken directly from the model links.
- The other Y-lines had growth rates that varied by location, although the majority had growth rates between 0.5% and 2%. The selected growth rates largely matched these rates, where are consistent with land areas that are mostly developed.

7. FUTURE YEAR 2045 BUILD TRAFFIC FORECAST

7.1 ASSUMPTIONS

The 2045 Build traffic forecast contains all of the assumptions found in the 2045 No-Build traffic volume network discussed in Section 6.1 along with the addition of the proposed projects (U-6066 and U-5981). The U-6066 and U-5981 projects were coded into the model by modifying the model to reflect the current preferred design. U-6066 would widen US 1 from four lanes to six lanes from US 64 to NC 55 (Williams Street). U-5981 would convert the existing diamond interchange at US 1 and NC 55 (Williams Street) to a diverging diamond interchange (DDI).

7.2 METHODOLOGY

The Triangle Regional Travel Demand Model (TRM) and engineering judgment were heavily relied upon in the calculation of the 2045 Future Year Build traffic volumes. Once the travel demand model was run to include U-6066 and U-5981, model volumes were extracted for each location included in the evaluation. Model volumes from the 2045 No-Build and Build Model runs were compared in order to calculate a diversion percentage between the two scenarios. These diversion percentages were then applied to the 2045 No-Build traffic volumes in order to develop 2045 Build Traffic volumes.

7.3 DESIGN FACTORS

The 2045 model network was reviewed to see if any of the corridors experienced changes in the percent of traffic occurring in the peak hour, direction of peak travel, or directional split. The selection of design factors for the 2045 Build scenario was similar to the evaluations discussed in the previous scenarios, with the selected values being the same as those selected for the 2045 No-Build scenario discussed in Section 5.3.

7.4 TRAFFIC FORECAST VOLUMES

Based on the methodology described in Section 7.2, traffic volumes for the 2045 Future Year Build Forecast Scenario were calculated. Table C7 in Appendix C show the comparisons of model output, diversion percentages, volume deltas, and selected volumes.

A brief summary of the key observations and considerations from the development of the 2045 Build volumes are as follows:

- The 2045 Build volumes from the travel demand model show diversion rates on US 1 between 3% and 14%. The selected diversion rates were very similar to the model diversion rates.
- The widening on US 1 generally increased traffic throughout the study area, with more vehicles attracted to US 1 to take advantage of the increased capacity on a direct route to Raleigh. Some roadways that operate as parallel roadways or alternate routes decreased in traffic with the widening of US 1 (NC 540 north of US 1, Apex Peakway, US 64, and Tryon Road (SR 1009)).

APPENDIX A:
HISTORIC AADT COUNT DATA

Table A1: NCDOT Historic AADT

Location	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
US 1 - West of NC 540	34,000		24,000		20,000		17,000		18,000	
US 1 - East of NC 540	34,000		24,000		18,000				18,000	
US 1 - East of NC 55	57,000		54,000		46,000		47,000		46,000	
US 1 - East of SR 1010 (Center St)/SR 1010 (Ten-Ten Rd)	59,000		63,000		57,000		60,000		59,000	
US 1/64 - East of US 64/SR 1009 (Tryon Rd)	104,000		98,000		93,000		99,000		94,000	
US 1/64 - East of SR 3977 (SE Cary Parkway)	126,000		122,000		118,000		118,000		113,000	
NC 540 - North of US 1	24,000	22,000	20,000	15,000	9,700					
NC 540 - South of US 1	17,000	16,000	13,000	11,000	7,200					
NC 55 (E. Williams St) - South of Perry Road	27,000		31,000		27,000		29,000			
NC 55 - South of US 1	45,000				43,000		44,000		49,000	
NC 55 (E. Williams St) - South of Dixie Pipeline/Storage King	43,000		43,000		42,000		44,000		39,000	
SR 1010 (Center St) - North of Waterford Green Dr	19,000		20,000		19,000		19,000		18,000	
SR 1010 (Ten-Ten Rd) - South of SR 1444 (Lufkin Rd)	28,000		27,000		36,000		26,000		23,000	
US 64 - North of US 1/64/US 1	48,000		48,000		53,000		46,000		42,000	
SR 1009 (Tryon Road) - South of Crescent Green	29,000		29,000		27,000		25,000		24,000	
SR 3977 (SE Cary Parkway) - North of US 1/64	34,000		33,000		31,000		30,000		29,000	
SR 3977 (SE Cary Parkway) - South of US 1/64	25,000		23,000		21,000		20,000		19,000	

Table A1: NCDOT Historic AADT

Location	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
US 1 - West of NC 540					17,000		16,000			12,000
US 1 - East of NC 540			18,000		16,000					
US 1 - East of NC 55	<i>19,000</i>		41,000		35,000		34,000			26,000
US 1 - East of SR 1010 (Center St)/SR 1010 (Ten-Ten Rd)	<i>37,000</i>		48,000		44,000					
US 1/64 - East of US 64/SR 1009 (Tryon Rd)	85,000				70,000		76,000	66,000		56,000
US 1/64 - East of SR 3977 (SE Cary Parkway)	113,000				90,000		78,000			76,000
NC 540 - North of US 1										
NC 540 - South of US 1										
NC 55 (E. Williams St) - South of Perry Road	28,000		26,000							
NC 55 - South of US 1	44,000		38,000							
NC 55 (E. Williams St) - South of Dixie Pipeline/Storage King	42,000		36,000							
SR 1010 (Center St) - North of Waterford Green Dr	19,000		18,000		19,000		18,000			<i>12,000</i>
SR 1010 (Ten-Ten Rd) - South of SR 1444 (Lufkin Rd)	25,000		24,000		26,000		22,000			13,000
US 64 - North of US 1/64/US 1	47,000		42,000		45,000		48,000			38,000
SR 1009 (Tryon Road) - South of Crescent Green	28,000		26,000		25,000		27,000			21,000
SR 3977 (SE Cary Parkway) - North of US 1/64	30,000		27,000		37,000		38,000	30,000		36,000
SR 3977 (SE Cary Parkway) - South of US 1/64	19,000		17,000		19,000		19,000			15,000

Note: *Red Italics* denote numbers removed from data set due to being greater than two standard deviations away from the trend line data.

APPENDIX B:
PROJECT CORRESPONDENCE

MEETING SUMMARY

Subject: NCDOT STIP Project U-6066 (US 1 Widening from US 64 to NC 55) and U-5981 (US 1 at NC 55 Interchange) Traffic Forecast Kickoff Meeting

Date: July 15, 2019

Time: 10:00-11:00 AM

Location: Online Meeting

Attendees:

NCDOT Division 5: Ben Upshaw, John Braxton

NCDOT Project Management Unit: Pam Williams

NCDOT Feasibility Study Unit: Derrick Lewis, Terry Arellano, Teresa Robinson, Deanna Thompson

VHB: Jonathan Soika, Andrew Topp, Tim Goins

Patriot Transportation Engineering: Peter Trencansky

The meeting began at approximately 10:00 AM with introductions. Following introductions, Peter Trencansky began the meeting by providing a summary of the project study area. The traffic forecast figures (attached) showing the intersections that will be included in the forecast were presented. The following items were discussed related to the study area:

- The traffic forecast area includes several interchanges with surface streets opposite the ramp terminal, creating what is essentially a five or six leg intersection. Traffic Forecasts typically offset the minor roadway away from the interchange and create two separate intersection. VHB requested that some information be provided that would allow them to better re-allocate the volumes for the actual configuration. Patriot agreed that they would provide information to assist in the development of the peak hour volumes for the actual configurations
- It was noted that Waterford Green was not included on the figure. It was agreed that this intersection should be added to the forecast
- It was also noted that the 2045 figure should include a fourth leg for the Apex Peakway at NC 55 intersection due to the planned extension of the Peakway.

Peter discussed that the traffic forecast was for both U-6066 and U-5981 and covered the entire area that may be needed for both projects. Pam and Peter also discussed that the individual scopes for the traffic operations analysis for each project will need to be developed to only include the intersections that are needed for each project. The forecast will also be used to verify the design of the US 1 at SR 1010 interchange design (STIP U-5825) that is currently being developed by VHB.

Peter next discussed the scenarios that will be included in the traffic forecast, including the following:

- 2019 Base Year No-Build
- 2045 Future Year No-Build
 - Neither U-6066 or U-5981 are built, but all other fiscally constrained projects are in place
- 2045 Future Year Build
 - All fiscally constrained project, including U-6066 and U-5981, are built
 - U-6066 includes widening US 1 from four to six lanes

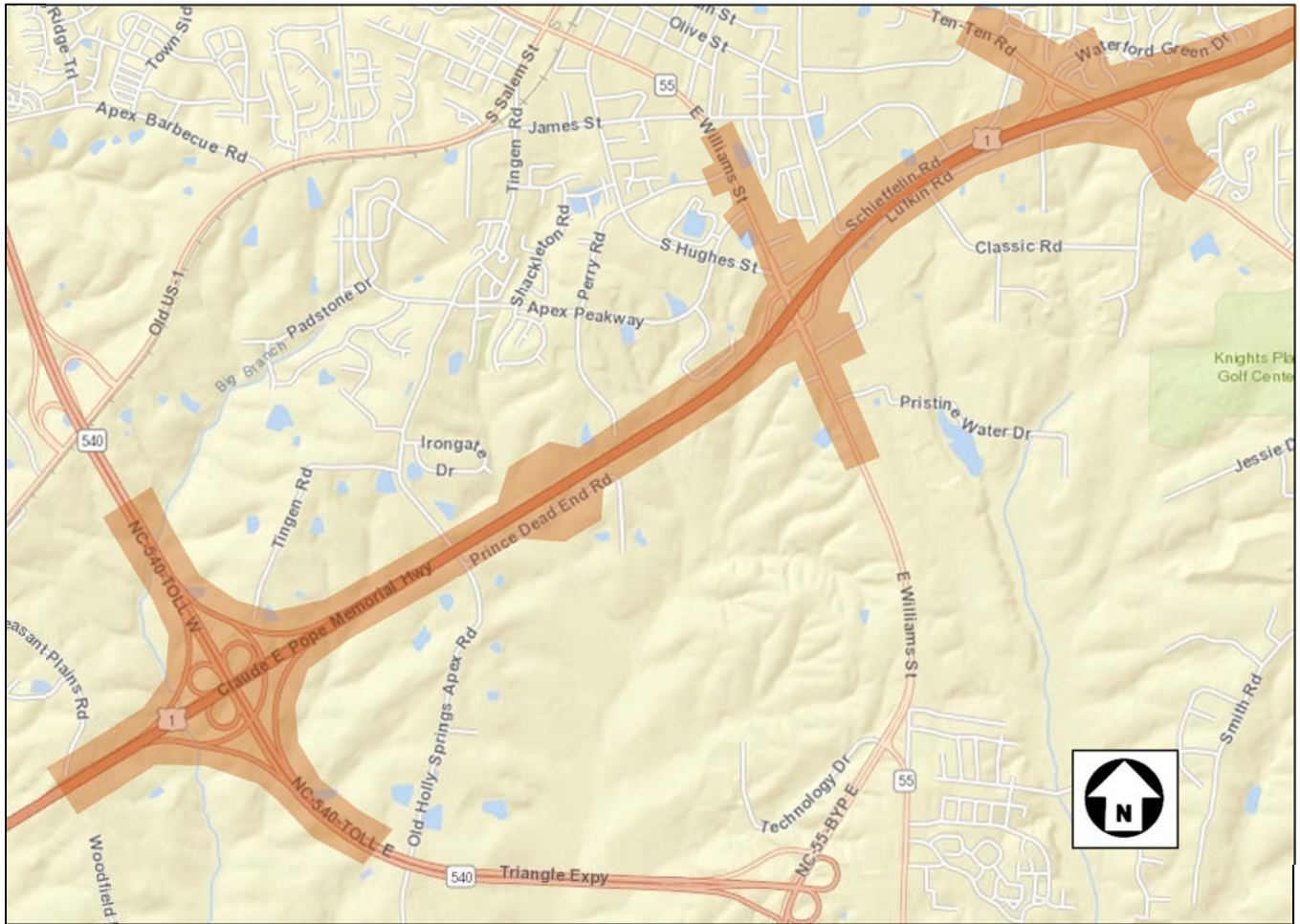
The group discussed the fiscally constrained projects in the area that are based on *Connect 2045: The Metropolitan Transportation Plan for the Capital Area Metropolitan Planning Organization and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization*. Notable projects in the area that are anticipated to affect traffic patterns are:

- MTP ID F15a3 – US 64 Conversion to Superstreet – from US 1 to Laura Duncan Road (2025 Horizon Year) (U-5301)
- MTP ID F15a, F15a1, F15a2 – US 64 conversion to expressway – from Laura Duncan Road to NC 540 (2025/2035 Horizon Year) (partially included in U-5301)
- MTP ID A166, A114a, A114b – SR 1010 (Center St/Ten Ten Road) – Widening & Interchange Improvements from Apex Peakway to Kildaire Farm Road (2025 Horizon Year) (U-5825)
- MTP ID 187b1, 187b2, 187b3 – Apex Peakway East – New Location – Lura Duncan Road to NC 55 (2025/2035 Horizon Year)
- MTP ID A96b, A622 – NC 55 Widening from Olive Chapel Road to Apex Peakway (2025 Horizon Year) (U-2901B)
- MTP ID A449 – Perry Road Extension – New Location including interchange at US 1 – from Apex Peakway to NC 55 Bypass (2035 Horizon Year)
- MTP ID F110c – US 1 Widening from NC 55 to NC 540 (2035 Horizon Year)
- MTP ID F3, F5, F6 – NC 540 Triangle Expressway (Toll) (Horizon Year 2025)
- MTP ID F4c1 – NC540 Triangle Expressway/Veridea Parkway Interchange (Horizon Year 2025)

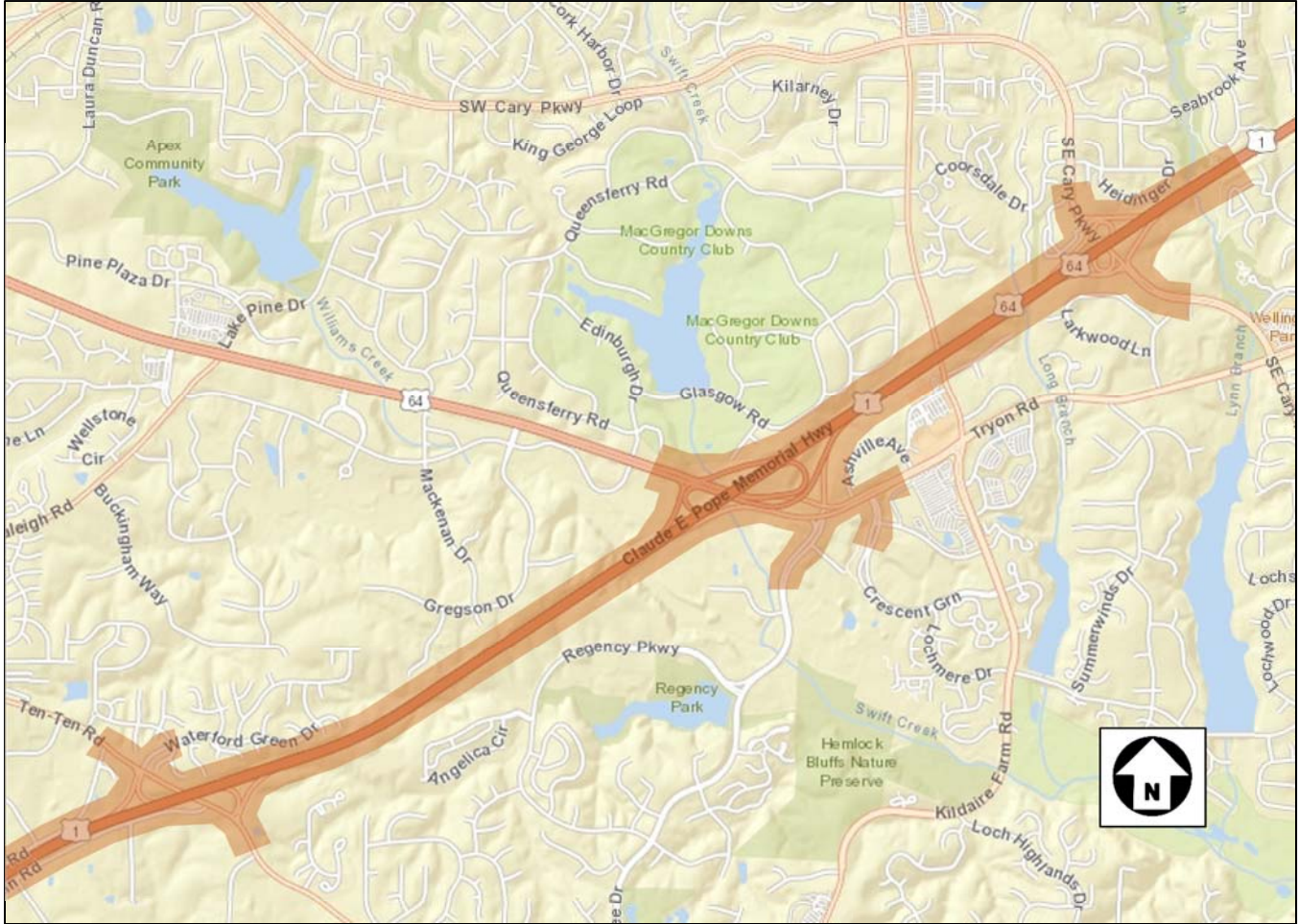
Peter next discussed the schedule and noted that the traffic counts had been collected in late-June and would be available by 7/19/19. Due to the more urgent need for the US 1/SR 1010 interchange data for U-5825, Patriot will expedite the schedule for getting the Interim forecast to NCDOT by two weeks and have it done by 8/9/19. Following a one-week review by NCDOT TPD, Patriot will provide Draft forecast volumes for the US 1/SR 1010 interchange. While the volume won't be final, it is not anticipated that they will change substantially, with any variations being minor and associated with creating a balanced forecast. The final forecast will be completed by 10/18/19.

