

**Waterstone South  
Attachment 7**

## Executive Summary

Capkov Ventures, Inc. has plans to develop a mixed-use development along NC 86 and Waterstone Drive in Hillsborough, North Carolina (Figure 1). The development is planned to be constructed in phases, with Phase 1 completed by 2027 and the full build-out of the development by 2033. The site will provide townhomes, apartments, general office, medical office, and neighborhood retail.

## Project Background

The proposed Capkov Waterstone development was analyzed in two (2) different phases. Phase 1 of the development is anticipated to be completed by 2027 and includes the following land use totals.

- › 205 Townhomes
- › 20,000 square feet (sf) Retail

The full build-out of the development is anticipated to be completed by 2033 and will construct the following additional land uses.

- › 20,000-sf Retail
- › 450 Apartments
- › 100,000-sf General Office
- › 100,000-sf Medical Office

The development plans to provide two (2) driveways on NC 86 and two (2) driveways on Waterstone Drive. The following summarizes the location of each planned access point:

- › Future Access #1, full movement access on NC 86, approximately 2,650 feet south of Waterstone Drive to be construction during Phase 1.
- › Future Access #2, full movement access on NC 86, approximately 1,900 feet south of Waterstone Drive to be constructed during Phase 1.
- › Future Access #3, full movement access on Waterstone Drive, approximately 950 feet west of NC 86 to be constructed after Phase 1.
- › Future Access #4, right-in/right-out access on Waterstone Drive, approximately 1,550 feet west of NC 86 to be constructed after Phase 1.

As determined through the project scoping process with the North Carolina Department of Transportation (NCDOT) and the Town of Hillsborough, the following intersections were included in the study area and analyzed for existing and future conditions, as applicable:

- › Old NC 86 (SR 1009) and I-40 Eastbound Ramps (unsignalized, future signalized)
- › Old NC 86 (SR 1009) and I-40 Westbound Ramps (unsignalized, future signalized)
- › Old NC 86 (SR 1009) and Waterstone Drive/ Rippy Lane (SR 1224) (signalized)
- › Old NC 86 (SR 1009) and Cates Creek Parkway/ Lafayette Drive (unsignalized)
- › NC 86 and Waterstone Drive (signalized)
- › NC 86 and New Hope Church Road (SR 1723) (signalized)
- › Waterstone Drive and Hospital East Driveway/ Summit Trail Drive (unsignalized)
- › NC 86 and Future Access #1 (future unsignalized)
- › NC 86 and Future Access #2 (future unsignalized)
- › Waterstone Drive and Future Access #3 (future unsignalized)
- › Waterstone Drive and Future Access #4 (future unsignalized)

The development is planned to be analyzed in multiple build phases. The following six (6) scenarios are proposed to be analyzed for AM and PM peak hour conditions:

- › Existing (2023) Conditions
- › No-Build (2027) Conditions
- › Phase 1 (2027) Conditions
- › No-Build (2033) Conditions
- › Build-out (2033) Conditions
- › Build-out (2033) Conditions with Improvements

The Existing (2023) scenario includes typical weekday AM and PM peak hour analysis based on turning movement count data collected in October 2022 and April 2023. For any turning movements collected prior to 2023, an annual growth rate of one percent (1%) was applied to the volumes. The No-Build (2027) and No-Build (2033) scenarios include existing traffic with an annual projected background growth rate of one percent (1%) applied in addition to site trips that were identified from two (2) nearby background developments. The Phase 1 (2027) scenario includes No-Build (2027) volumes with the addition of site trips generated by only Phase 1 of the proposed development, and the Build-out (2033) scenario includes No-Build (2033) volumes with the addition of site trips generated by the full build-out of the development. Potential offsite roadway and traffic control improvements with the complete development in place are accounted for within Build-out (2033) with Improvements scenario.

## Existing (2023) Conditions

Existing analyses were conducted based on current roadway geometrics and intersection turning movement counts collected in October 2022 and April 2023. Turning movements for the intersection

of Old NC 86 (SR 1009) and Cates Creek Parkway/ Lafayette Drive were grown to 2023 using an annual growth rate of one percent (1%).

As reported in the Summary Level of Service (LOS) table on page viii, the existing signalized intersections are operating at LOS C or better during both peak hours. The stop-controlled eastbound I-40 off-ramp is operating at LOS F during the AM peak hour and LOS E during the PM peak hour. Stop-controlled eastbound Lafayette Drive at Old NC 86 is operating at LOS F during both peak hours, and stop-controlled eastbound Waterstone Drive at NC 86 is operating at LOS E during the PM peak hour.

