STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. R. "JOEY" HOPKINS
SECRETARY

April 30, 2024

Melissa Helbert-Pogoloff, P.E. – Kimley-Horn and Associates, Inc.
Prepared for:
Cox Universal Group
Johnson City, TN

SUBJECT: ****FINAL DECISION** *Clayton Road Multifamily-*** SR 3501 (Clayton Rd) Multifamily Residential development TIA and Site Plan review located in Arden, Buncombe County Division 13.

The District Office has performed a TIA and Site Plan review of the subject residential development located on SR 3501 Clayton Rd across from Roberts Lake Circle in Arden, Buncombe County. The project consists of 114 Dwelling Units and will be generating an approximate total of 498 unadjusted daily trips.

The District Office has determined the following listed improvement(s) (please see attached document) are required to be done in accordance with the *Policy on Street and Driveway Access to North Carolina Highways*. All improvements and documentation shall be shown on the plans and provided as part of the package submitted to the NCDOT District Office for review and approval of a Driveway Access Permit. The development is also subject to the approval of the local municipal authority (Buncombe County Planning & Zoning).

All work is to be designed in strict compliance with the North Carolina Department of Transportation Standards and Specifications. At your convenience, please submit for a driveway access permit in accordance and provide all necessary documentation. Feel free to give us a call at the District Office (828) 250-3200 if you would like to discuss further.

Sincerely,

DocuSigned by:
6D92D71E27C94A3...
Christopher D. Medlin, P.E.
District Engineer

CDM/nkd
Attachments

NC DEPARTMENT OF TRANSPORTATION
DIVISION 13 DISTRICT II OFFICE
ASHEVILLE, NC 28802

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11 OLD CHARLOTTE HWY.
ASHEVILLE, NC 28803

Website: www.ncdot.gov

Clayton Road Multifamily TIA

SC-2024-040 **Buncombe County**

The Department of Transportation (NCDOT) has completed a review of the subject site. The comments and recommendations contained in this review are based on data for background conditions presented in the sealed Traffic Impact Analysis (TIA) and are subject to a driveway access permit approval from the local District Engineer's Office and appropriate local authorities (Buncombe County Planning & Zoning).

Key Dates	
Initially Received by CMS	4/02/2024
Date of Latest Information Received by CMS	4/02/2024
Date of Preliminary Review Accepting TIA for Review	4/26/2024
Sealed TIA Prepared by Kimley-Horn	4/02/2024
Site Plan Prepared by Seamon Whiteside	3/06/2024

Proposed Development

According to the TIA, the proposed Clayton Road Multifamily development is to be located to the east of SR 3501 (Clayton Rd) across from Roberts Lake Circle in Arden, Buncombe County. The TIA states the development is to be constructed by 2025 and is to consist of the following:

Land Use	Land Use Code	Size
Multifamily Housing (Mid-Rise)	221	114 DU

Trip Generation - Unadjusted Volumes During a Typical Weekday Based on appropriate methodology outlined in the *ITE Trip Generation Manual, 11th Ed.*			
	IN	OUT	TOTAL
AM Peak Hour	9	30	39
PM Peak Hour	27	18	45
Daily Trips			498

Requested Access Points		
Driveway	Public Roadway	Access Type
Site Access	East side of SR 3502 (Clayton Rd) across from Roberts Lake Circle	All-Movement

Study Area

Study Area and Proposed Site Location - ↑ N

Photo Credit: Google Maps

FBRMPO Comprehensive Transportation Plan	
Route	Facility Vision
NC 191 (Brevard Rd)	Boulevard – Needs Improvement
NC 146 (Long Shoals Rd)	Boulevard – Needs Improvement
SR 3501 (Clayton Rd)	Minor Thoroughfare – Needs Improvement

TIA Comments

The following items vary from our recommended practices (cumulative of all TIA submittals):

- The EB approach for the intersection of Roberts Lake Road and Site Access is incorrectly represented in the TIA (figures and Synchro models). It should be a single lane approach with no right turn storage.
- The network was broken into two segments in synchro. For a more accurate representation in SimTraffic, the network should be modeled as one continuous entity.
- Internal Protected Stem lengths for each proposed driveway should be provided in the TIA in conformance with requirements in the Driveway Manual.

General Reference

For reference to various documents applicable to this review please reference the following links: https://connect.ncdot.gov/resources/safety/Pages/Congestion-Management.aspx and https://connect.ncdot.gov/resources/safety/Teppl/Pages/Teppl-Topic.aspx?Topic_List=C37.