Study Area Questionnaire Sent to Local Planners & Engineers

Patriot Transportation Engineering is currently in the process of developing a traffic forecast for NCDOT STIP Project No. U-6066, which would improve a 3-mile segment of US 1 by Wake County by widening the roadway from 4 to 6 lanes and converting the standard diamond interchange at US 1 and NC 55 to a diverging-diamond interchange (DDI). The forecast study area is shown in the following figures:



Study Area Questionnaire Sent to Local Planners & Engineers



We have reviewed the *Connect 2045: The Metropolitan Transportation Plan for the Capital Area Metropolitan Planning Organization and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization* (2045 MTP) and are seeking input from local planners and engineers who are familiar with the area. We have identified you as a local representative. I have listed a few questions below that will help us in the development in the traffic forecast. We would greatly appreciate your time in answering these questions. You may answer the questions in text format below and return them to me at: lee@pt-engineering.net.

If you would rather discuss the questions over the phone, I will be following up with a phone call early next week. Thank you in advance for your time and please let me know if you have any questions.

- 1) Current and historical traffic trends indicate that the traffic growth along the US 1 study corridor has been steady over a 20-year period, although the rate of traffic growth has been noticeably higher west of NC 55 and NC 540. The 20-year growth rates east of NC 55 average 2.9%, and the 10-year growth rates average 1.4%. The 20-year growth rates west of NC 55 average 4.6%, and the 10-year growth rates average 9.2%.

The growth rates on other roads connecting to the study corridor over the last 20 years have also generally increased, although some locations show a slowing in the rate of growth in recent years compared to more historic numbers.

- a. Do you agree with the growth patterns described?

Study Area Questionnaire Sent to Local Planners & Engineers

- b. What growth patterns have you noticed?
 - c. Would you expect the growth rate to change substantially in the next 20 years?
 - d. Do you expect the growth rate to increase in the future? If so, by what percent per year?
- 2) The traffic forecast will include developing volumes for the average traffic situation. Aside from school being in session are there any noticeable seasonal differences in traffic?
- 3) According to the North Carolina Office of State Budget and Management (OSBM) the population of Wake County was approximately 1,048,800 in 2017 and is projected to grow by 1.84% per year to around 1,538,700 in 2038. The population projections for Wake County that are contained within the MTP are roughly the same, showing a projected population of 1,715,800 in the year 2045 with a growth rate of around 1.90% per year. The MTP shows a growth rate for the entire Capital Area MPO region of 1.89% to the year 2045.
 - a. Do you think that the 1.84% to 1.90% population growth rate is reasonable for the project study area or do you think it will be higher or lower?
 - b. Do you know of any other population projections for this area that may be helpful as we review the growth in the area?
- 4) The latest version of the Triangle Regional Travel Demand Model (TRM) shows that between 2013 and 2045, the US 1 study corridor has a growth rate of roughly 2.2% per year. For most of the roads connecting to US 1, the model shows growth rates of around 1.0%, with specific locations ranging from 0.5% to 1.9%. However, the model's growth rates on NC 540 show a growth rate of around 5.5%.
 - a. Do you think that these traffic growth rates are reasonable for the project study area or do you think they will be higher or lower?
- 5) The 2045 MTP includes a substantial number of roadway projects in vicinity of the study area. Of those projects, the following are thought to have the greatest capability of affecting travel patterns on the study corridor.
 - o MTP ID F5, F6 – NC 540 Triangle Expressway (Toll) – from NC 55 Bypass to I-40 (south) (2025 Horizon Year) (STIP R-2721, R-2828)
 - o MTP ID F3 – NC 540 Triangle Expressway (Toll) – from I-40 (south) to US 64 East Bypass (2035 Horizon Year) (STIP R-2829)
 - o MTP ID F15a3 – US 64 Conversion to Superstreet – from US 1 to Laura Duncan Road (2025 Horizon Year) (STIP U-5301)
 - o MTP ID F15a, F15a1, F15a2 – US 64 conversion to expressway – from Laura Duncan Road to NC 540 (2025/2035 Horizon Year) (partially included in STIP U-5301)
 - o MTP ID A166, A114a, A114b – SR 1010 (Center St/Ten Ten Road) – Widening & Interchange Improvements from Apex Peakway to Kildaire Farm Road (2025 Horizon year) (STIP U-5825)
 - o MTP ID 187b1, 187b2, 187b3 – Apex Peakway East – New Location – Lura Duncan Road to NC 55 (2025/2035 Horizon Year)
 - o MTP ID A96b, A622 – NC 55 Widening from Olive Chapel Road to Apex Peakway (2025 Horizon Year) (STIP U-2901B)
 - o MTP ID A449 – Perry Road Extension – New Location including interchange at US 1 – from Apex Peakway to NC 55 Bypass (2035 Horizon Year)
 - o MTP ID F110c – US 1 Widening from NC 55 to NC 540 (2035 Horizon Year)

Study Area Questionnaire Sent to Local Planners & Engineers

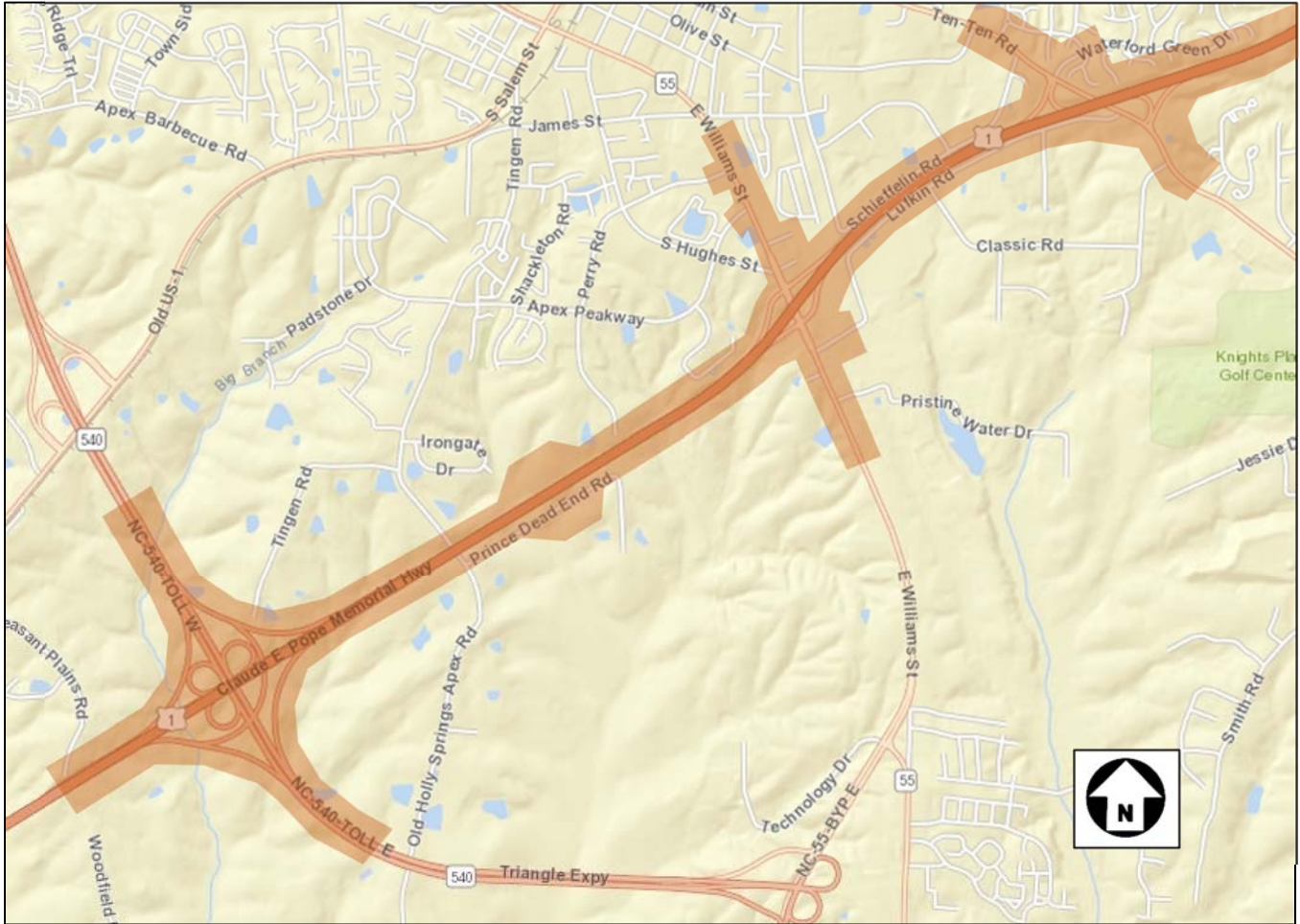
- a. What affect, if any, do you believe these projects will have on the traffic volumes in the study area?
 - b. Do you know of any reasonably foreseeable transportation projects that are not identified above that may affect traffic volumes in the traffic forecast study area?
- 6) Forecasts for U-2719, U-5301, U-5825, U-2901, and R-2721/R-2828/R-2829, which cover portions of the same study area as this forecast, were performed in the last three years. Are you aware of any other previous traffic forecasts that were performed in or near the study area?
- 7) A preliminary review of the socio-economic data within the Triangle Regional Travel Demand Model (TRM) indicates general agreement with approved developments in the study area. We are currently aware of the following developments within the study area:
- i. Veridea Development District – 475 acre mixed-use development, including up to 8,000 DUs, 3.5 million sf of retail space, and 12 million sf office/industrial space; located south of US 1 between NC 540 and NC 55
 - ii. West Village PUD – 380 residential DUs and 500,000 sf mixed-use space (non-residential); located northwest of the US1/NC 540 interchange
 - iii. Apex High School Reconstruction – Reconstruction of High School, at Laura Duncan Rd/US 64, to accommodate roughly the same number of students
 - iv. HealthPark at Kildaire – 527,400 sf of mixed use development north of the Tryon Road/Kildaire Farm Road intersection
 - v. WakeMed Cary expansion – 2-story vertical expansion of existing hospital and new 134,000 sf medical office building
 - vi. Regency Creek Office Buildings – 240,000 sf office space (2 buildings) south of the Tryon Road/Regency Parkway intersection
- a. Do you know of any other substantial approved or planned developments in the vicinity of the traffic forecast area, brought forward in the last two years, that may affect our traffic forecast? (More recently conceived/approved plans would not have made it into the socio-economic development of the TRM.)
- 8) Do you have any additional comments that would be helpful in our development of the traffic forecast?
- 9) This questionnaire is being sent to the following individuals:
- i. David Keilson, NCDOT Division 5, Division Planning Engineer (dpkeilson@ncdot.gov)
 - ii. Ron Garrett, NCDOT Division 5, Assistant Division Traffic Engineer (rjgarrett@nc.gov)
 - iii. Tracy Parrott, NCDOT Division 5, Division Project Delivery Engineer (tnparrott@ncdot.gov)
 - iv. Amy Neidringhaus, NCDOT Division 5, District 1 District Engineer (anneidringhaus@ncdot.gov)
 - v. Scott Walston, NCDOT Transportation Planning Division (Eastern Piedmont Group) (swalston@ncdot.gov)
 - vi. Chris Lukasina, Capital Area MPO, Executive Director (chris.lukasina@campo-nc.us)
 - vii. Alex Rickard, Capital Area MPO, Deputy Director (alex.rickard@campo-nc.us)
 - viii. Mike Bruff, Capital Area MPO, Transportation Modeling Engineer (mike.bruff@campo-nc.us)
 - ix. Tim Gardiner, Wake County, Transportation Planner (tim.gardiner@wakegov.com)
 - x. Juliet Andes, Town of Cary, Facilities Planning Manager (juliet.andes@townofcary.org)

Study Area Questionnaire Sent to Local Planners & Engineers

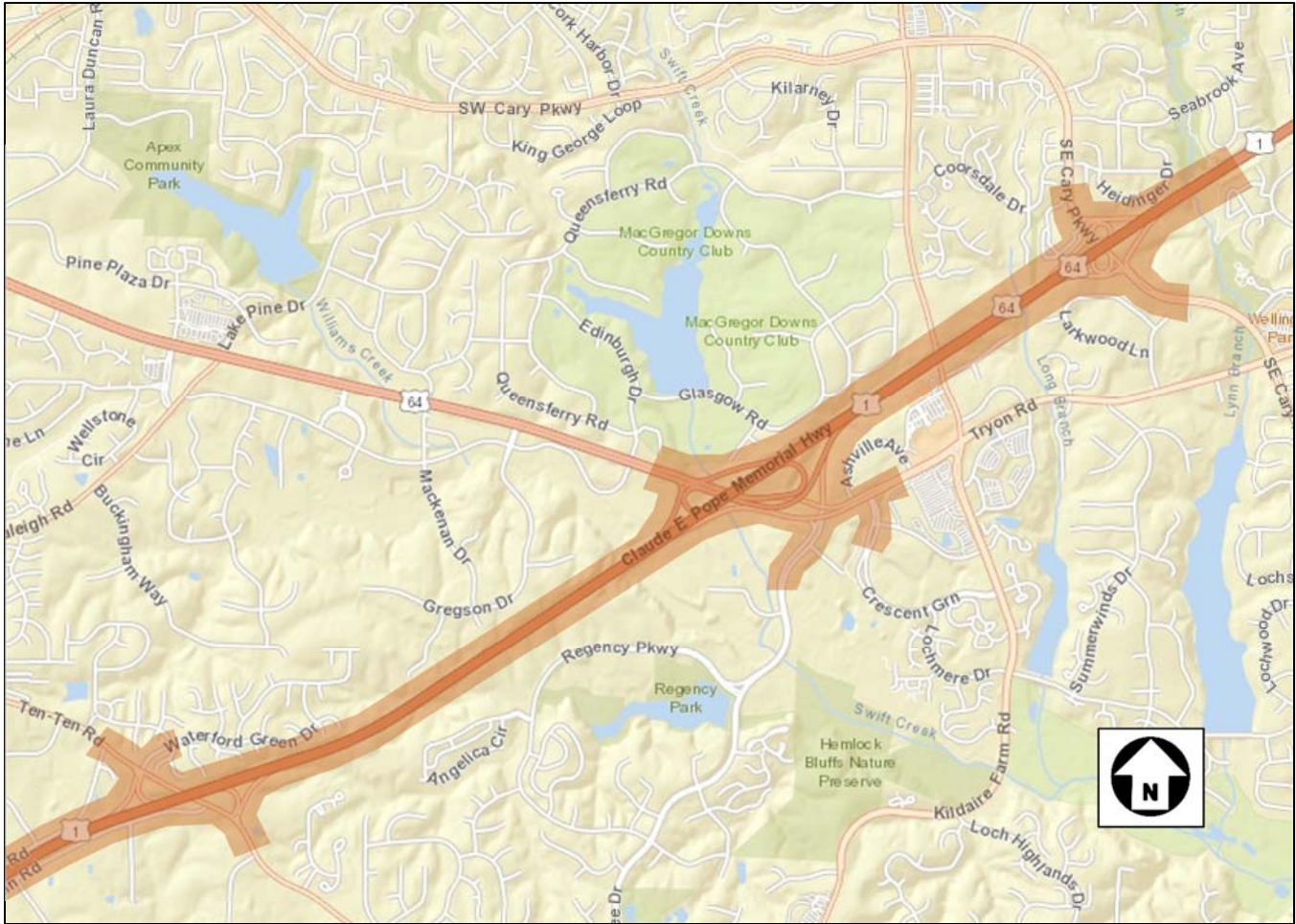
- xi. Luana Deans, Town of Cary, Transportation Planning Engineer (luana.deans@townofcary.org)
 - xii. Russell Dalton, Town of Apex, Senior Transportation Engineer (russell.dalton@apexnc.org)
 - xiii. Shannon Cox, Town of Apex, Long Range Planner Manager (shannon.cox@apexnc.org)
- a. Are there any other individuals whom you think we should contact to discuss this forecast?