## No-Build (2027) Conditions

An annual growth rate of one percent (1%) was applied to the Existing (2023) peak hour volumes to calculate the expected background growth within the study area. Two (2) background developments are expected to be completed before the construction of Phase 1 of the Capkov Waterstone development. The peak hour site trips from these developments were included in the No-Build (2027) volume calculations:

- › Cates Creek Multifamily
- › Research Triangle Logistics Park

One (1) background roadway improvement project was identified in the study area to be completed before the completion of Phase 1. NCDOT STIP No. I-3306A is widening I-40 from across Orange County but is also providing interchange improvements at Old NC 86. The project plans to provide additional turn lanes and signalize both ramp intersections. The widening project is currently under construction and should be completed before Phase 1 of the development is complete.

As shown on the Summary LOS table on page viii, all signalized intersections within the study area are expected to operate at LOS D or better during both peak hours. Eastbound stop-controlled Lafayette Drive and westbound Cates Creek Parkway are projected to operate at LOS F during both peak hours. Stop-controlled eastbound Waterstone Drive at NC 86 is expected to operate at LOS F during the PM peak hour only.

## Phase 1 (2027) Trip Generation

The Capkov Waterstone development was analyzed in two (2) different build phases. Trip generation for Phase 1 was conducted based on the most appropriate corresponding trip generation codes included in the *ITE Trip Generation Manual, 11<sup>th</sup> Edition* and the suggested method of calculation in the NCDOT's "*Rate vs. Equation*" *Spreadsheet*. Phase 1 proposes to build up to 205 townhomes and 20,000-sf of neighborhood retail space. ITE Land Use Code (LUC) 215 (Single-Family Attached Housing) and LUC 822 (Strip Retail Plaza (<40k)) were used based on the NCDOT guidance. Internal capture was calculated based on the NCHRP 684 method and NCDOT Internal Capture spreadsheet.

As a result, Phase 1 of the Capkov Waterstone development is projected to generate 2,465 daily external site trips, with 145 trips (52 entering, 93 exiting) occurring in the AM peak hour and 233 trips (127 entering, 106 exiting) occurring in the PM peak hour. The external site trips were apportioned

as pass-by and non-pass-by trips based on NCDOT and ITE guidance. The generated site trips were distributed in accordance with the existing turning movement counts and land uses.

## Phase 1 (2027) Conditions

The Phase 1 (2027) conditions account for both the No-Build (2027) traffic and the site traffic generated by Phase 1 of the proposed development.

As shown on the Summary LOS table on page viii, with the addition of site trips, all signalized intersections within the study area are expected to maintain operations at LOS D or better during both peak hours. Stop-controlled eastbound Lafayette Drive and stop-controlled westbound Cates Creek Parkway are expected to continue to operate at LOS F during both peak hours. Stop-controlled eastbound Waterstone Drive is expected to continue to operate at LOS F during only the PM peak hour. Both future access driveways along NC 86 are projected to operate at LOS C during both peak hours.

## No-Build (2033) Conditions

To calculate the No-Build (2033) volumes, an annual growth rate of one percent (1%) was applied to the Existing (2023) volumes to calculate the background growth in the study area in addition to site trips from background developments assumed within the No-Build (2027) scenario. No additional background developments were identified to be included in the No-Build (2033) volume calculations.

One (1) additional background roadway improvement project was identified in the study area that is expected to be constructed before the full build-out of the development is completed. NCDOT STIP No. U-5845 plans to widen Old NC 86 (SR 1009) from I-40 to the Eno River to provide a four-lane cross-section.

As shown on the Summary LOS table on page viii, all signalized intersections within the study area are expected to operate at LOS D or better during both peak hours. Eastbound stop-controlled Lafayette Drive and westbound Cates Creek Parkway are projected to operate at LOS F during both peak hours. Stop-controlled eastbound Waterstone Drive at NC 86 is expected to operate at LOS E during the AM peak hour and LOS F during the PM peak hour.

## Build-out (2033) Trip Generation

Trip generation for the full build-out of the development was conducted based on the most appropriate corresponding trip generation codes included in the *ITE Trip Generation Manual, 11th Edition* and the suggested method of calculation in the NCDOT's "Rate vs. Equation" Spreadsheet. The full build-out of the Capkov Waterstone development proposes to build a maximum of 205 townhomes, 450 apartments, 100,000-sf general office, 100,000-sf medical office, and 40,000-sf neighborhood retail. ITE Land Use Code (LUC) 215 (Single-Family Attached Housing), LUC 220 (Multifamily Housing (Low-Rise)), LUC 710 (General Office), LUC 720 (Medical-Dental Office), and LUC 822 (Strip Retail Plaza (<40K)) were used based on the NCDOT guidance. Internal capture was

calculated based on the NCHRP 684 method and the NCDOT Internal Capture calculation spreadsheet.

As a result, the Waterstone Capkov development is projected to generate 11,187 external daily weekday site trips, with 695 external trips (422 entering, 273 exiting) occurring in the AM peak hour and 1,107 external trips (456 entering, 651 exiting) occurring in the PM peak hour. The external site trips were apportioned as pass-by and non-pass-by trips based on NCDOT and ITE guidance. The generated site trips were distributed in accordance with the existing turning movement counts and land uses.

## Build-out (2033) Conditions

The Build-out (2033) conditions account for both the No-Build (2033) traffic and site traffic generated by the full build-out of the proposed development.

As shown on the Summary LOS table on page viii, with the addition of site trips, the signalized intersection of NC 86 and New Hope Church Road is expected to operate at LOS F during the AM peak hour. All other study area signalized intersections are projected to operate at LOS C or better during both peak hours. Stop-controlled eastbound Lafayette Drive and stop-controlled westbound Cates Creek Parkway are expected to operate at LOS F during both peak hours. Stop-controlled eastbound Waterstone Drive at NC 86 is projected to operate at LOS F during both peak hours. Stop-controlled future Access #1 is projected to operate at LOS E during the AM peak hour and LOS F during the PM peak hour, and stop-controlled Future Access #2 and Future Access #3 are projected to operate at LOS E during the PM peak hour.

## Roadway Improvement Recommendations

### Phase 1 (2027)

As indicated in the traffic capacity analyses, Phase 1 of proposed development is projected to have a minimal impact on the traffic operations at the study area intersections. Therefore, no offsite improvements are recommended with the construction of only Phase 1. The following outlines the recommended lane configurations for each driveway connection that is proposed with Phase 1.

#### NC 86 and Future Access #1

Stop-controlled Future Access #1 is expected to operate at LOS C during the AM and PM peak hours under Phase 1 (2027) conditions. While some turn lanes along NC 86 may not be warranted with only site traffic from Phase 1 in place, this driveway should be designed to account for future phases of development. The following lane configurations are recommended for the driveway connection:

- › Construct Future Access #1 as full movement access with a single ingress lane and two egress lanes with a continuous left-turn lane and exclusive right-turn lane with at least 100 feet and appropriate taper. Provide an internal protected stem (IPS) of 100 feet for Future Access #1.
- › Provide a northbound left-turn lane along NC 86 with at least 100 feet of storage and appropriate taper.

- › Provide a southbound right-turn lane along NC 86 with at least 100 feet of storage and appropriate taper.

#### NC 86 and Future Access #2

Stop-controlled Future Access #2 is expected to operate at LOS C during the AM and PM peak hours under Phase 1 (2027) conditions. While some turn lanes along NC 86 may not be warranted with only site traffic from Phase 1 in place, this driveway should be designed to account for future phases of development. The following lane configurations are recommended for the driveway connection:

- › Construct Future Access #2 as full movement access with a single ingress lane and two egress lanes with a continuous left-turn lane and exclusive right-turn lane with at least 100 feet and appropriate taper. Provide an internal protected stem (IPS) of 100 feet for Future Access #2.
- › Provide a northbound left-turn lane along NC 86 with at least 100 feet of storage and appropriate taper.
- › Provide a southbound right-turn lane along NC 86 with at least 100 feet of storage and appropriate taper.

### **Build-out (2033)**

The full build-out of the development is expected to impact operations within the surrounding roadway network with the additional site traffic. The following offsite roadway improvements are recommended with the full build-out of the development.

#### NC 86 and Waterstone Drive

The existing stop-controlled approach is expected to operate at LOS F during both peak hours under Build-out (2033) conditions. The following improvements should be implemented with the full build-out of the development:

- › Monitor the intersection for signalization, and when warranted and approved install a traffic signal.

#### NC 86 and New Hope Church Road (SR 1723)

The existing signalized intersection is expected to deteriorate to LOS F during the AM peak hour under Build-out (2033) conditions. The following improvements should be implemented with the full build-out of the development.

- › Construct an exclusive southbound right-turn lane along NC 86 with at least 150 feet of storage and appropriate taper.
- › Construct an exclusive westbound left-turn lane along New Hope Church Road with at least 200 feet of storage and appropriate taper.

No additional lane configuration or traffic control improvements are recommended for either Future Access #1 or Future Access #2 along NC 86 with the additional development in place. Operations along Future Access #1 and Future Access #2 are expected to degrade to LOS E or worse during at least one peak hour; however, peak hour signal warrants are not expected to be met for either driveway. Additionally, significant queueing is not expected along either driveway approach. The following is recommended for the proposed driveway connections along Waterstone Drive.

### Waterstone Drive and Future Access #3

Stop-controlled Future Access #3 is expected to operate at LOS C during the AM peak hour and LOS E during the PM peak hour under Build-out (2033) conditions. The Future Access #3 connection is proposed to provide full movement access which would necessitate a new opening in the median along Waterstone Drive. This new median opening should meet the NCDOT's guidelines for median opening spacing and will promote the potential for development on the north side of Waterstone Drive. The following lane configurations are recommended for the driveway connection:

- › Construct Future Access #3 as full movement access with a single ingress lane and two egress lanes with a continuous left-turn lane and exclusive right-turn lane with at least 100 feet and appropriate taper. Provide an internal protected stem (IPS) of 100 feet for Future Access #3.
- › Provide a westbound left-turn lane along Waterstone Drive with at least 100 feet of storage and appropriate taper.
- › Provide an eastbound right-turn lane along Waterstone Drive with at least 100 feet of storage and appropriate taper.