Comments completed by Shannon Cox & Russell Dalton via email – 07/31/19

Patriot Transportation Engineering is currently in the process of developing a traffic forecast for NCDOT STIP Project No. U-6066, which would improve a 3-mile segment of US 1 by Wake County by widening the roadway from 4 to 6 lanes and converting the standard diamond interchange at US 1 and NC 55 to a diverging-diamond interchange (DDI). The forecast study area is shown in the following figures:



Comments completed by Shannon Cox & Russell Dalton via email – 07/31/19



We have reviewed the *Connect 2045: The Metropolitan Transportation Plan for the Capital Area Metropolitan Planning Organization and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization* (2045 MTP) and are seeking input from local planners and engineers who are familiar with the area. We have identified you as a local representative. I have listed a few questions below that will help us in the development in the traffic forecast. We would greatly appreciate your time in answering these questions. You may answer the questions in text format below and return them to me at: lee@pt-engineering.net.

If you would rather discuss the questions over the phone, I will be following up with a phone call early next week. Thank you in advance for your time and please let me know if you have any questions.

- 1) Current and historical traffic trends indicate that the traffic growth along the US 1 study corridor has been steady over a 20-year period, although the rate of traffic growth has been noticeably higher west of NC 55 and NC 540. The 20-year growth rates east of NC 55 average 2.9%, and the 10-year growth rates average 1.4%. The 20-year growth rates west of NC 55 average 4.6%, and the 10-year growth rates average 9.2%.

The growth rates on other roads connecting to the study corridor over the last 20 years have also generally increased, although some locations show a slowing in the rate of growth in recent years compared to more historic numbers.

- a. Do you agree with the growth patterns described?

Comments completed by Shannon Cox & Russell Dalton via email – 07/31/19

An overall growth trend is accurate. It is also reasonable that the highest traffic growth along the US 1 corridor study area has been on the western part of the corridor as this is an area of substantial population growth, and the completion of NC 540 during the study timeframe has likely increased volumes on US 1 (as a point of access to NC 540). It is somewhat surprising that the higher growth trends haven't been seen from Ten Ten Road west toward NC 540.

b. What growth patterns have you noticed?

Observed patterns are similar to what the data reflect. Traffic volumes have substantially increased along US 1 between NC 540 and Ten Ten Road. Volumes at ramps and interchanges are over capacity most days during morning and evening peak hours. There are also frequent crashes – especially between Ten Ten Road and Tryon Road where US 1 narrows.

c. Would you expect the growth rate to change substantially in the next 20 years?

The growth rate will likely remain as strong and possibly continue to increase as the towns of Apex and Holly Springs continue to experience substantial population growth. There is potential for development to occur at a large scale along the US 1 corridor if the Veridea project moves forward. The completion of NC 540 project may somewhat relieve volumes along NC 540 as the southern part of Wake County has new options to access NC 540; however, historically any reductions in traffic volumes along existing roads seem to be short lived as development along the new road corridor increases.

d. Do you expect the growth rate to increase in the future? If so, by what percent per year?

Can't answer, except to say that substantial growth will likely continue along this corridor for the foreseeable future. You mention various historical growth rates depending on location and timeframe. The actual rate to be assumed for a specific time period at a specific location and comparison to historical rates would be a traffic modeling exercise.

2) The traffic forecast will include developing volumes for the average traffic situation. Aside from school being in session are there any noticeable seasonal differences in traffic?

No, other than holidays.

3) According to the North Carolina Office of State Budget and Management (OSBM) the population of Wake County was approximately 1,048,800 in 2017 and is projected to grow by 1.84% per year to around 1,538,700 in 2038. The population projections for Wake County that are contained within the MTP are roughly the same, showing a projected population of 1,715,800 in the year 2045 with a growth rate of around 1.90% per year. The MTP shows a growth rate for the entire Capital Area MPO region of 1.89% to the year 2045.

a. Do you think that the 1.84% to 1.90% population growth rate is reasonable for the project study area or do you think it will be higher or lower?

The population growth in southern Wake County is likely higher than the overall CAMPO region.

b. Do you know of any other population projections for this area that may be helpful as we review the growth in the area?

Comments completed by Shannon Cox & Russell Dalton via email – 07/31/19

The Town of Apex prepares a quarterly development report including population estimates based on development data. Apex's population projections are based on an average growth rate of 5.82% based on information from fiscal years 2014-2018. The full development report is available at:

<https://www.apexnc.org/DocumentCenter/View/405/Apex-Development-Report?bidId=>.

4) The latest version of the Triangle Regional Travel Demand Model (TRM) shows that between 2013 and 2045, the US 1 study corridor has a growth rate of roughly 2.2% per year. For most of the roads connecting to US 1, the model shows growth rates of around 1.0%, with specific locations ranging from 0.5% to 1.9%. However, the model's growth rates on NC 540 show a growth rate of around 5.5%.

a. Do you think that these traffic growth rates are reasonable for the project study area or do you think they will be higher or lower?

A 2%+/- annual growth rate may be reasonable for estimating long term growth on US 1 or other major corridors that are already heavily traveled but lower volume corridors that connect with largely undeveloped areas may experience higher rates.

5) The 2045 MTP includes a substantial number of roadway projects in vicinity of the study area. Of those projects, the following are thought to have the greatest capability of affecting travel patterns on the study corridor.

- o MTP ID F5, F6 – NC 540 Triangle Expressway (Toll) – from NC 55 Bypass to I-40 (south) (2025 Horizon Year) (STIP R-2721, R-2828)
- o MTP ID F3 – NC 540 Triangle Expressway (Toll) – from I-40 (south) to US 64 East Bypass (2035 Horizon Year) (STIP R-2829)
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- o MTP ID A449 – Perry Road Extension – New Location including interchange at US 1 – from Apex Peakway to NC 55 Bypass (2035 Horizon Year)
- o MTP ID F110c – US 1 Widening from NC 55 to NC 540 (2035 Horizon Year)

a. What affect, if any, do you believe these projects will have on the traffic volumes in the study area?

The completion of NC 540 and the Perry Road Extension projects are probably most likely to impact traffic volumes on US 1 in the Apex portion of the study area. The potential impacts of NC 540 were described in Question 1. The Perry Road Extension will create new access to US 1 and land areas that are substantially undeveloped north and south of US 1 and will likely increase traffic volumes along the study corridor. The projects described below, and other roadways that may be built as part of development in this area, will also likely increase development and traffic along US 1.

b. Do you know of any reasonably foreseeable transportation projects that are not identified above that may affect traffic volumes in the traffic forecast study area?

Comments completed by Shannon Cox & Russell Dalton via email – 07/31/19

- Jessie Drive (new location and improvement) from Ten Ten Road to NC 55. The Town is completing a feasibility study for this roadway. The study will inform prioritization of the project for future funding. A traffic forecast is available as part of the feasibility study.
- Extension of Pleasant Plains Road over US 1 to Woodfield Dead End Road in Holly Springs. This is not a funded project but, given the relationship to US 1 should probably be considered in the study. The Southwest Area Study (SWAS) 2045 model runs projected 12,100 vpd along this route.
- The Town of Apex long range transportation plan and the Southwest Area Study update include an overpass of US 1 connecting Lufkin Road and Schieffelin Road. This is not a funded project. SWAS 2045 model runs project 2,100vpd – 6,500 vpd

6) Forecasts for U-2719, U-5301, U-5825, U-2901, and R-2721/R-2828/R-2829, which cover portions of the same study area as this forecast, were performed in the last three years. Are you aware of any other previous traffic forecasts that were performed in or near the study area?

Traffic forecasts were recently completed by CAMPO as part of the SWAS.

- 7) A preliminary review of the socio-economic data within the Triangle Regional Travel Demand Model (TRM) indicates general agreement with approved developments in the study area. We are currently aware of the following developments within the study area:
- i. Veridea Development District – 475 acre mixed-use development, including up to 8,000 DUs, 3.5 million sf of retail space, and 12 million sf office/industrial space; located south of US 1 between NC 540 and NC 55
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 - vi. Regency Creek Office Buildings – 240,000 sf office space (2 buildings) south of the Tryon Road/Regency Parkway intersection
- a. Do you know of any other substantial approved or planned developments in the vicinity of the traffic forecast area, brought forward in the last two years, that may affect our traffic forecast? (More recently conceived/approved plans would not have made it into the socio-economic development of the TRM.)

All proposals for development and rezoning submitted to the Town are available online at:

<http://apexnc.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=fa9ba2017b784030b15ef4da27d9e795>. Additional projects that may be important to consider include:

- Horton Park PUD
- Cash Corporate Center
- Aquiline PUD
- Jessie Commons PUD
- Meridian at Ten Ten

Comments completed by Shannon Cox & Russell Dalton via email – 07/31/19

8) Do you have any additional comments that would be helpful in our development of the traffic forecast?

- The recent analysis of US 1 for the Strategic Tolling Study conducted by CAMPO should also be referenced as a resource.
- The Town of Apex Comprehensive Transportation Plan is available at: <http://www.apexnc.org/1193/Advance-Apex>

9) This questionnaire is being sent to the following individuals:

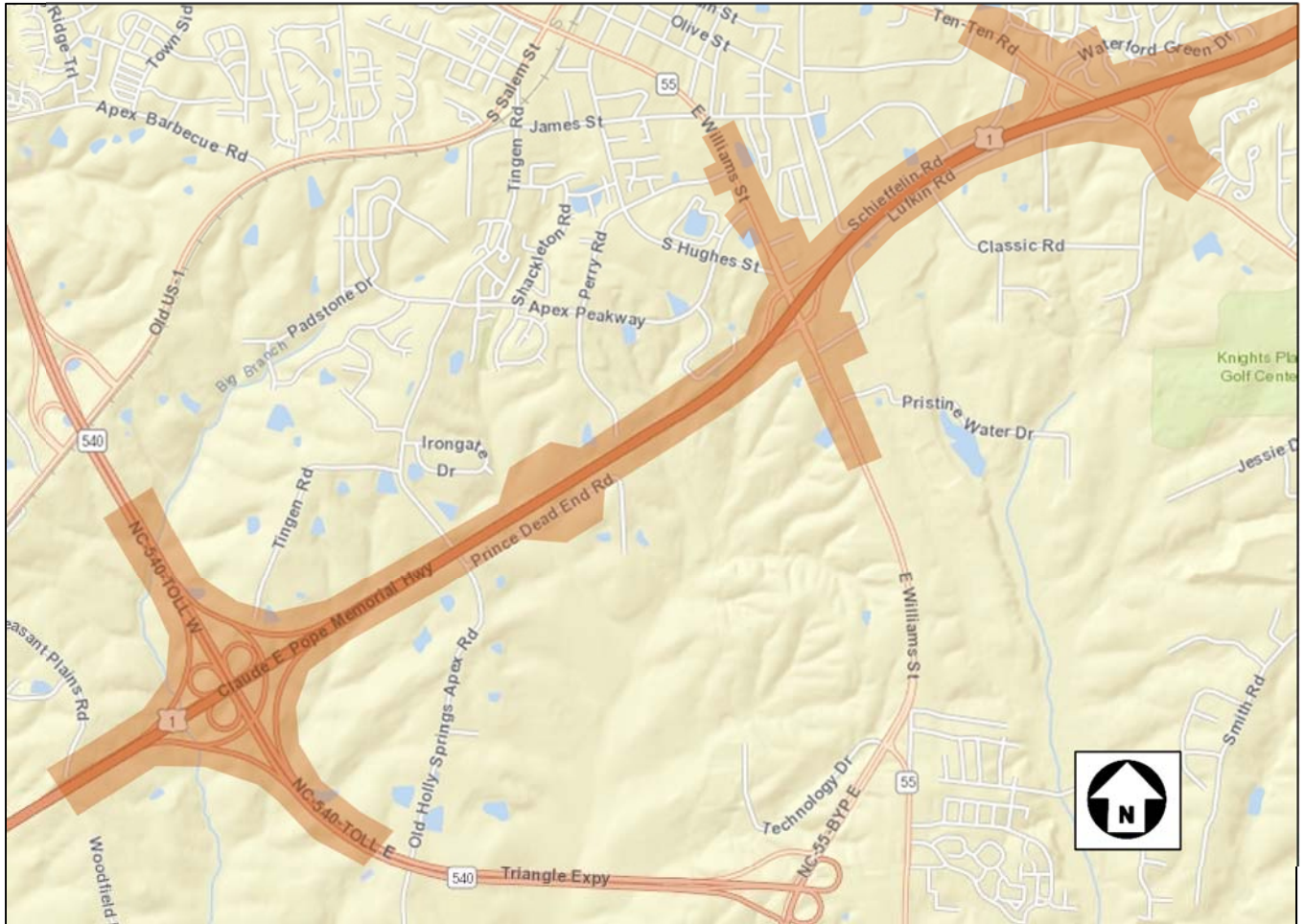
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 - viii. Mike Bruff, Capital Area MPO, Transportation Modeling Engineer (mike.bruff@campo-nc.us)
 - ix. Tim Gardiner, Wake County, Transportation Planner (tim.gardiner@wakegov.com)
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 - xi. Luana Deans, Town of Cary, Transportation Planning Engineer (luana.deans@townofcary.org)
 - xii. Russell Dalton, Town of Apex, Senior Transportation Engineer (russell.dalton@apexnc.org)
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- a. Are there any other individuals whom you think we should contact to discuss this forecast?

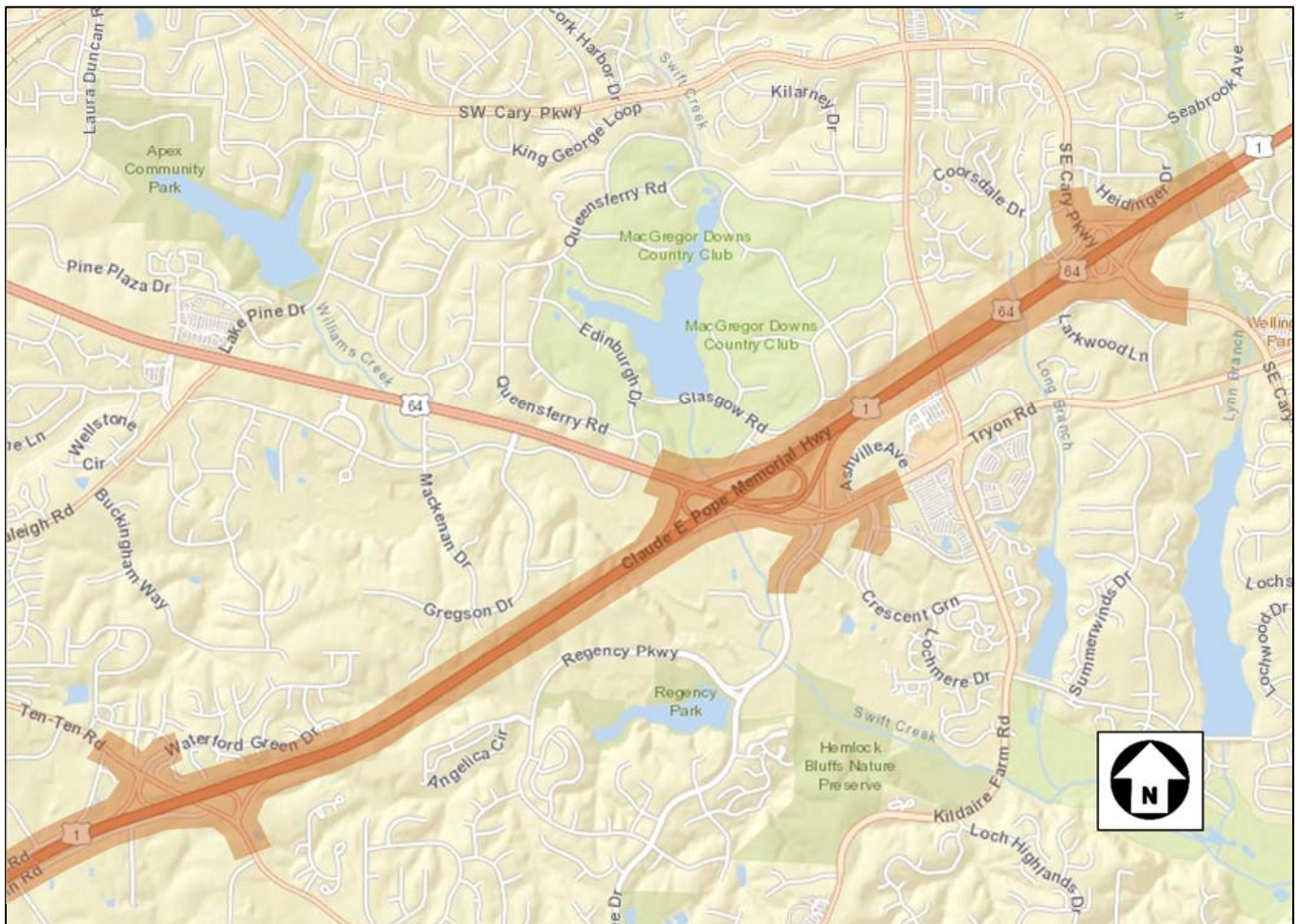
While outside of the study corridor, development patterns in the Town of Holly Springs will impact the traffic forecast along the corridor and they should provide input to these questions.