### Waterstone Drive and Future Access #4

Stop-controlled Future Access #4 is expected to operate at LOS B during the AM and PM peak hours under Build-out (2033) conditions. The following lane configurations are recommended for the driveway connection:

- › Construct Future Access #4 as a right-in/right-out only access with a single ingress lane and single egress lane. Provide an internal protected stem (IPS) of 100 feet for Future Access #4.

## **Additional Discussion**

### Old NC 86 (SR 1009) and Cates Creek Parkway/ Lafayette Drive

The stop-controlled approaches along Cates Creek Parkway and Lafayette Drive are projected to operate at LOS F during both peak hours under No-Build (2027) conditions. No improvements are recommended for the intersection for this development since the site is not anticipated to generate vehicular traffic along either stop-controlled approach. This intersection is within the NCDOT STIP No. U-5845 project study area, and the intersection is being studied and improved with that project.

Additional analysis may be needed to assess the timing for improvements recommended within the Build-out (2033) analysis. Improvements may be needed either with the completion of development along NC 86 or not until later portions of development occur along Waterstone Drive. Future phasing studies may be necessary to better define the timing of these improvements.

The summary of LOS results for all scenarios are shown in Table ES-1. The future lane configurations and traffic control at the study area intersections with Phase 1 and the full build-out of the development are shown in Figure ES-1 and Figure ES-2, respectively.

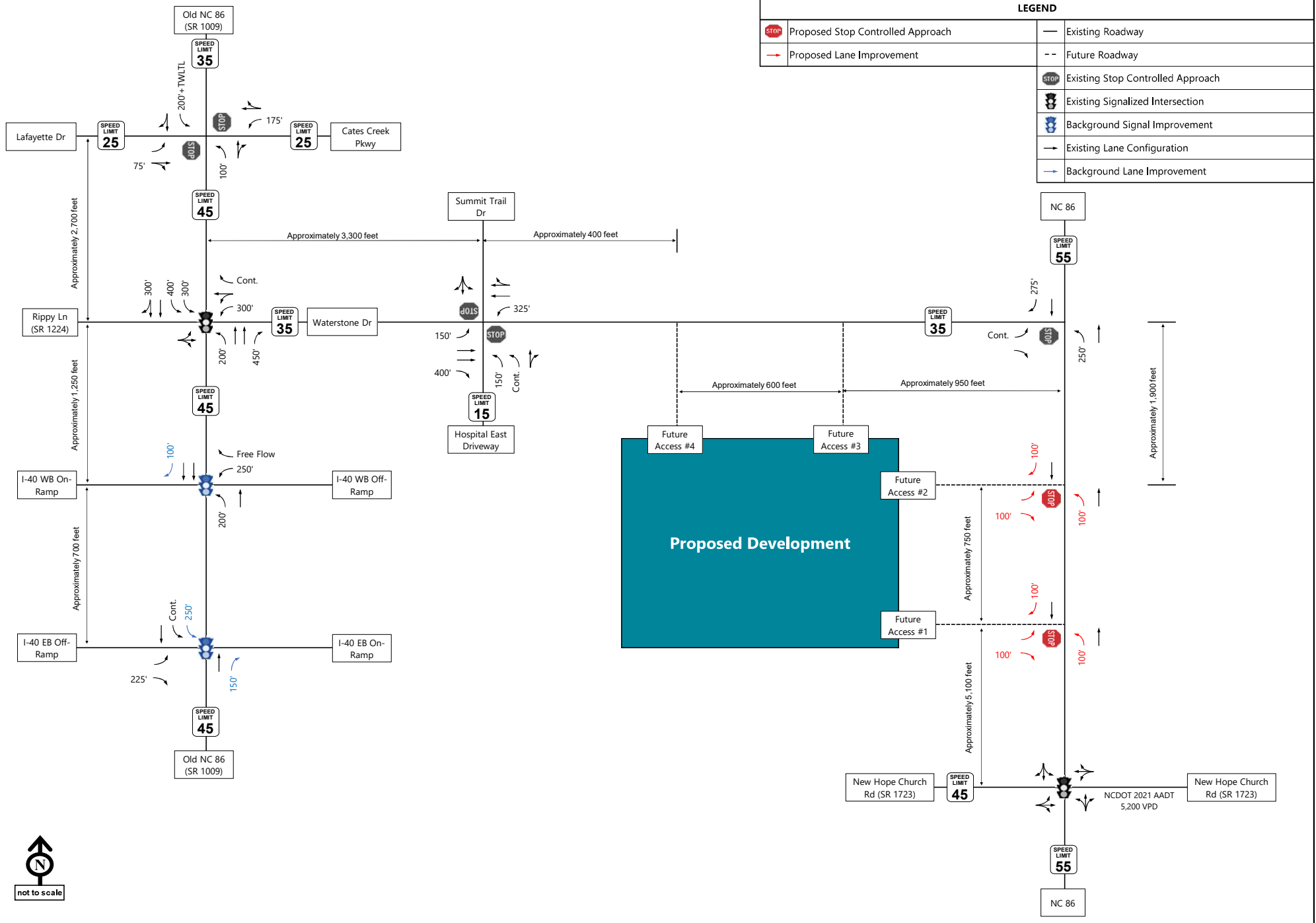
**Table ES-1 Summary Level of Service Table**

Intersection and Approach	Traffic Control	Existing (2023)		No-Build (2027)		Phase 1 (2027)		No-Build (2033)		Build-out (2033)		Build-out (2033) with Improvements	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
<b>Old NC 86 and I-40 EB Ramps</b>	Unsignalized/ Signalized	-	-	<b>C (24.7)</b>	<b>B (19.9)</b>	<b>C (24.7)</b>	<b>B (20.0)</b>	<b>C (20.9)</b>	<b>C (22.5)</b>	<b>C (22.4)</b>	<b>C (23.7)</b>	<b>C (22.4)</b>	<b>C (23.7)</b>
Eastbound		F-129.8	E-38.3	C-33.5	C-32.3	C-33.5	C-32.4	C-34.4	D-36.0	C-31.8	D-38.9	C-31.8	D-38.9
Northbound		---	---	C-26.1	C-20.5	C-26.1	C-20.5	C-22.9	C-22.6	C-24.2	C-23.0	C-24.2	C-23.0
Southbound		---	---	C-21.6	B-16.4	C-21.6	B-16.4	B-18.4	B-18.5	C-20.2	B-19.9	C-20.2	B-19.9
<b>Old NC 86 and I-40 WB Ramps</b>	Unsignalized/ Signalized	-	-	<b>B (11.0)</b>	<b>A (6.8)</b>	<b>B (11.0)</b>	<b>A (6.8)</b>	<b>B (13.0)</b>	<b>B (10.3)</b>	<b>B (12.6)</b>	<b>B (10.5)</b>	<b>B (12.6)</b>	<b>B (10.5)</b>
Westbound		C-18.6	C-20.6	A-5.7	A-0.5	A-5.7	A-0.5	B-17.5	A-3.0	B-12.9	A-3.0	B-12.9	A-3.0
Northbound		---	---	A-9.3	A-6.0	A-9.3	A-5.9	A-9.3	A-9.4	A-9.2	A-9.4	A-9.2	A-9.4
Southbound		---	---	B-14.5	B-10.7	B-14.5	B-10.7	B-14.3	B-14.8	B-14.4	B-14.9	B-14.4	B-14.9
<b>Old NC 86 and Waterstone Drive/ Rippy Lane</b>	Signalized	<b>B (13.8)</b>	<b>B (15.0)</b>	<b>B (14.3)</b>	<b>B (15.8)</b>	<b>B (14.5)</b>	<b>B (15.9)</b>	<b>B (14.8)</b>	<b>B (16.2)</b>	<b>B (15.5)</b>	<b>B (18.3)</b>	<b>B (15.5)</b>	<b>B (18.3)</b>
Eastbound		C-29.5	C-30.0	C-31.5	C-35.0	C-32.0	D-35.5	C-33.5	D-37.0	D-35.5	D-39.5	D-35.5	D-39.5
Westbound		B-19.5	C-21.8	C-21.6	C-24.9	C-21.7	C-24.9	C-22.4	C-25.8	C-23.0	C-27.8	C-23.0	C-27.8
Northbound		B-13.7	B-14.3	B-14.1	B-14.5	B-14.2	B-14.6	B-14.4	B-14.7	B-14.5	B-15.3	B-14.5	B-15.3
Southbound		B-11.5	B-10.6	B-11.7	B-11.0	B-11.8	B-11.2	B-12.0	B-11.3	B-12.8	B-13.0	B-12.8	B-13.0
<b>Old NC 86 and Cates Creek Parkway/ Lafayette Drive</b>	Unsignalized	-	-	-	-	-	-	-	-	-	-	-	-
Eastbound		F-67.0	F-63.6	F-180.6	F-175.3	F-180.7	F-185.3	F-82.6	F-74.9	F-98.5	F-94.6	F-98.5	F-94.6