Comments completed by Kenneth Withrow, Chris Lukasina, Alex Rickard, & Mike Bruff via email – 07/31/19

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If you would rather discuss the questions over the phone, I will be following up with a phone call early next week. Thank you in advance for your time and please let me know if you have any questions.

- 1) Current and historical traffic trends indicate that the traffic growth along the US 1 study corridor has been steady over a 20-year period, although the rate of traffic growth has been noticeably higher west of NC 55 and NC 540. The 20-year growth rates east of NC 55 average 2.9%, and the 10-year growth rates average 1.4%. The 20-year growth rates west of NC 55 average 4.6%, and the 10-year growth rates average 9.2%.

The growth rates on other roads connecting to the study corridor over the last 20 years have also

Comments completed by Kenneth Withrow, Chris Lukasina, Alex Rickard, & Mike Bruff via email – 07/31/19

generally increased, although some locations show a slowing in the rate of growth in recent years compared to more historic numbers.

- a. Do you agree with the growth patterns described?

Answer – In speaking with the transportation engineers/modelers for the Capital Area MPO, the growth patterns are reasonable.

- b. What growth patterns have you noticed?

Answer – The proposed project is located within the southwestern portion of Wake County; which has been reviewed by local staffs and the consultant team as a part of the Southwest Area Study. Page 19 of the Study's final report notes that the area "is experiencing a population growth rate that is up to five times higher than the state".

- c. https://nmcdn.io/e186d21f8c7946a19faed23c3da2f0da/8bfec28a290449a7b10eb1fee3a0e264/files/programs-studies/area-studies/SWAS_Report_20190701-Chapters_1-7.pdf Would you expect the growth rate to change substantially in the next 20 years?

Answer – The growth rate is based on local land use transportation improvement assumptions in the TRM and are not expected to change substantially in the next 20 (barring any unforeseen circumstances).

- d. Do you expect the growth rate to increase in the future? If so, by what percent per year?

Answer – Barring any unforeseen circumstances, there is no expectation that the growth rate will increase in the future.

- 2) The traffic forecast will include developing volumes for the average traffic situation. Aside from school being in session are there any noticeable seasonal differences in traffic?

Answer – Aside from traffic differences based on the traditional school calendar, there are no noticeable seasonal differences in traffic within the Capital Area MPO's transportation network.

- 3) According to the North Carolina Office of State Budget and Management (OSBM) the population of Wake County was approximately 1,048,800 in 2017 and is projected to grow by 1.84% per year to around 1,538,700 in 2038. The population projections for Wake County that are contained within the MTP are roughly the same, showing a projected population of 1,715,800 in the year 2045 with a growth rate of around 1.90% per year. The MTP shows a growth rate for the entire Capital Area MPO region of 1.89% to the year 2045.

- a. Do you think that the 1.84% to 1.90% population growth rate is reasonable for the project study area or do you think it will be higher or lower?

Answer – the 1.89% to 1.90% population growth rate is reasonable for the project area.

- b. Do you know of any other population projections for this area that may be helpful as we review the growth in the area?

Answer – The sources for the current population projections (NC OSBM) constitute the most reliable data sources available. We are not aware of any additional population projections for this area that may be useful.

- 4) The latest version of the Triangle Regional Travel Demand Model (TRM) shows that between 2013 and 2045, the US 1 study corridor has a growth rate of roughly 2.2% per year. For most of the roads connecting to US 1, the model shows growth rates of around 1.0%, with specific locations ranging from 0.5% to 1.9%. However, the model's growth rates on NC 540 show a growth rate of around 5.5%.

- a. Do you think that these traffic growth rates are reasonable for the project study area or do you think they will be higher or lower?

Answer – The traffic growth rate is based on local land use transportation improvement assumptions in the TRM and are reasonable for the project area.

Comments completed by Kenneth Withrow, Chris Lukasina, Alex Rickard, & Mike Bruff via email – 07/31/19

- 5) The 2045 MTP includes a substantial number of roadway projects in vicinity of the study area. Of those projects, the following are thought to have the greatest capability of affecting travel patterns on the study corridor.
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 - o MTP ID A96b, A622 – NC 55 Widening from Olive Chapel Road to Apex Peakway (2025 Horizon Year) (STIP U-2901B)
 - o MTP ID A449 – Perry Road Extension – New Location including interchange at US 1 – from Apex Peakway to NC 55 Bypass (2035 Horizon Year)
 - o MTP ID F110c – US 1 Widening from NC 55 to NC 540 (2035 Horizon Year)
- a. What affect, if any, do you believe these projects will have on the traffic volumes in the study area?
[Answer – These projects will improve the LOS for the area's transportation system.](#)
- b. Do you know of any reasonably foreseeable transportation projects that are not identified above that may affect traffic volumes in the traffic forecast study area?
[Answer – Please add MTP ID F4c1 – Veridea Interchange at NC 540 – New Location – TIP Number R-2635D \(2025 Horizon Year\) to the project list. This project is included in the adopted 2045 MTP and the TRM.](#)
- 6) Forecasts for U-2719, U-5301, U-5825, U-2901, and R-2721/R-2828/R-2829, which cover portions of the same study area as this forecast, were performed in the last three years. Are you aware of any other previous traffic forecasts that were performed in or near the study area?
[Answer – Please consider the current traffic forecasts that have been done for Projects I-5701 and I-5703. Also examine the I-40/I-440&US 1/US 64 Hot Spot Study traffic forecasts done in 2015.](#)
- 7) A preliminary review of the socio-economic data within the Triangle Regional Travel Demand Model (TRM) indicates general agreement with approved developments in the study area. We are currently aware of the following developments within the study area:
- i. Veridea Development District – 475 acre mixed-use development, including up to 8,000 DUs, 3.5 million sf of retail space, and 12 million sf office/industrial space; located south of US 1 between NC 540 and NC 55
 - ii. West Village PUD – 380 residential DUs and 500,000 sf mixed-use space (non-residential); located northwest of the US1/NC 540 interchange
 - iii. Apex High School Reconstruction – Reconstruction of High School, at Laura Duncan Rd/US 64, to accommodate roughly the same number of students
 - iv. HealthPark at Kildaire – 527,400 sf of mixed use development north of the Tryon Road/Kildaire Farm Road intersection

Comments completed by Kenneth Withrow, Chris Lukasina, Alex Rickard, & Mike Bruff via email – 07/31/19

- v. WakeMed Cary expansion – 2-story vertical expansion of existing hospital and new 134,000 sf medical office building
- vi. Regency Creek Office Buildings – 240,000 sf office space (2 buildings) south of the Tryon Road/Regency Parkway intersection
- a. Do you know of any other substantial approved or planned developments in the vicinity of the traffic forecast area, brought forward in the last two years, that may affect our traffic forecast? (More recently conceived/approved plans would not have made it into the socio-economic development of the TRM.)

Answer – The Capital Area MPO staff, in conjunction with municipal planning staff in the area continuously coordinate on possible land use revisions and/or developments that may affect traffic forecasts. Output from the TRM assumes local knowledge of buildout in an area. At this time, the Capital Area MPO is not aware of substantial approved or planned developments in the vicinity of the traffic forecast area.

- 8) Do you have any additional comments that would be helpful in our development of the traffic forecast?

Answer – you are encouraged to stay engaged with the progression of NCDOT projects I-5701 and I-5703 in the general area of your traffic forecasts. Also, please reference the Triangle Strategic Tolling Study Report [https://nmcndn.io/e186d21f8c7946a19faed23c3da2f0da/8bfec28a290449a7b10eb1fee3a0e264/files/programs-studies/triangle-strategic-tolling-study/Strategic Tolling Study Report Public Review.pdf](https://nmcndn.io/e186d21f8c7946a19faed23c3da2f0da/8bfec28a290449a7b10eb1fee3a0e264/files/programs-studies/triangle-strategic-tolling-study/Strategic_Tolling_Study_Report_Public_Review.pdf)

- 9) This questionnaire is being sent to the following individuals:

- i. David Keilson, NCDOT Division 5, Division Planning Engineer (dpkeilson@ncdot.gov)
- ii. Ron Garrett, NCDOT Division 5, Assistant Division Traffic Engineer (rjgarrett@nc.gov)
- iii. Tracy Parrott, NCDOT Division 5, Division Project Delivery Engineer (tnparrott@ncdot.gov)
- iv. Amy Neidringhaus, NCDOT Division 5, District 1 District Engineer (anneidringhaus@ncdot.gov)
- v. Scott Walston, NCDOT Transportation Planning Division (Eastern Piedmont Group) (swalston@ncdot.gov)
- vi. Chris Lukasina, Capital Area MPO, Executive Director (chris.lukasina@campo-nc.us)
- vii. Alex Rickard, Capital Area MPO, Deputy Director (alex.rickard@campo-nc.us)
- viii. Mike Bruff, Capital Area MPO, Transportation Modeling Engineer (mike.bruff@campo-nc.us)
- ix. Tim Gardiner, Wake County, Transportation Planner (tim.gardiner@wakegov.com)
- x. Juliet Andes, Town of Cary, Facilities Planning Manager (juliet.andes@townofcary.org)
- xi. Luana Deans, Town of Cary, Transportation Planning Engineer (luana.deans@townofcary.org)
- xii. Russell Dalton, Town of Apex, Senior Transportation Engineer (russell.dalton@apexnc.org)
- xiii. Shannon Cox, Town of Apex, Long Range Planner Manager (shannon.cox@apexnc.org)

- a. Are there any other individuals whom you think we should contact to discuss this forecast?

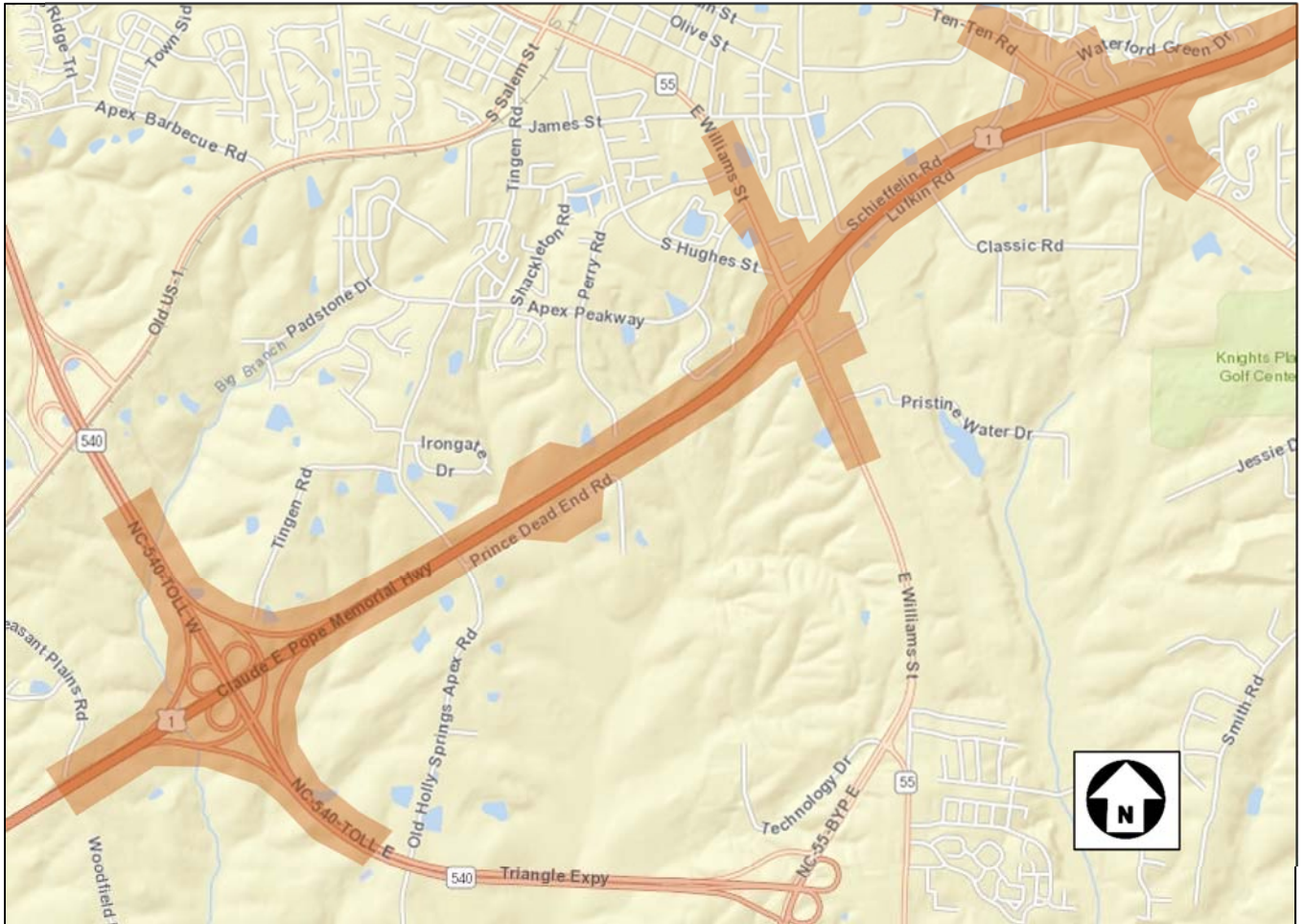
Answer – Other individuals whom should be contacted to discuss this forecast include:

**Comments completed by Kenneth Withrow, Chris Lukasina, Alex Rickard,
& Mike Bruff via email – 07/31/19**

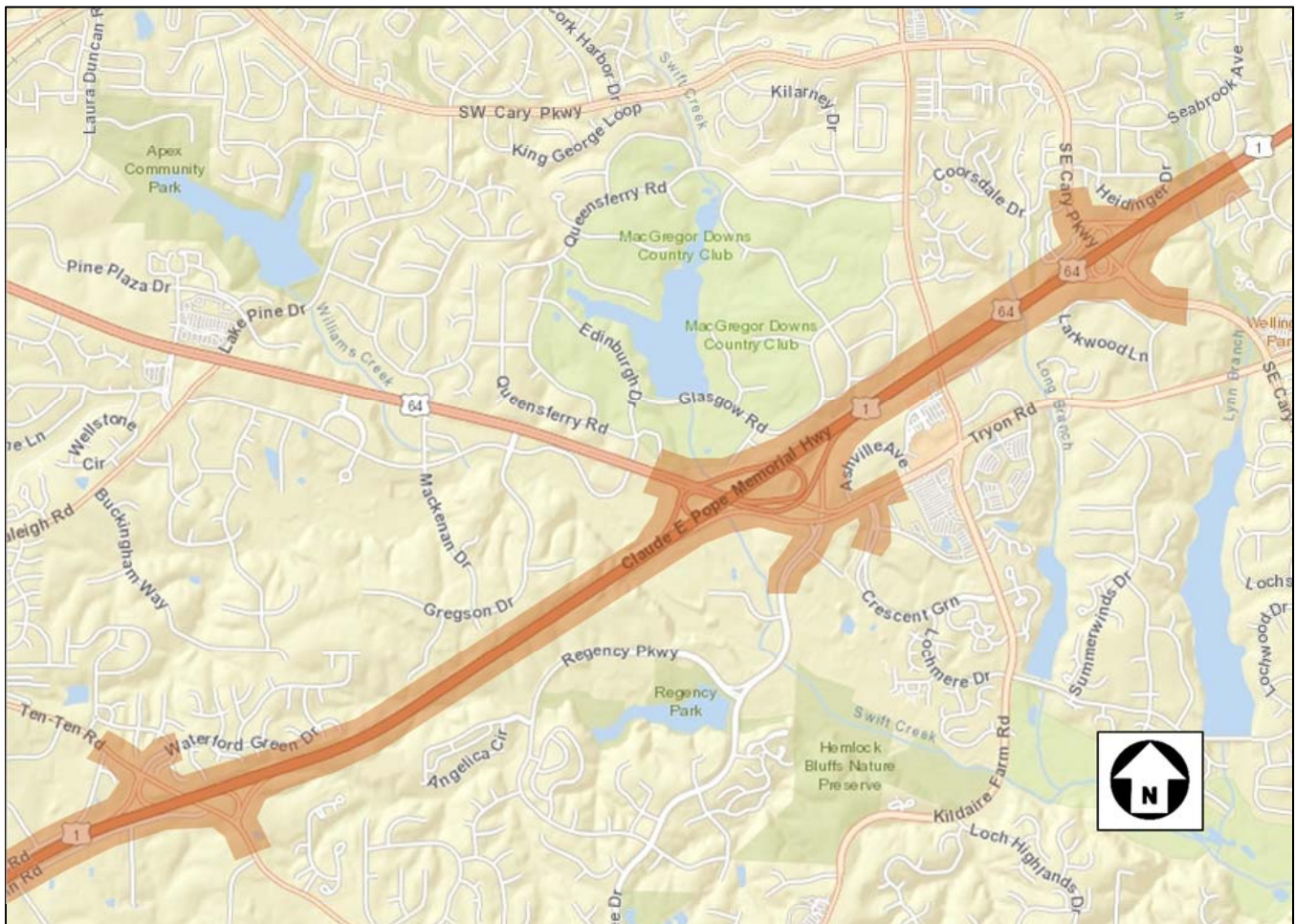
Mr. Golam Moinuddin - Golam.Moinuddin@atkinglobal.com, and Mr. Robert Hanson - Robert.Hanson@atkinglobal.com.

Comments completed by Luana Deans & Juliet Andes via email – 08/05/19

Patriot Transportation Engineering is currently in the process of developing a traffic forecast for NCDOT STIP Project No. U-6066, which would improve a 3-mile segment of US 1 by Wake County by widening the roadway from 4 to 6 lanes and converting the standard diamond interchange at US 1 and NC 55 to a diverging-diamond interchange (DDI). The forecast study area is shown in the following figures:



Comments completed by Luana Deans & Juliet Andes via email – 08/05/19



We have reviewed the *Connect 2045: The Metropolitan Transportation Plan for the Capital Area Metropolitan Planning Organization and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization* (2045 MTP) and are seeking input from local planners and engineers who are familiar with the area. We have identified you as a local representative. I have listed a few questions below that will help us in the development in the traffic forecast. We would greatly appreciate your time in answering these questions. You may answer the questions in text format below and return them to me at: lee@pt-engineering.net.

If you would rather discuss the questions over the phone, I will be following up with a phone call early next week. Thank you in advance for your time and please let me know if you have any questions.

- 1) Current and historical traffic trends indicate that the traffic growth along the US 1 study corridor has been steady over a 20-year period, although the rate of traffic growth has been noticeably higher west of NC 55 and NC 540. The 20-year growth rates east of NC 55 average 2.9%, and the 10-year growth rates average 1.4%. The 20-year growth rates west of NC 55 average 4.6%, and the 10-year growth rates average 9.2%.

The growth rates on other roads connecting to the study corridor over the last 20 years have also

Comments completed by Luana Deans & Juliet Andes via email – 08/05/19

generally increased, although some locations show a slowing in the rate of growth in recent years compared to more historic numbers.

- a. Do you agree with the growth patterns described? [Limited information is provided in the above summary about Cary's area of the study so it is difficult to comment on whether we agree. In this area of the region, Cary is growing slower than Apex.](#)
 - b. What growth patterns have you noticed? [Cary is primarily built out in this area. However surrounding jurisdictions are continuing to see growth and rely on the thoroughfares and interchanges throughout the study area to access US 1/64.](#)
 - c. Would you expect the growth rate to change substantially in the next 20 years? [The opening of NC540 will change access to this area of the region. I'd expect growth to continue as access improves.](#)
 - d. Do you expect the growth rate to increase in the future? [I expect growth, however it is difficult to say if the growth rate will increase or remain steady as there is already significant growth in Apex, Holly Springs, etc. If so, by what percent per year? TRM may be best source to estimate.](#)
- 2) The traffic forecast will include developing volumes for the average traffic situation. Aside from school being in session are there any noticeable seasonal differences in traffic? [Holiday shopping. Although Crossroads is not in the study area, it is a regional destination.](#)
- 3) According to the North Carolina Office of State Budget and Management (OSBM) the population of Wake County was approximately 1,048,800 in 2017 and is projected to grow by 1.84% per year to around 1,538,700 in 2038. The population projections for Wake County that are contained within the MTP are roughly the same, showing a projected population of 1,715,800 in the year 2045 with a growth rate of around 1.90% per year. The MTP shows a growth rate for the entire Capital Area MPO region of 1.89% to the year 2045.
- a. Do you think that the 1.84% to 1.90% population growth rate is reasonable for the project study area or do you think it will be higher or lower? [Higher.](#)
 - b. Do you know of any other population projections for this area that may be helpful as we review the growth in the area? [No.](#)
- 4) The latest version of the Triangle Regional Travel Demand Model (TRM) shows that between 2013 and 2045, the US 1 study corridor has a growth rate of roughly 2.2% per year. For most of the roads connecting to US 1, the model shows growth rates of around 1.0%, with specific locations ranging from 0.5% to 1.9%. However, the model's growth rates on NC 540 show a growth rate of around 5.5%.
- a. Do you think that these traffic growth rates are reasonable for the project study area or do you think they will be higher or lower? [For Cary thoroughfares, they seem reasonable.](#)
- 5) The 2045 MTP includes a substantial number of roadway projects in vicinity of the study area. Of those projects, the following are thought to have the greatest capability of affecting travel patterns on the study corridor.
- o MTP ID F5, F6 – NC 540 Triangle Expressway (Toll) – from NC 55 Bypass to I-40 (south) (2025 Horizon Year) (STIP R-2721, R-2828)
 - o MTP ID F3 – NC 540 Triangle Expressway (Toll) – from I-40 (south) to US 64 East Bypass (2035 Horizon Year) (STIP R-2829)

**Comments completed by Luana Deans & Juliet Andes via email –
08/05/19**

- o MTP ID F15a3 – US 64 Conversion to Superstreet – from US 1 to Laura Duncan Road (2025 Horizon Year) (STIP U-5301)
 - o MTP ID F15a, F15a1, F15a2 – US 64 conversion to expressway – from Laura Duncan Road to NC 540 (2025/2035 Horizon Year) (partially included in STIP U-5301)
 - o MTP ID A166, A114a, A114b – SR 1010 (Center St/Ten Ten Road) – Widening & Interchange Improvements from Apex Peakway to Kildaire Farm Road (2025 Horizon year) (STIP U-5825)
 - o MTP ID 187b1, 187b2, 187b3 – Apex Peakway East – New Location – Lura Duncan Road to NC 55 (2025/2035 Horizon Year)
 - o MTP ID A96b, A622 – NC 55 Widening from Olive Chapel Road to Apex Peakway (2025 Horizon Year) (STIP U-2901B)
 - o MTP ID A449 – Perry Road Extension – New Location including interchange at US 1 – from Apex Peakway to NC 55 Bypass (2035 Horizon Year)
 - o MTP ID F110c – US 1 Widening from NC 55 to NC 540 (2035 Horizon Year)
- a. What affect, if any, do you believe these projects will have on the traffic volumes in the study area? [Increase in traffic volumes with obviously the greatest increase on NC540. However I'd refer to each project's traffic analysis and review their future projections and methodology.](#)
- b. Do you know of any reasonably foreseeable transportation projects that are not identified above that may affect traffic volumes in the traffic forecast study area? [Crossroads Junction \(I-5701/I-5703\).](#)
- 6) Forecasts for U-2719, U-5301, U-5825, U-2901, and R-2721/R-2828/R-2829, which cover portions of the same study area as this forecast, were performed in the last three years. Are you aware of any other previous traffic forecasts that were performed in or near the study area? [No.](#)
- 7) A preliminary review of the socio-economic data within the Triangle Regional Travel Demand Model (TRM) indicates general agreement with approved developments in the study area. We are currently aware of the following developments within the study area:
- i. Veridea Development District – 475 acre mixed-use development, including up to 8,000 DUs, 3.5 million sf of retail space, and 12 million sf office/industrial space; located south of US 1 between NC 540 and NC 55
 - ii. West Village PUD – 380 residential DUs and 500,000 sf mixed-use space (non-residential); located northwest of the US1/NC 540 interchange
 - iii. Apex High School Reconstruction – Reconstruction of High School, at Laura Duncan Rd/US 64, to accommodate roughly the same number of students
 - iv. HealthPark at Kildaire – 527,400 sf of mixed use development north of the Tryon Road/Kildaire Farm Road intersection
 - v. WakeMed Cary expansion – 2-story vertical expansion of existing hospital and new 134,000 sf medical office building
 - vi. Regency Creek Office Buildings – 240,000 sf office space (2 buildings) south of the Tryon Road/Regency Parkway intersection
- a. Do you know of any other substantial approved or planned developments in the vicinity of the traffic forecast area, brought forward in the last two years, that may affect our traffic forecast? (More recently conceived/approved plans would not have made it into the socio-economic development of the TRM.) [Refer to the Town's Active Development website for current information on active and approved developments, <https://www.townofcary.org/projects-initiatives/maps/interactive-development-map>.](#)

Comments completed by Luana Deans & Juliet Andes via email – 08/05/19

- 8) Do you have any additional comments that would be helpful in our development of the traffic forecast? [Figures showing the growth rates would be more helpful instead of providing in paragraph form.](#)

- 9) This questionnaire is being sent to the following individuals:
 - i. David Keilson, NCDOT Division 5, Division Planning Engineer (dpkeilson@ncdot.gov)
 - ii. Ron Garrett, NCDOT Division 5, Assistant Division Traffic Engineer (rjgarrett@nc.gov)
 - iii. Tracy Parrott, NCDOT Division 5, Division Project Delivery Engineer (tnparrott@ncdot.gov)
 - iv. Amy Neidringhaus, NCDOT Division 5, District 1 District Engineer (anneidringhaus@ncdot.gov)
 - v. Scott Walston, NCDOT Transportation Planning Division (Eastern Piedmont Group) (swalston@ncdot.gov)
 - vi. Chris Lukasina, Capital Area MPO, Executive Director (chris.lukasina@campo-nc.us)
 - vii. Alex Rickard, Capital Area MPO, Deputy Director (alex.rickard@campo-nc.us)
 - viii. Mike Bruff, Capital Area MPO, Transportation Modeling Engineer (mike.bruff@campo-nc.us)
 - ix. Tim Gardiner, Wake County, Transportation Planner (tim.gardiner@wakegov.com)
 - x. Juliet Andes, Town of Cary, Facilities Planning Manager (juliet.andes@townofcary.org)

 - xi. Luana Deans, Town of Cary, Transportation Planning Engineer (luana.deans@townofcary.org)
 - xii. Russell Dalton, Town of Apex, Senior Transportation Engineer (russell.dalton@apexnc.org)
 - xiii. Shannon Cox, Town of Apex, Long Range Planner Manager (shannon.cox@apexnc.org)

- a. Are there any other individuals whom you think we should contact to discuss this forecast? Consider Kendra.Parrish@hollyspringsnc.us

APPENDIX C:
TRAFFIC FORECAST TABLES

Table C1: 2019 Base Year No-Build Traffic Volumes

Forecast Location	NCDOT Historic Count Data							AADT Extrapolated to 2019 (1)	Historic Count Data ⁽⁵⁾		Project Specific Count Data ⁽²⁾		2019 No-Build Traffic Forecast
	2011	2012	2013	2014	2015	2016	2017		TMC	Mainline	TMC	Mainline	
US 1 - West of NC 540	17,000		20,000		24,000		34,000	34,300		31,700 (6)	37,500 (3)		36,200
US 1 - NC 540 to NC 55			18,000		24,000		34,000	33,700	33,000 (10)	29,600 (6)	36,300 (3) 37,400 (3)	37,000 (4)	35,300
US 1 - NC 55 to 1010 (Center St)/SR 1010 (Ten-Ten Rd)	47,000		46,000		54,000		57,000	58,700	68,300 (10)		69,700 (3) 69,900 (3)	70,300 (4)	68,100 (11)
US 1 - SR 1010 (Center St)/SR 1010 (Ten-Ten Rd) to US 64/SR 1009 (Tryon Rd)	60,000		57,000		63,000		59,000	60,500	77,500 (3) 71,000 (9)		80,300 (3) 80,300 (3)	80,900 (4)	78,600 (11)
US 1/64 - US 64/SR 1009 (Tryon Rd) to SR 3977 (SE Cary Parkway)	99,000		93,000		98,000		104,000	103,300	104,500 (9) 114,300 (3)	111,000 (7) 107,500 (8)			110,000
US 1/64 - East of SR 3977 (SE Cary Parkway)	118,000		118,000		122,000		126,000	128,400		127,800 (7)	122,200 (3)	123,100 (4)	129,400
NC 540 - North of US 1			9,700	15,000	20,000	22,000	24,000 (13)	32,400			31,800 (3)		31,000
NC 540 - South of US 1			7,200	11,000	13,000	16,000	17,000 (14)	22,700			32,300 (3)		31,500 (12)
NC 55 (E. Williams St) - North of Perry Road											25,100 (3)		25,200
NC 55 (E. Williams St) - Perry Road to Apex Peakway	29,000		27,000		31,000		27,000	28,000	25,600 (3)		26,100 (3) 26,000 (3)		26,200
NC 55 (E. Williams St) - Apex Peakway to Marco Dr									28,600 (3)		29,200 (3) 29,800 (3)		29,500
NC 55 (E. Williams St) - Marco Dr to Mark Weaver Ln/SR 1158 (S. Hughes St)											30,000 (3) 30,100 (3)		30,000
NC 55 (E. Williams St) - Mark Weaver Ln/SR 1158 (S. Hughes St) to US 1									30,500 (3) 30,900 (10)		32,400 (3) 32,200 (3)		32,000
NC 55 - US 1 to SR 1444 (Lufkin Rd)	44,000		43,000				45,000	42,700	45,700 (10) 45,100 (3)		47,900 (3) 47,800 (3)		47,000
NC 55 (E. Williams St) - SR 1444 (Lufkin Rd) to Dixie Pipeline/Storage King										52,100 (8)	47,300 (3) 46,600 (3)		46,600
NC 55 (E. Williams St) - South of Dixie Pipeline/Storage King	44,000		42,000		43,000		43,000	44,300			46,500 (3)		46,500
Perry Road - West of NC 55 (E. Williams St)											4,000 (3)		4,000
Apex Peakway - West of NC 55 (E. Williams St)									6,900 (3)		7,100 (3)		7,100
Marco Dr - East of NC 55 (E. Williams St)											2,900 (3)		2,900
SR 1158 (S. Hughes St) - West of NC 55 (E. Williams St)											2,500 (3)		2,500
Mark Weaver Ln - East of NC 55 (E. Williams St)											2,100 (3)		2,100
SR 1444 (Lufkin Rd) - East of NC 55 (E. Williams St)											5,400 (3)		5,400
Storage King - West of NC 55 (E. Williams St)											200 (3)		300
Dixie Pipeline - East of NC 55 (E. Williams St)											100 (3)		200
SR 1010 (Center St) - North of Waterford Green Dr	19,000		19,000		20,000		19,000	19,900	20,400 (10)		22,000 (3)		22,000
SR 1010 (Center St) - Waterford Green Dr to US 1									21,300 (10) 24,500 (10)		22,900 (3) 23,000 (3)		23,000