Westbound		C-20.7	C-20.2	F-144.1	F-79.4	F-149.2	F-82.3	F-67.3	F-55.0	F-78.5	F-68.7	F-78.5	F-68.7
<b>NC 86 and New Hope Church Road</b>	Signalized	<b>C (33.3)</b>	<b>B (15.7)</b>	<b>D (41.2)</b>	<b>B (16.4)</b>	<b>D (47.8)</b>	<b>B (18.7)</b>	<b>D (48.6)</b>	<b>B (17.5)</b>	<b>F (83.1)</b>	<b>D (46.7)</b>	<b>D (50.8)</b>	<b>C (25.0)</b>
Eastbound		D-48.6	B-18.1	E-62.8	B-19.3	E-77.7	C-21.8	E-74.0	C-20.2	F-142.3	F-86.9	F-92.1	D-36.0
Westbound		D-43.4	B-13.7	D-54.5	B-14.3	D-49.2	B-14.7	E-55.3	B-14.4	D-43.9	C-21.9	C-33.2	B-15.8
Northbound		A-8.8	B-15.5	A-9.0	B-16.0	B-11.4	B-17.6	B-11.8	B-17.4	B-14.9	B-16.6	B-17.6	C-22.7
Southbound		C-29.7	B-15.3	D-36.5	B-16.0	D-48.2	B-19.5	D-47.7	B-17.2	F-103.4	E-58.1	D-54.7	C-24.3
<b>NC 86 and Waterstone Drive</b>	Unsignalized	-	-	-	-	-	-	-	-	-	-	<b>C (24.8)</b>	<b>C (20.2)</b>
Eastbound		D-25.9	E-40.7	D-31.3	F-53.1	D-34.5	F-63.5	E-40.4	F-82.3	F-138.1	F-235.8	C-26.8	B-19.2
Northbound		---	---	---	---	---	---	---	---	---	---	C-21.1	B-18.0
Southbound		---	---	---	---	---	---	---	---	---	---	C-27.2	C-24.6
<b>Waterstone Drive and Hospital East Driveway/ Summit Trail Drive</b>	Unsignalized	-	-	-	-	-	-	-	-	-	-	-	-
Northbound		B-11.5	B-10.9	B-11.8	B-11.3	B-11.8	B-11.4	B-11.8	B-10.9	B-12.5	B-13.6	B-12.5	B-13.6
Southbound		B-12.8	B-12.9	B-13.4	B-13.4	B-13.7	B-13.7	B-13.4	B-12.9	C-18.1	C-20.9	C-18.1	C-20.9
<b>NC 86 and Future Access #1</b>	Unsignalized	-	-	-	-	-	-	-	-	-	-	-	-
Eastbound		---	---	---	---	C-20.9	C-18.2	---	---	E-37.8	F-86.4	E-40.9	F-86.4
<b>NC 86 and Future Access #2</b>	Unsignalized	-	-	-	-	-	-	-	-	-	-	-	-
Eastbound		---	---	---	---	C-18.5	C-15.7	---	---	D-29.3	E-38.0	D-31.1	E-38.0
<b>Waterstone Drive and Future Access #3</b>	Unsignalized	-	-	-	-	-	-	-	-	-	-	-	-
Northbound		---	---	---	---	---	---	---	---	C-20.2	E-45.8	C-21.7	E-45.8
<b>Waterstone Drive and Future Access #4</b>	Unsignalized	-	-	-	-	-	-	-	-	-	-	-	-
Northbound		---	---	---	---	---	---	---	---	B-10.0	B-10.2	B-10.2	B-10.2

X (XX.X) = Overall intersection LOS (average delay), X-XX = Approach LOS and average delay

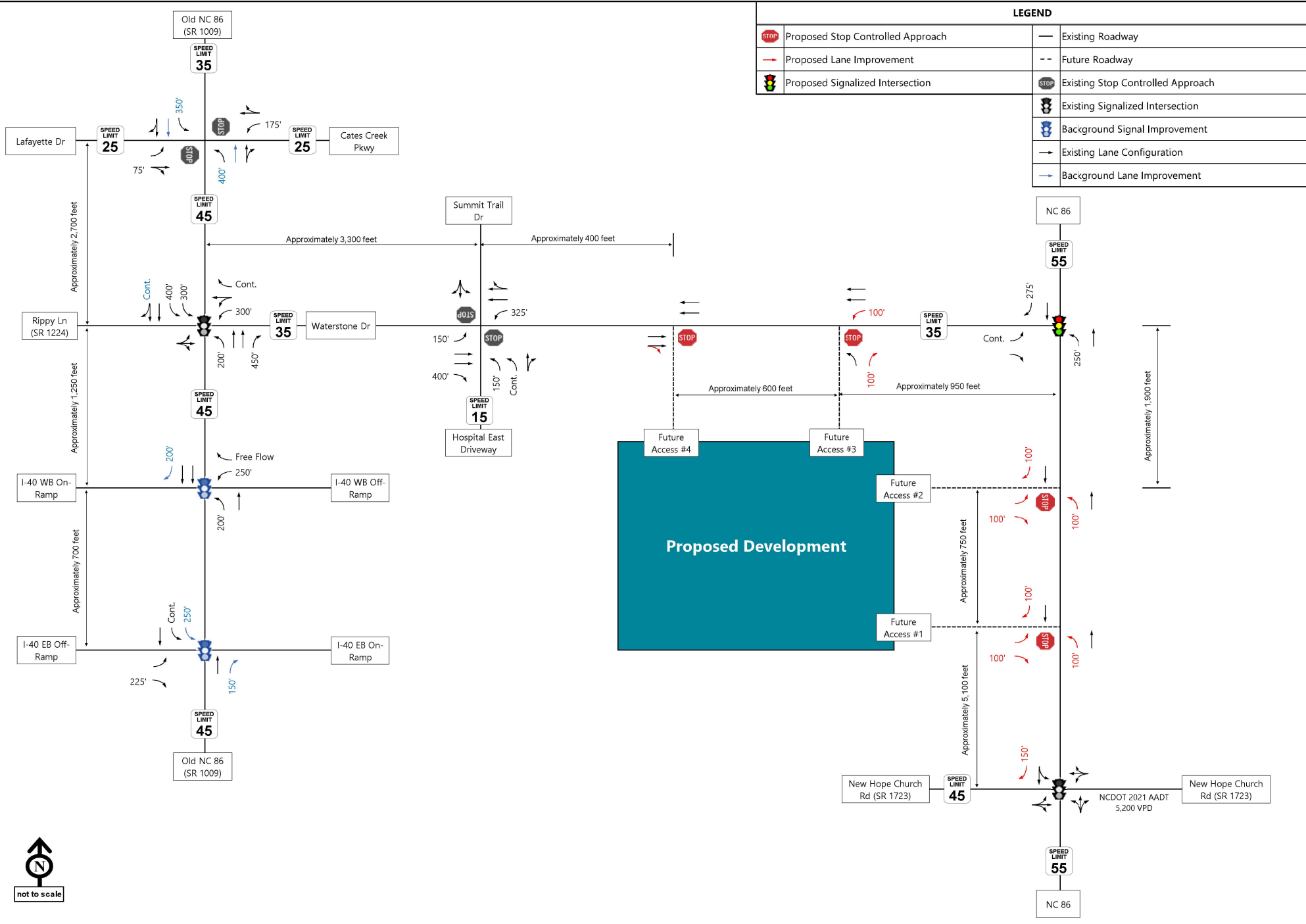


LEGEND			
	Proposed Stop Controlled Approach		Existing Roadway
	Proposed Lane Improvement		Future Roadway
	Existing Stop Controlled Approach		Existing Signalized Intersection
	Background Signal Improvement		Existing Lane Configuration
	Background Lane Improvement		



**Figure ES-1**  
**Phase 1 (2027) Lane Configurations and Traffic Control**

**Capkov Waterstone TIA**  
**Hillsborough, NC**



**LEGEND**

	Proposed Stop Controlled Approach		Existing Roadway
	Proposed Lane Improvement		Future Roadway
	Proposed Signalized Intersection		Existing Stop Controlled Approach
			Existing Signalized Intersection
	Background Signal Improvement		Existing Lane Configuration
	Background Lane Improvement		



**Figure ES-2**  
**Build-out (2033) Lane Configurations and Traffic Control**

**Capkov Waterstone TIA**  
**Hillsborough, NC**



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. R. "JOEY" HOPKINS  
SECRETARY

December 7, 2023

**ORANGE COUNTY**

Nathaniel Rhomberg, PE  
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Raleigh, NC 27606

Subject: Proposed Capkov Waterstone Mixed Use Development  
Located on NC 86 and Waterstone Drive (Municipal)  
**Review of Transportation Impact Analysis (TIA)**

Dear Mr. Rhomberg,

NCDOT staff has performed a review of the TIA and preliminary concept site plan enclosed therein. Based on the submitted information and upon conferring with Town staff, we offer the following comments.

**General:**

The proposed development is located on the southwest corner of the intersection of NC 86 and Waterstone Drive. The development is planned to be developed in two phases with phase one completed in 2027 and full buildout by 2033. Phase one consists of 205 townhomes and 20,000 SF of retail. Phase one is expected to generate approximately 2600 unadjusted daily trips. Phase two will add 20,000 SF of retail, 450 apartments, 100,000 SF of general office and 100,000 SF of medical office. Upon full buildout, the site is expected to generate approximately 12,000 unadjusted daily trips. Proposed development access consists of the following:

- Future Access #1, full movement access on NC 86, approximately 2,650 feet south of Waterstone Drive to be construction during Phase 1.
- Future Access #2, full movement access on NC 86, approximately 1,900 feet south of Waterstone Drive to be constructed during Phase 1.

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*Customer Service:* 1-877-368-4968

*Location:*  
115 EAST CRESCENT SQUARE DRIVE  
GRAHAM, NC 27253

*Website:* [www.ncdot.gov](http://www.ncdot.gov)

- Future Access #3, full movement access on Waterstone Drive, approximately 950 feet west of NC 86 to be constructed after Phase 1.
- Future Access #4, right-in/right-out access on Waterstone Drive, approximately 1,550 feet west of NC 86 to be constructed after Phase 1.