Table C1: 2019 Base Year No-Build Traffic Volumes

Forecast Location	NCDOT Historic Count Data							AADT Extrapolated to 2019 (1)	Historic Count Data ⁽⁵⁾		Project Specific Count Data ⁽²⁾		2019 No-Build Traffic Forecast
	2011	2012	2013	2014	2015	2016	2017		TMC	Mainline	TMC	Mainline	
SR 1010 (Ten-Ten Rd) - US 1 to SR 1444 (Lufkin Rd)									32,200 ⁽¹⁰⁾ 30,600 ⁽¹⁰⁾		32,300 ⁽³⁾ 32,100 ⁽³⁾		31,700
SR 1010 (Ten-Ten Rd) - South of SR 1444 (Lufkin Rd)	26,000		36,000		27,000		28,000	31,300	28,400 ⁽¹⁰⁾	28,200 ⁽⁷⁾	29,600 ⁽³⁾		29,100
Waterford Green Dr - East of SR 1010 (Center St)									2,500 ⁽¹⁰⁾		2,600 ⁽³⁾		2,600
SR 1444 (Lufkin Rd) - West of SR 1010 (Ten-Ten Rd)									5,300 ⁽¹⁰⁾		6,200 ⁽³⁾		6,200
US 64 - North of US 1/64/US 1	46,000		53,000		48,000		48,000	51,600	61,400 ⁽³⁾	52,500 ⁽⁶⁾	61,600 ⁽³⁾		60,000
SR 1009 (Tryon Rd) - US 1/64 to SR 4067 (Regency Parkway)									54,600 ⁽³⁾ 44,400 ⁽⁹⁾		49,800 ⁽³⁾		48,600
SR 1009 (Tryon Rd) - SR 4067 (Regency Parkway) to Crescent Green									40,500 ⁽⁹⁾		40,900 ⁽³⁾ 38,900 ⁽³⁾		39,100
SR 1009 (Tryon Road) - South of Crescent Green	25,000		27,000		29,000		29,000	31,000			33,100 ⁽³⁾		33,000
SR 4067 (Regency Parkway) - West of SR 1009 (Tryon Rd)									24,300 ⁽⁹⁾	21,300 ⁽⁷⁾	24,700 ⁽³⁾		24,500
Crescent Green - West of SR 1009 (Tryon Road)											9,500 ⁽³⁾		9,300
SR 3977 (SE Cary Parkway) - North of US 1/64	30,000		31,000		33,000		34,000	35,300			35,400 ⁽³⁾		36,200
SR 3977 (SE Cary Parkway) - South of US 1/64	20,000		21,000		23,000		25,000	26,100			26,500 ⁽³⁾		26,000

Notes:

- (1) Data extrapolated to 2019 based on linear regression of 2007-2017 data
- (2) All Project Specific Counts were converted to AADT based on the NCDOT Traffic Survey Unit ATR Seasonal Factors as described in Section 2.3
- (3) 2019 13-hour Turning Movement Count - factored to 24-hour volumes and adjusted to AADT.
- (4) 2019 Project Specific Mainline Count - Adjusted to AADT.
- (5) All Historic Counts were converted to AADT based on the NCDOT Traffic Survey Unit ATR Seasonal Factors as described in Section 2.3
- (6) 2016 Project Specific Mainline Count - Adjusted to AADT.
- (7) 2017 Project Specific Mainline Count - Adjusted to AADT.
- (8) 2018 Project Specific Mainline Count - Adjusted to AADT.
- (9) 2016 13-hour Turning Movement Count - factored to 24-hour volumes and adjusted to AADT.
- (10) 2017 13-hour Turning Movement Count - factored to 24-hour volumes and adjusted to AADT.
- (11) The difference in volumes between the historic AADT data and the recent count is substantial; however, project specific counts collected at the same time for adjacent segments are consistent with the AADT data. Therefore, a higher reliance was given to the TMC and manual classification counts.
- (12) The increase in traffic south of US 1 is primarily attributed to the addition of the Veridia Parkway interchange
- (13) Draft 2018 AADT data includes a volume of 29,500 at this location
- (14) Draft 2018 AADT data includes a volume of 17,000 at this location

Table C2: 2019 Base Year No-Build Design Data – Truck Percentages

Forecast Location	Previous Forecast		NCDOT AADT GIS	Historic Count Data		Project Specific Count Data		Selected Base Year BY NB Value
	Truck Percentage	STIP Project	Truck Percentage	TMC	Mainline	TMC	Mainline	
US 1 - West of NC 540	9, 6	R-2721	4, 5		9, 6 (3)	5, 4 (1)		5, 4
US 1 - NC 540 to NC 55	4, 4	R-2721	4, 4	5, 4 (7)	4, 4 (3)	5, 4 (1)	(5, 4) (2)	5, 4
	5, 2	U-2901				5, 4 (1)	(5, 4) (2)	
US 1 - NC 55 to 1010 (Center St)/SR 1010 (Ten-Ten Rd)	5, 2	U-2901	4, 3	5, 3 (7)		4, 2 (1)	(4, 2) (2)	4, 2
						4, 2 (1)	(4, 2) (2)	
US 1 - SR 1010 (Center St)/SR 1010 (Ten-Ten Rd) to US 64/SR 1009 (Tryon Rd)	3, 4	U-5301	4, 3	4, 2 (3)		4, 2 (1)	(4, 2) (2)	4, 2
				3, 4 (6)			(4, 2) (2)	
US 1/64 - US 64/SR 1009 (Tryon Rd) to SR 3977 (SE Cary Parkway)	3, 2	I-5703	3, 2	3, 4 (6)	3, 2 (4)	4, 2 (1)		4, 2
	4, 5	U-2719						
	3, 4	U-5301						
US 1/64 - East of SR 3977 (SE Cary Parkway)	3, 2	I-5703	3, 2		3, 2 (4)	4, 2 (1)	(3, 2) (2)	4, 2
	4, 5	U-2719						
NC 540 - North of US 1	7, 4	R-2721	4, 1			6, 2 (1)		6, 2
NC 540 - South of US 1	7, 4	R-2721	4, 1			6, 2 (1)		6, 2
NC 55 (E. Williams St) - North of Perry Road	4, 1	U-2901	3, 1			3, 1 (1)		3, 1
NC 55 (E. Williams St) - Perry Road to Apex Peakway	4, 1	U-2901	3, 1	2, 1 (1)		3, 1 (1)		3, 1
						3, 1 (1)		
NC 55 (E. Williams St) - Apex Peakway to Marco Dr	4, 1	U-2901	3, 1	2, 1 (1)		3, 1 (1)		3, 1
						3, 1 (1)		
NC 55 (E. Williams St) - Marco Dr to Mark Weaver Ln/SR 1158 (S. Hughes St)	4, 1	U-2901	3, 1			3, 1 (1)		3, 1
						3, 1 (1)		
NC 55 (E. Williams St) - Mark Weaver Ln/SR 1158 (S. Hughes St) to US 1	4, 1	U-2901	3, 1	4, 1 (7)		3, 1 (1)		3, 1
						3, 1 (1)		
NC 55 - US 1 to SR 1444 (Lufkin Rd)	5, 2	U-2901	4, 2	5, 1 (7)		5, 2 (1)		4, 2
						5, 2 (1)		
NC 55 (E. Williams St) - SR 1444 (Lufkin Rd) to Dixie Pipeline/Storage King	4, 1	U-2901	4, 2		2, 1 (5)	4, 1 (1)		4, 2
						4, 1 (1)		
NC 55 (E. Williams St) - South of Dixie Pipeline/Storage King			4, 2			4, 1 (1)		4, 2
Perry Road - West of NC 55 (E. Williams St)	1, 1	U-2901				1, 1 (1)		2, 1
Apex Peakway - West of NC 55 (E. Williams St)	3, 1	U-2901		2, 1 (1)		2, 1 (1)		2, 1
Marco Dr - East of NC 55 (E. Williams St)						3, 1 (1)		3, 1
SR 1158 (S. Hughes St) - West of NC 55 (E. Williams St)	2, 1	U-2901				3, 1 (1)		3, 1
Mark Weaver Ln - East of NC 55 (E. Williams St)	2, 1	U-2901				2, 1 (1)		2, 1
SR 1444 (Lufkin Rd) - East of NC 55 (E. Williams St)	10, 3	U-2901				12, 5 (1)		12, 4
Storage King - West of NC 55 (E. Williams St)						7, 0 (1)		6, 1

Table C2: 2019 Base Year No-Build Design Data – Truck Percentages

Forecast Location	Previous Forecast		NCDOT AADT GIS	Historic Count Data		Project Specific Count Data		Selected Base Year BY NB Value
	Truck Percentage	STIP Project	Truck Percentage	TMC	Mainline	TMC	Mainline	
Dixie Pipeline - East of NC 55 (E. Williams St)						3, 72 (1)		3, 70 (8)
SR 1010 (Center St) - North of Waterford Green Dr				2, 1 (7)		4, 1 (1)		3, 1
SR 1010 (Center St) - Waterford Green Dr to US 1				2, 1 (7)		4, 1 (1)		3, 1
				2, 1 (7)		3, 1 (1)		
SR 1010 (Ten-Ten Rd) - US 1 to SR 1444 (Lufkin Rd)				2, 1 (7)		4, 1 (1)		3, 1
				2, 1 (7)		4, 1 (1)		
SR 1010 (Ten-Ten Rd) - South of SR 1444 (Lufkin Rd)				3, 1 (7)	2, 1 (4)	3, 1 (1)		3, 1
Waterford Green Dr - East of SR 1010 (Center St)				1, 1 (7)		1, 1 (1)		2, 1
SR 1444 (Lufkin Rd) - West of SR 1010 (Ten-Ten Rd)				5, 2 (7)		8, 1 (1)		8, 2
US 64 - North of US 1/64/US 1	3, 2	U-5301	3, 2	3, 1 (1)	17,2 (3)			3, 2 (9)
SR 1009 (Tryon Rd) - US 1/64 to SR 4067 (Regency Parkway)	2, 1	U-5301		1, 1 (1)				2, 1
				1, 1 (6)				
SR 1009 (Tryon Rd) - SR 4067 (Regency Parkway) to Crescent Green	2, 1	U-5301		1, 1 (6)		2, 1 (1)		2, 1
SR 1009 (Tryon Road) - South of Crescent Green						3, 1 (1)		2, 1
SR 4067 (Regency Parkway) - West of SR 1009 (Tryon Rd)	2, 1	U-5301		1, 1 (6)	1, 1 (4)			2, 1
Crescent Green - West of SR 1009 (Tryon Road)						1, 1 (1)		2, 1
SR 3977 (SE Cary Parkway) - North of US 1/64	2, 1	I-5703				2, 1 (1)		2, 1
	2, 1	U-2719						
SR 3977 (SE Cary Parkway) - South of US 1/64	2, 1	I-5703				1, 1 (1)		2, 1
	2, 1	U-2719						

Notes:

- (1) 2019 13-hour Turning Movement Count
- (2) 2019 Volume, Speed, Class Mainline Count
- (3) 2016 Project Specific Mainline Count - Adjusted to AADT.
- (4) 2017 Project Specific Mainline Count - Adjusted to AADT.
- (5) 2018 Project Specific Mainline Count - Adjusted to AADT.
- (6) 2016 13-hour Turning Movement Count - factored to 24-hour volumes and adjusted to AADT.
- (7) 2017 13-hour Turning Movement Count - factored to 24-hour volumes and adjusted to AADT.
- (8) High volume of TTST attributed to driveway being for Dixie Pipeline fueling depot
- (9) High dual volume in historic count came from radar counts which have a tendency to over count truck volumes

Table C3: 2019 Base Year No-Build Design Data – Directional Distribution

Forecast Location	Previous Forecast		Historic Count Data				Project Specific Count Data				Selected 2019 BY NB Value	
	Directional Distribution (PM Peak)	STIP Project	TMC		Mainline		TMC		Mainline		AM Peak	PM Peak
			AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		
US 1 - West of NC 540	60 WB	R-2721			66 EB	58 WB (3)	62.8 EB	62.0 WB (1)			60.0 EB	60.0 WB
US 1 - NC 540 to NC 55	55 WB	R-2721			64 EB	52 WB (3)	53.8 EB	51.9 EB (1)	57.0 EB	53.2 EB (2)	57.5 EB	52.5 WB
	55 EB	U-2901	64 EB	53 EB (7)			56.6 EB	53.4 EB (1)	57.0 EB	53.2 EB (2)		
US 1 - NC 55 to 1010 (Center St)/SR 1010 (Ten-Ten Rd)	55 EB	U-2901	66 EB	55 WB (7)			56.0 EB	53.5 WB (1)	60.5 EB	53.5 WB (2)	57.5 EB	52.5 WB
							57.5 EB	53.6 WB (1)	60.5 EB	53.5 WB (2)		
US 1 - SR 1010 (Center St)/SR 1010 (Ten-Ten Rd) to US 64/SR 1009 (Tryon Rd)	55 WB	U-5301	62 EB	57 WB (3)			58.9 EB	52.7 WB (1)	58.9 EB	52.7 WB (2)	57.5 EB	52.5 WB
			62 EB	57 WB (6)			59.3 EB	53.1 WB (1)	58.9 EB	52.7 WB (2)		
US 1/64 - US 64/SR 1009 (Tryon Rd) to SR 3977 (SE Cary Parkway)	55 WB	U-5301	54 EB	54 WB (6)	53 EB	50 WB (4)	50.1 EB	51.5 EB (1)			52.5 EB	52.5 WB
	55 WB	I-5703										
	55 WB	U-2719	51 EB	55 WB (1)	52 EB	53 WB (5)	50.4 WB	52.8 EB (1)				
US 1/64 - East of SR 3977 (SE Cary Parkway)	55 WB	I-5703			53 EB	52 WB (4)	50.0 WB	50.7 EB (1)	50.0 WB	50.7 EB (2)	52.5 EB	52.5 WB
	55 WB	U-2719										
NC 540 - North of US 1	55 SB	R-2721					69.4 NB	83.9 SB (1)			70.0 NB	80.0 SB
NC 540 - South of US 1	55 SB	R-2721					56.9 NB	79.5 SB (1)			60.0 NB	80.0 SB
NC 55 (E. Williams St) - North of Perry Road	55 NB	U-2901					53.6 NB	50.4 SB (1)			55.0 NB	52.5 NB
NC 55 (E. Williams St) - Perry Road to Apex Peakway	55 NB	U-2901	55 NB	52 SB (1)			54.9 NB	51.0 NB (1)			55.0 NB	52.5 NB
							54.9 NB	50.8 NB (1)				
NC 55 (E. Williams St) - Apex Peakway to Marco Dr	55 NB	U-2901	56 NB	52 NB (1)			56.2 NB	54.3 NB (1)			55.0 NB	52.5 NB
							56.1 NB	53.7 NB (1)				
NC 55 (E. Williams St) - Marco Dr to Mark Weaver Ln/SR 1158 (S. Hughes St)	55 NB	U-2901					61.2 NB	55.9 NB (1)			55.0 NB	52.5 NB
							60.4 NB	55.2 NB (1)				
NC 55 (E. Williams St) - Mark Weaver Ln/SR 1158 (S. Hughes St) to US 1	55 NB	U-2901	58 NB	51 SB (7)			55.0 NB	52.1 NB (1)			55.0 NB	52.5 NB
							55.4 NB	52.1 NB (1)				
NC 55 - US 1 to SR 1444 (Lufkin Rd)	55 SB	U-2901	68 NB	61 SB (7)			56.9 NB	58.0 SB (1)			60.0 NB	60.0 SB
							60.3 NB	58.6 SB (1)				
NC 55 (E. Williams St) - SR 1444 (Lufkin Rd) to Dixie Pipeline/Storage King	55 SB	U-2901			63 NB	63 SB (5)	63.4 NB	60.5 SB (1)			65.0 NB	60.0 SB
							66.4 NB	60.3 SB (1)				
NC 55 (E. Williams St) - South of Dixie Pipeline/Storage King							66.3 NB	60.3 SB (1)			65.0 NB	60.0 SB
Perry Road - West of NC 55 (E. Williams St)	60 WB	U-2901					59.0 WB	59.6 WB (1)			60.0 WB	60.0 WB
Apex Peakway - West of NC 55 (E. Williams St)	65 WB	U-2901	59 WB	67 WB (1)			60.1 WB	62.5 WB (1)			60.0 WB	62.5 WB
Marco Dr - East of NC 55 (E. Williams St)							86.6 EB	72.9 EB (1)			80.0 EB	70.0 EB
SR 1158 (S. Hughes St) - West of NC 55 (E. Williams St)	55 WB	U-2901					99.5 EB	99.3 EB (1)			95.0 EB	95.0 EB (8)
Mark Weaver Ln - East of NC 55 (E. Williams St)	55 EB	U-2901					52.5 WB	55.1 WB (1)			52.5 WB	55.0 WB
SR 1444 (Lufkin Rd) - East of NC 55 (E. Williams St)	65 WB	U-2901					69.1 EB	65.5 WB (1)			70.0 EB	65.0 WB
Storage King - West of NC 55 (E. Williams St)							60.0 EB	50.0 WB (1)			60.0 WB	55.0 WB
Dixie Pipeline - East of NC 55 (E. Williams St)							100.0 WB	100.0 WB (1)			60.0 WB	60.0 WB (9)
SR 1010 (Center St) - North of Waterford Green Dr			53 NB	50 SB (7)			54.5 NB	53.3 SB (1)			55.0 NB	52.5 SB

Table C3: 2019 Base Year No-Build Design Data – Directional Distribution

Forecast Location	Previous Forecast		Historic Count Data				Project Specific Count Data				Selected 2019 BY NB Value	
	Directional Distribution (PM Peak)	STIP Project	TMC		Mainline		TMC		Mainline		AM Peak	PM Peak
			AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		
SR 1010 (Center St) - Waterford Green Dr to US 1			52 SB 56 SB	50 SB (7) 54 SB (7)			50.8 NB 50.3 NB	52.5 SB (1) 52.4 SB (1)			52.5 NB	52.5 SB
SR 1010 (Ten-Ten Rd) - US 1 to SR 1444 (Lufkin Rd)			52 SB 57 NB	56 SB (7) 51 NB (7)			56.3 NB 56.7 NB	50.0 SB (1) 50.6 NB (1)			57.5 NB	52.5 SB
SR 1010 (Ten-Ten Rd) - South of SR 1444 (Lufkin Rd)			58 NB	51 SB (7)	57 NB	51 SB (4)	58.3 NB	50.9 SB (1)			57.5 NB	52.5 SB
Waterford Green Dr - East of SR 1010 (Center St)			81 WB	51 EB (7)			75.1 WB	55.8 EB (1)			75.0 WB	55.0 EB
SR 1444 (Lufkin Rd) - West of SR 1010 (Ten-Ten Rd)			50 WB	61 EB (7)			51.8 WB	56.1 EB (1)			52.5 WB	55.0 EB
US 64 - North of US 1/64/US 1	55 NB	U-5301	52 NB	50 NB (1)	51 NB	51 NB (3)	55.5 NB	52.5 SB (1)			55.0 NB	52.5 SB
SR 1009 (Tryon Rd) - US 1/64 to SR 4067 (Regency Parkway)	55 NB	U-5301	64 SB 57 SB	51 SB (1) 57 NB (6)			57.3 SB 58.2 SB	55.6 NB (1) 56.7 NB (1)			55.0 SB	55.0 NB
SR 1009 (Tryon Rd) - SR 4067 (Regency Parkway) to Crescent Green	55 NB	U-5301	54 SB	54 NB (6)			51.2 SB 52.2 SB	50.4 NB (1) 50.8 NB (1)			52.5 SB	52.5 NB
SR 1009 (Tryon Road) - South of Crescent Green							52.5 NB	55.5 SB (1)			52.5 NB	52.5 SB
SR 4067 (Regency Parkway) - West of SR 1009 (Tryon Rd)			58 WB	58 EB (6)	62 WB	52 EB (4)	62.6 WB	61.9 EB (1)			62.5 WB	62.5 EB
Crescent Green - West of SR 1009 (Tryon Road)							64.3 WB	68.0 EB (1)			65.0 WB	67.5 EB
SR 3977 (SE Cary Parkway) - North of US 1/64	55 NB 55 SB	I-5703 U-2719					54.5 NB	53.7 NB (1)			55.0 NB	55.0 NB
SR 3977 (SE Cary Parkway) - South of US 1/64	55 SB 55 SB	I-5703 U-2719					57.5 NB	52.8 SB (1)			57.5 NB	52.5 SB

- Notes:**
- (1) 2019 13-hour Turning Movement Count
 - (2) 2019 Volume, Speed, Class Mainline Count
 - (3) 2016 Project Specific Mainline Count - Adjusted to AADT.
 - (4) 2017 Project Specific Mainline Count - Adjusted to AADT.
 - (5) 2018 Project Specific Mainline Count - Adjusted to AADT.
 - (6) 2016 13-hour Turning Movement Count - factored to 24-hour volumes and adjusted to AADT.
 - (7) 2017 13-hour Turning Movement Count - factored to 24-hour volumes and adjusted to AADT.
 - (8) Roadway is highly directional due to right-in/right-out intersection at NC 55 creating unbalanced travel patterns to/from the area near Wal-Mart
 - (9) Traffic count only captured the exiting traffic; therefore, volumes and factors were adjusted to account for the full traffic volume

Table C4: 2019 Base Year No-Build Design Data – Peak Hour Factor

Forecast Location	Previous Forecast		Historic Count Data				Project Specific Count Data				Selected 2019 BY NB Value			
	Peak Hour Factor (PM Peak)	STIP Project	TMC		Mainline		TMC		Mainline					
			AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		
US 1 - West of NC 540	12	R-2721		10	11	(3)	9.3	9.5	(1)			9.0	9.5	
US 1 - NC 540 to NC 55	12	R-2721	9	10	(7)	11	11	(3)	8.7	9.7	(1)	9.2	10.0	(2)
	7	U-2901							9.1	10.0	(1)	9.2	10.0	(2)
US 1 - NC 55 to 1010 (Center St)/SR 1010 (Ten-Ten Rd)	7	U-2901	8	9	(7)				7.5	9.1	(1)	7.5	9.0	(2)
									7.7	9.1	(1)	7.5	9.0	(2)
US 1 - SR 1010 (Center St)/SR 1010 (Ten-Ten Rd) to US 64/SR 1009 (Tryon Rd)	8	U-5301	8	8	(3)				7.6	8.5	(1)	7.5	8.4	(2)
			7	8	(6)				7.5	8.4	(1)	7.5	8.4	(2)
US 1/64 - US 64/SR 1009 (Tryon Rd) to SR 3977 (SE Cary Parkway)	8	U-5301	8	8	(6)	8	8	(4)	7.9	8.3	(1)			
	8	I-5703										8.0	8.5	
	10	U-2719	8	8	(1)	8	8	(5)	8.3	8.4	(1)			
US 1/64 - East of SR 3977 (SE Cary Parkway)	8	I-5703				8	8	(4)	7.9	8.3	(1)	7.9	8.3	(2)
	10	U-2719										8.0	8.5	
NC 540 - North of US 1	11	R-2721							10.0	13.2	(1)			
NC 540 - South of US 1	11	R-2721							13.2	9.8	(1)			
NC 55 (E. Williams St) - North of Perry Road	7	U-2901							6.3	7.6	(1)			
NC 55 (E. Williams St) - Perry Road to Apex Peakway	7	U-2901	7	8	(1)				6.5	7.6	(1)			
									6.5	7.7	(1)			
NC 55 (E. Williams St) - Apex Peakway to Marco Dr	7	U-2901	7	8	(1)				6.5	8.2	(1)			
									6.6	8.0	(1)			
NC 55 (E. Williams St) - Marco Dr to Mark Weaver Ln/SR 1158 (S. Hughes St)	7	U-2901							7.0	7.9	(1)			
									7.0	7.9	(1)			
NC 55 (E. Williams St) - Mark Weaver Ln/SR 1158 (S. Hughes St) to US 1	7	U-2901	7	8	(7)				7.0	7.7	(1)			
									7.1	7.8	(1)			
NC 55 - US 1 to SR 1444 (Lufkin Rd)	7	U-2901	7	8	(7)				6.5	7.8	(1)			
									6.6	7.9	(1)			
NC 55 (E. Williams St) - SR 1444 (Lufkin Rd) to Dixie Pipeline/Storage King	7	U-2901				7	8	(5)	6.5	7.9	(1)			
									6.7	7.9	(1)			
NC 55 (E. Williams St) - South of Dixie Pipeline/Storage King									6.7	7.9	(1)			
Perry Road - West of NC 55 (E. Williams St)	7	U-2901							7.0	7.3	(1)			
Apex Peakway - West of NC 55 (E. Williams St)	10	U-2901	5	9	(1)				5.0	9.8	(1)			
Marco Dr - East of NC 55 (E. Williams St)									10.8	8.1	(1)			
SR 1158 (S. Hughes St) - West of NC 55 (E. Williams St)	5	U-2901							8.2	5.5	(1)			
Mark Weaver Ln - East of NC 55 (E. Williams St)	5	U-2901							9.3	4.6	(1)			
SR 1444 (Lufkin Rd) - East of NC 55 (E. Williams St)	8	U-2901							8.6	8.4	(1)			
Storage King - West of NC 55 (E. Williams St)										7.6				
Dixie Pipeline - East of NC 55 (E. Williams St)									20.9	2.1	(1)			
SR 1010 (Center St) - North of Waterford Green Dr			8	8	(7)				7.0	8.3	(1)			

Table C4: 2019 Base Year No-Build Design Data – Peak Hour Factor

Forecast Location	Previous Forecast		Historic Count Data				Project Specific Count Data				Selected 2019 BY NB Value	
	Peak Hour Factor (PM Peak)	STIP Project	TMC		Mainline		TMC		Mainline		AM Peak	PM Peak
			AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		
SR 1010 (Center St) - Waterford Green Dr to US 1			9	8 (7)			7.1	8.5 (1)			7.0	8.5
SR 1010 (Ten-Ten Rd) - US 1 to SR 1444 (Lufkin Rd)			8	7 (7)			7.2	7.9 (1)			7.0	8.0
SR 1010 (Ten-Ten Rd) - South of SR 1444 (Lufkin Rd)			8	8 (7)	7	8 (4)	6.7	7.8 (1)			7.0	8.0
Waterford Green Dr - East of SR 1010 (Center St)			10	9 (7)			8.6	8.5 (1)			8.5	8.5
SR 1444 (Lufkin Rd) - West of SR 1010 (Ten-Ten Rd)			12	8 (7)			10.6	9.2 (1)			11.0	9.0
US 64 - North of US 1/64/US 1	9	U-5301	8	8 (1)	8	9 (3)	7.7	7.6 (1)			7.5	7.5
SR 1009 (Tryon Rd) - US 1/64 to SR 4067 (Regency Parkway)	9	U-5301	8	8 (1)			7.9	8.5 (1)			7.5	8.0
SR 1009 (Tryon Rd) - SR 4067 (Regency Parkway) to Crescent Green	9	U-5301	8	9 (6)			8.1	8.7 (1)			7.0	8.0
SR 1009 (Tryon Rd) - South of Crescent Green			7	8 (6)			7.1	8.0 (1)			7.0	8.0
SR 1009 (Tryon Road) - South of Crescent Green							7.1	7.9 (1)			7.0	8.0
SR 1009 (Tryon Road) - South of Crescent Green							6.7	7.8 (1)			7.0	8.0
SR 4067 (Regency Parkway) - West of SR 1009 (Tryon Rd)	10	U-5301	9	10 (6)	10	11 (4)	9.6	9.5 (1)			9.5	9.5
Crescent Green - West of SR 1009 (Tryon Road)							8.5	9.8 (1)			8.5	10.0
SR 3977 (SE Cary Parkway) - North of US 1/64	10	I-5703					6.9	8.5 (1)			7.0	8.5
SR 3977 (SE Cary Parkway) - South of US 1/64	10	U-2719					6.9	8.3 (1)			7.0	8.5
SR 3977 (SE Cary Parkway) - South of US 1/64	10	I-5703					6.9	8.3 (1)			7.0	8.5
SR 3977 (SE Cary Parkway) - South of US 1/64	10	U-2719										

Notes:

- (1) 2019 13-hour Turning Movement Count
- (2) 2019 Volume, Speed, Class Mainline Count
- (3) 2016 Project Specific Mainline Count - Adjusted to AADT.
- (4) 2017 Project Specific Mainline Count - Adjusted to AADT.
- (5) 2018 Project Specific Mainline Count - Adjusted to AADT.
- (6) 2016 13-hour Turning Movement Count - factored to 24-hour volumes and adjusted to AADT.
- (7) 2017 13-hour Turning Movement Count - factored to 24-hour volumes and adjusted to AADT.

Table C5: Model Validation

Forecast Location	Model 2013		2019 No-Build		FY No-Build Volumes	
	Model Volume	AADT	Interpolated Model ⁽¹⁾	Forecast Volume	2045 Model	2045 Forecast
US 1 - West of NC 540	20,618	20,000	27,100	36,200	54,944	64,600
US 1 - NC 540 to Perry Road Extension	26,354	18,000	34,200	35,300	68,069	67,100
US 1 - Perry Road Extension to NC 55	26,354		37,900	35,300	88,090	87,500
US 1 - NC 55 to 1010 (Center St)/SR 1010 (Ten-Ten Rd)	63,534	46,000	71,500	68,100	106,181	102,900
US 1 - SR 1010 (Center St)/SR 1010 (Ten-Ten Rd) to US 64/SR 1009 (Tryon Rd)	75,516	57,000	85,000	78,600	126,138	120,200
US 1/64 - US 64/SR 1009 (Tryon Rd) to SR 3977 (SE Cary Parkway)	114,618	93,000	125,200	110,000	171,077	155,900
US 1/64 - East of SR 3977 (SE Cary Parkway)	126,938	118,000	138,100	129,400	186,319	177,800
NC 540 - North of US 1	18,182	9,700	27,600	31,000	68,527	75,800
NC 540 - South of US 1	9,026	7,200	21,300	31,500	74,738	81,100
Perry Road Extension - North of US 1					17,612	17,400
Perry Road Extension - South of US 1					37,742	37,000
NC 55 (E. Williams St) - North of Perry Road	25,603		27,500	25,200	35,696	33,400
NC 55 (E. Williams St) - Perry Road to Apex Peakway	27,194	27,000	28,600	26,200	34,657	34,200
NC 55 (E. Williams St) - Apex Peakway to Marco Dr	31,020		34,800	29,500	50,937	44,000
NC 55 (E. Williams St) - Marco Dr to Mark Weaver Ln/SR 1158 (S. Hughes St)	31,020		34,800	30,000	50,937	45,400
NC 55 (E. Williams St) - Mark Weaver Ln/SR 1158 (S. Hughes St) to US 1	31,020		34,800	32,000	50,937	48,300
NC 55 - US 1 to SR 1444 (Lufkin Rd)	50,623	43,000	52,500	47,000	60,769	54,900
NC 55 (E. Williams St) - SR 1444 (Lufkin Rd) to Dixie Pipeline/Storage King	46,683		48,900	46,600	58,260	55,600
NC 55 (E. Williams St) - South of Dixie Pipeline/Storage King	46,683	42,000	48,900	46,500	58,260	55,500
Apex Peakway - West of NC 55 (E. Williams St)	7,139		6,400	7,100	3,287	8,800
Apex Peakway - East of NC 55 (E. Williams St)					19,295	17,000
SR 1444 (Lufkin Rd) - East of NC 55 (E. Williams St)	1,995		1,800	5,400	1,187	7,500
SR 1010 (Center St) - North of Waterford Green Dr	20,186	19,000	21,800	22,000	28,689	30,200
SR 1010 (Center St) - Waterford Green Dr to US 1	20,626		23,000	23,000	33,246	31,400
SR 1010 (Ten-Ten Rd) - US 1 to SR 1444 (Lufkin Rd)	23,195		26,900	31,700	42,887	47,900
SR 1010 (Ten-Ten Rd) - South of SR 1444 (Lufkin Rd)	23,195	36,000	26,900	29,100	42,887	44,100
Waterford Green Dr - East of SR 1010 (Center St)	1,919		1,900	2,600	1,972	2,800
SR 1444 (Lufkin Rd) - West of SR 1010 (Ten-Ten Rd)	717		600	6,200	5	8,600
US 64 - North of US 1/64/US 1	42,513	53,000	44,900	60,000	55,070	80,800
SR 1009 (Tryon Rd) - US 1/64 to SR 4067 (Regency Parkway)	32,261		33,200	48,600	37,331	56,100
SR 1009 (Tryon Rd) - SR 4067 (Regency Parkway) to Crescent Green	32,261		33,200	39,100	37,331	45,100
SR 1009 (Tryon Road) - South of Crescent Green	14,052	27,000	18,400	33,000	37,333	38,100