### **Findings and Recommendations and Analysis Updates:**

We concur with the findings and recommendations contained in the TIA. However, due to the extended buildout period of the proposed development, updates to the TIA prior to proceeding with Phase 2 will be required in order to ensure an accurate assessment of future conditions.

### **Required Improvements:**

As a condition of the pending NCDOT driveway permit, the following are the improvements that the applicant is required to construct to mitigate the anticipated site traffic impacts and to ensure acceptable operation at the various study intersections.

#### **Phase 1 :**

##### **NC 86 and Future Access #1:**

- Construct Future Access #1 as a stop controlled, full movement access with a single ingress lane and two egress lanes with a continuous left-turn lane and exclusive right-turn lane with at least 100 feet of storage and appropriate transitions.
- Provide an internal protected stem (IPS) of 100 feet for Future Access #1.
- Provide a northbound left-turn lane along NC 86 with at least 100 feet of storage and appropriate transitions.
- Provide a southbound right-turn lane along NC 86 with at least 100 feet of storage and appropriate transitions.

##### **NC 86 and Future Access #2:**

- Construct Future Access #2 as a stop controlled, full movement access with a single ingress lane and two egress lanes with a continuous left-turn lane and exclusive right-turn lane with at least 100 feet and appropriate transition.
- Provide an internal protected stem (IPS) of 100 feet for Future Access #2.
- Provide a northbound left-turn lane along NC 86 with at least 100 feet of storage and appropriate transition.
- Provide a southbound right-turn lane along NC 86 with at least 100 feet of storage and appropriate transition.

## **Phase 2:**

### **NC 86 and Waterstone Drive:**

- Monitor the intersection for signalization, and when warranted and approved install a traffic signal.

### **NC 86 and New Hope Church Road:**

- Construct an exclusive southbound right-turn lane along NC 86 with at least 150 feet of storage and appropriate transition.
- Construct an exclusive westbound left-turn lane along New Hope Church Road with at least 200 feet of storage and appropriate transition.
- Modify traffic signal to accommodate revised intersection geometry.

### **Waterstone Drive and Future Access #3:**

- Construct Future Access #3 as stop controlled, full movement access with a single ingress lane and two egress lanes with a continuous left-turn lane and exclusive right-turn lane with at least 100 feet and appropriate transitions.
- Provide an internal protected stem (IPS) of 100 feet for Future Access #3.
- Provide a westbound left-turn lane along Waterstone Drive with at least 100 feet of storage and appropriate transitions.
- Provide an eastbound right-turn lane along Waterstone Drive with at least 100 feet of storage and appropriate transitions.

Since Waterstone Drive is a municipal street, this access is subject to approval by the Town of Hillsborough.

### **Waterstone Drive and Future Access #4:**

- Construct Future Access #4 as a right-in/right-out only access with a single ingress lane and single egress lane.
- Provide an internal protected stem (IPS) of 100 feet for Future Access #4.

Since Waterstone Drive is a municipal street, this access is subject to approval by the Town of Hillsborough.

## **Multi-modal and Streetscape Enhancements:**

Any locally stipulated multi-modal enhancements including but not limited to sidewalk, bike lanes, bus pull offs, lighting, landscaping etc. on State maintained routes are subject to NCDOT requirements and approval through the encroachment process.

**Cross-Access Connectivity:**

Provision of cross access with the adjacent properties is encouraged to accommodate internal connectivity and improve distribution of existing and future traffic volumes on the adjacent public road network.

**General Requirements:**

It is necessary to obtain an NCDOT driveway permit and/or encroachment agreement(s) prior to performing work on the NCDOT right of way. As a condition of the agreement, the permittee shall be responsible for design and construction of the above stipulated improvements in accordance with NCDOT requirements. An approved permit will be issued upon receipt of applicable approved roadway and signal construction plans, and any necessary performance and indemnity bonds.

The applicant shall dedicate any additional right of way necessary to accommodate the required road improvements or future improvements as stipulated.

The applicant shall verify that the proposed street and driveway connections provide for adequate vertical and horizontal sight distances in accordance with NCDOT requirements.

Intersection radii and geometry shall be designed to accommodate turning movements of the largest anticipated vehicle.

All pavement markings shall be long life thermoplastic. Pavement markers shall be installed if they previously existed on the roadway.

The permittee shall be responsible for the installation and relocation of any additional highway signs that may be necessary due to these improvements and shall comply with the requirements of the MUTCD.

Feel free to contact me if you have any questions.

Sincerely,

DocuSigned by:  
*C. N Edwards Jr., PE*  
C60BB6060F8A458...

C. N. Edwards Jr., PE  
District Engineer

Cc: D.M. McPherson, Division Traffic Engineer  
Town of Hillsborough