Table C5: Model Validation

Forecast Location	Model 2013		2019 No-Build		FY No-Build Volumes	
	Model Volume	AADT	Interpolated Model ⁽¹⁾	Forecast Volume	2045 Model	2045 Forecast
SR 4067 (Regency Parkway) - West of SR 1009 (Tryon Rd)	15,684		17,000	24,500	22,808	32,600
Crescent Green - West of SR 1009 (Tryon Road)	13,910			9,300		10,600
SR 3977 (SE Cary Parkway) - North of US 1/64	34,332	31,000	36,500	36,200	45,687	45,700
SR 3977 (SE Cary Parkway) - South of US 1/64	17,154	21,000	18,400	26,000	23,858	33,600

Notes: (1) Interpolated volume between 2013 and 2045 model data

Table C6: 2045 No-Build Traffic Volumes

Forecast Location	Forecast 2019 Base Year NB	Historic Growth Rate		Model Growth Rate ⁽¹⁾	Chosen Growth Rate ⁽¹⁾	Model Volume Delta ⁽²⁾	Chosen Volume Delta ⁽²⁾	Future Year No-Build Volumes	
	AADT	2008-2017	1998-2017	2013-2045	2019-2045	2019-2045	2019-2045	2045 Model	2045 Forecast
US 1 - West of NC 540	36,200	9.41%	4.48%	3.11%	2.25%	27,900	28,400	54,944	64,600
US 1 - NC 540 to Perry Road Extension	35,300	8.92%	4.79%	3.01%	2.50%	33,900	31,800	68,069	67,100
US 1 - Perry Road Extension to NC 55	35,300			3.84%	3.55%	50,200	52,200	88,090	87,500
US 1 - NC 55 to 1010 (Center St)/SR 1010 (Ten-Ten Rd)	68,100	2.96%	3.69%	1.62%	1.60%	34,700	34,800	106,181	102,900
US 1 - SR 1010 (Center St)/SR 1010 (Ten-Ten Rd) to US 64/SR 1009 (Tryon Rd)	78,600	0.25%	2.16%	1.62%	1.65%	41,100	41,600	126,138	120,200
US 1/64 - US 64/SR 1009 (Tryon Rd) to SR 3977 (SE Cary Parkway)	110,000	0.98%	2.85%	1.26%	1.35%	45,900	45,900	171,077	155,900
US 1/64 - East of SR 3977 (SE Cary Parkway)	129,400	1.27%	2.83%	1.21%	1.23%	48,200	48,400	186,319	177,800
NC 540 - North of US 1	31,000	23.04%	23.04%	4.23%	3.50%	40,900	44,800	68,527	75,800
NC 540 - South of US 1	31,500	22.37%	22.37%	6.83%	3.70%	53,400	49,600	74,738	81,100
Perry Road Extension - North of US 1	0						17,400	17,612	17,400 ⁽⁴⁾
Perry Road Extension - South of US 1	0						37,000	37,742	37,000 ⁽⁴⁾
NC 55 (E. Williams St) - North of Perry Road	25,200			1.04%	1.09%	8,200	8,200	35,696	33,400
NC 55 (E. Williams St) - Perry Road to Apex Peakway	26,200	-0.35%	0.53%	0.76%	1.03%	6,100	8,000	34,657	34,200
NC 55 (E. Williams St) - Apex Peakway to Marco Dr	29,500			1.56%	1.55%	16,200	14,500	50,937	44,000
NC 55 (E. Williams St) - Marco Dr to Mark Weaver Ln/SR 1158 (S. Hughes St)	30,000			1.56%	1.61%	16,200	15,400	50,937	45,400
NC 55 (E. Williams St) - Mark Weaver Ln/SR 1158 (S. Hughes St) to US 1	32,000			1.56%	1.60%	16,200	16,300	50,937	48,300
NC 55 - US 1 to SR 1444 (Lufkin Rd)	47,000	-0.85%	0.72%	0.57%	0.60%	8,200	7,900	60,769	54,900
NC 55 (E. Williams St) - SR 1444 (Lufkin Rd) to Dixie Pipeline/Storage King	46,600			0.62%	0.68%	9,000	9,000	61,659	55,600
NC 55 (E. Williams St) - South of Dixie Pipeline/Storage King	46,500	0.83%	1.13%	0.69%	0.68%	9,400	9,000	58,260	55,500
Perry Road - West of NC 55 (E. Williams St)	4,000				0.70%		800		4,800
Apex Peakway - West of NC 55 (E. Williams St)	7,100			-2.39%	0.83%	-3,100	1,700	3,287	8,800 ⁽⁵⁾
Apex Peakway - East of NC 55 (E. Williams St)	0						17,000	19,295	17,000 ⁽⁶⁾
Marco Dr - East of NC 55 (E. Williams St)	2,900				1.79%		1,700		4,600
SR 1158 (S. Hughes St) - West of NC 55 (E. Williams St)	2,500				0.57%		400		2,900
Mark Weaver Ln - East of NC 55 (E. Williams St)	2,100				1.11%		700		2,800
SR 1444 (Lufkin Rd) - East of NC 55 (E. Williams St)	5,400			-1.61%	1.27%	-700	2,100	1,187	7,500 ⁽⁷⁾
Storage King - West of NC 55 (E. Williams St)	300				0.00%		0		300
Dixie Pipeline - East of NC 55 (E. Williams St)	200				0.00%		0		200
SR 1010 (Center St) - North of Waterford Green Dr	22,000	0.79%	0.40%	1.10%	1.23%	6,900	8,200	28,689	30,200

Table C6: 2045 No-Build Traffic Volumes

Forecast Location	Forecast 2019 Base Year NB	Historic Growth Rate		Model Growth Rate ⁽¹⁾	Chosen Growth Rate ⁽¹⁾	Model Volume Delta ⁽²⁾	Chosen Volume Delta ⁽²⁾	Future Year No-Build Volumes	
	AADT	2008-2017	1998-2017	2013-2045	2019-2045	2019-2045	2019-2045	2045 Model	2045 Forecast
SR 1010 (Center St) - Waterford Green Dr to US 1	23,000			1.50%	1.20%	10,300	8,400	33,246	31,400
SR 1010 (Ten-Ten Rd) - US 1 to SR 1444 (Lufkin Rd)	31,700			1.94%	1.60%	16,000	16,200	42,887	47,900
SR 1010 (Ten-Ten Rd) - South of SR 1444 (Lufkin Rd)	29,100	1.99%	2.84%	1.94%	1.61%	16,000	15,000	42,887	44,100
Waterford Green Dr - East of SR 1010 (Center St)	2,600			0.09%	0.29%	0	200	1,972	2,800
SR 1444 (Lufkin Rd) - West of SR 1010 (Ten-Ten Rd)	6,200			-14.37%	1.27%	-600	2,400	5	8,600 ⁽⁷⁾
US 64 - North of US 1/64/US 1	60,000	1.49%	0.92%	0.81%	1.15%	10,200	20,800	55,070	80,800 ⁽⁸⁾
SR 1009 (Tryon Rd) - US 1/64 to SR 4067 (Regency Parkway)	48,600			0.46%	0.55%	4,100	7,500	37,331	56,100 ⁽⁹⁾
SR 1009 (Tryon Rd) - SR 4067 (Regency Parkway) to Crescent Green	39,100			0.46%	0.55%	4,100	6,000	37,331	45,100 ⁽⁹⁾
SR 1009 (Tryon Road) - South of Crescent Green	33,000	2.66%	1.05%	3.10%	0.55%	18,900	5,100	37,333	38,100 ⁽⁹⁾
SR 4067 (Regency Parkway) - West of SR 1009 (Tryon Rd)	24,500			1.18%	1.10%	5,800	8,100	22,808	32,600
Crescent Green - West of SR 1009 (Tryon Road)	9,300				0.50%		1,300		10,600
SR 3977 (SE Cary Parkway) - North of US 1/64	36,200	2.10%	-0.46%	0.90%	0.90%	9,200	9,500	45,687	45,700
SR 3977 (SE Cary Parkway) - South of US 1/64	26,000	3.56%	2.13%	1.04%	0.99%	5,400	7,600	23,858	33,600

Notes:

- (1) Growth rate shown is the Compound Annual Growth Rate (CAGR).
- (2) Volume Delta is the raw change in volume between either the model volumes or the forecast volumes
- (3) Growth rate and model volumes shown are for a centroid connector that was determined to be representative of the change in volume for the subject roadway
- (4) Forecast volume for Perry Road Extension were developed based on proportioning the travel demand model volumes based on a factor developed by dividing the model volume by the forecast volumes for adjacent segments
- (5) Forecast volume for existing Apex Peakway showed a reduction in volume as traffic would either use the NC 55 or Perry Road Extension interchanges and bypass this segment of roadway, based on the nature of the Peakway being a circumferential roadway it is not likely that this degree of diversion will occur; therefore a minor increase in volume was forecast for this location.
- (6) Forecast volume for Apex Peakway Extension were developed based on proportioning the travel demand model volumes based on a factor developed by dividing the model volume by the forecast volumes for adjacent segments
- (7) The change in model volumes along Lufkin Road are due to a change in the centroid connector connectivity in the model between the base year and future year model network; therefore, a growth rate that was consistent with growth for the area TAZs was used instead.
- (8) The travel demand models show very little growth along US 64 and are substantially lower than previous forecasts. Based on the opinions of local planners and engineers and the strong historic growth along the corridor a higher growth rate was selected for this roadway.
- (9) The change in model volumes along Tryon Road are due to a change in the centroid connector connectivity in the model between the base year and future year model network; therefore, a growth rate that was consistent with growth for the area TAZs and along the entire corridor was used instead.

Table C7: 2045 Build Traffic Volumes

Forecast Location	2045 Model Volumes, Daily		Model Diversion Percent	Chosen Diversion Percent	Model Volume Delta	Chosen Volume Delta	2045 Forecast Volumes	
	No-Build	Build					No-Build	Build
US 1 - West of NC 540	54,944	57,349	4.38%	4.18%	2,405	2,700	64,600	67,300
US 1 - NC 540 to Perry Road Extension	68,069	75,817	11.38%	12.22%	7,748	8,200	67,100	75,300
US 1 - Perry Road Extension to NC 55	88,090	96,321	9.34%	9.49%	8,231	8,300	87,500	95,800
US 1 - NC 55 to 1010 (Center St)/SR 1010 (Ten-Ten Rd)	106,181	120,071	13.08%	13.41%	13,890	13,800	102,900	116,700
US 1 - SR 1010 (Center St)/SR 1010 (Ten-Ten Rd) to US 64/SR 1009 (Tryon Rd)	126,138	143,536	13.79%	15.06%	17,398	18,100	120,200	138,300
US 1/64 - US 64/SR 1009 (Tryon Rd) to SR 3977 (SE Cary Parkway)	171,077	182,059	6.42%	7.50%	10,982	11,700	155,900	167,600
US 1/64 - East of SR 3977 (SE Cary Parkway)	186,319	192,142	3.13%	3.54%	5,823	6,300	177,800	184,100
NC 540 - North of US 1	68,527	66,732	-2.62%	-2.51%	-1,795	-1,900	75,800	73,900
NC 540 - South of US 1	74,738	76,896	2.89%	2.47%	2,158	2,000	81,100	83,100
Perry Road Extension - North of US 1	17,612	17,376	-1.34%	-0.57%	-236	-100	17,400	17,300
Perry Road Extension - South of US 1	37,742	37,997	0.68%	0.00%	255	0	37,000	37,000
NC 55 (E. Williams St) - North of Perry Road	35,696	36,901	3.38%	3.59%	1,205	1,200	33,400	34,600
NC 55 (E. Williams St) - Perry Road to Apex Peakway	34,657	35,867	3.49%	3.51%	1,210	1,200	34,200	35,400
NC 55 (E. Williams St) - Apex Peakway to Marco Dr	50,937	51,967	2.02%	2.27%	1,030	1,000	44,000	45,000
NC 55 (E. Williams St) - Marco Dr to Mark Weaver Ln/SR 1158 (S. Hughes St)	50,937	51,967	2.02%	2.20%	1,030	1,000	45,400	46,400
NC 55 (E. Williams St) - Mark Weaver Ln/SR 1158 (S. Hughes St) to US 1	50,937	51,967	2.02%	2.07%	1,030	1,000	48,300	49,300
NC 55 - US 1 to SR 1444 (Lufkin Rd)	60,769	61,492	1.19%	1.28%	723	700	54,900	55,600
NC 55 (E. Williams St) - SR 1444 (Lufkin Rd) to Dixie Pipeline/Storage King	61,659	62,309	1.05%	1.26%	650	700	55,600	56,300
NC 55 (E. Williams St) - South of Dixie Pipeline/Storage King	58,260	58,667	0.70%	1.26%	407	700	55,500	56,200
Perry Road - West of NC 55 (E. Williams St)				0.00%		0	4,800	4,800
Apex Peakway - West of NC 55 (E. Williams St)	3,287	3,152	-4.11%	-3.41%	-135	-300	8,800	8,500
Apex Peakway - East of NC 55 (E. Williams St)	19,295	18,482	-4.21%	-4.12%	-813	-700	17,000	16,300
Marco Dr - East of NC 55 (E. Williams St)				0.00%		0	4,600	4,600
SR 1158 (S. Hughes St) - West of NC 55 (E. Williams St)				0.00%		0	2,900	2,900
Mark Weaver Ln - East of NC 55 (E. Williams St)				0.00%		0	2,800	2,800
SR 1444 (Lufkin Rd) - East of NC 55 (E. Williams St)	1,187	858	-27.72%	0.00%	-329	0	7,500	7,500
Storage King - West of NC 55 (E. Williams St)				0.00%		0	300	300
Dixie Pipeline - East of NC 55 (E. Williams St)				0.00%		0	200	200
SR 1010 (Center St) - North of Waterford Green Dr	28,689	28,515	-0.61%	0.00%	-174	0	30,200	30,200

Table C7: 2045 Build Traffic Volumes

Forecast Location	2045 Model Volumes, Daily		Model Diversion Percent	Chosen Diversion Percent	Model Volume Delta	Chosen Volume Delta	2045 Forecast Volumes	
	No-Build	Build					No-Build	Build
SR 1010 (Center St) - Waterford Green Dr to US 1	28,689	28,515	-0.61%	0.00%	-174	0	31,400	31,400
SR 1010 (Ten-Ten Rd) - US 1 to SR 1444 (Lufkin Rd)	42,887	44,514	3.79%	3.55%	1,627	1,700	47,900	49,600
SR 1010 (Ten-Ten Rd) - South of SR 1444 (Lufkin Rd)	42,887	44,514	3.79%	3.85%	1,627	1,700	44,100	45,800
Waterford Green Dr - East of SR 1010 (Center St)	1,972	1,972	0.00%	0.00%	0	0	2,800	2,800
SR 1444 (Lufkin Rd) - West of SR 1010 (Ten-Ten Rd)	5	5	0.00%	0.00%	0	0	8,600	8,600
US 64 - North of US 1/64/US 1	55,070	51,622	-6.26%	-3.47%	-3,448	-2,800	80,800	78,000
SR 1009 (Tryon Rd) - US 1/64 to SR 4067 (Regency Parkway)	37,331	36,966	-0.98%	0.00%	-365	0	56,100	56,100
SR 1009 (Tryon Rd) - SR 4067 (Regency Parkway) to Crescent Green	37,331	36,966	-0.98%	0.00%	-365	0	45,100	45,100
SR 1009 (Tryon Road) - South of Crescent Green	37,333	36,969	-0.98%	0.00%	-364	0	38,100	38,100
SR 4067 (Regency Parkway) - West of SR 1009 (Tryon Rd)	22,808	21,506	-5.71%	-3.07%	-1,302	-1,000	32,600	31,600
Crescent Green - West of SR 1009 (Tryon Road)				0.00%		0	10,600	10,600
SR 3977 (SE Cary Parkway) - North of US 1/64	45,687	47,202	3.32%	3.50%	1,515	1,600	45,700	47,300
SR 3977 (SE Cary Parkway) - South of US 1/64	23,858	24,728	3.65%	3.57%	870	1,200	33,600	34,800

Notes:



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