It should be noted that poor LOS and excessive queuing may persist throughout network after recommended developer and outside mitigation.

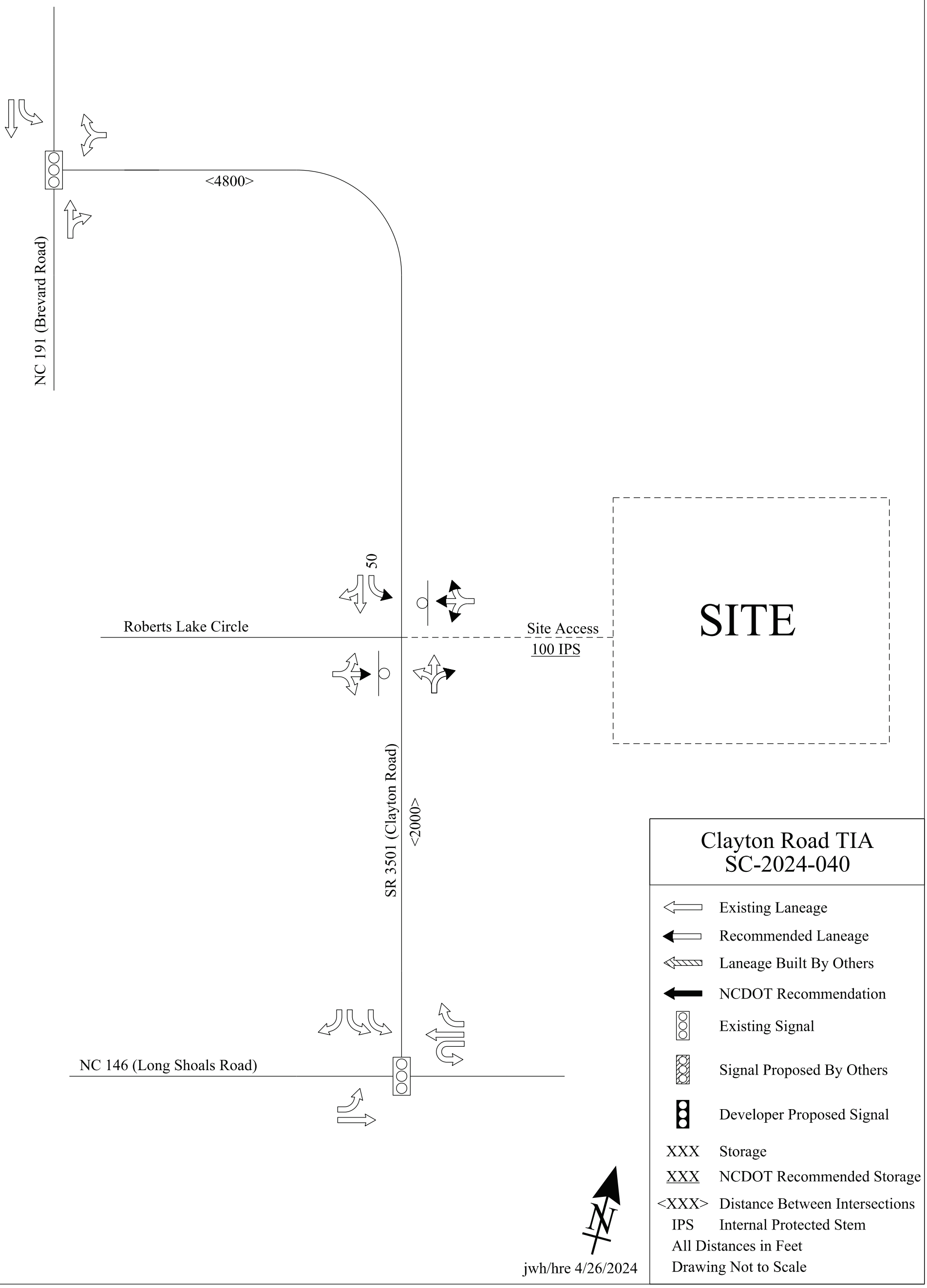
Analysis of all lanes with finite storage should include an appropriate default taper of 100 feet or more in the analysis. Our storage distances in our reports are minimums that do not include deceleration or taper distances.

Any signing and pavement marking revisions/modifications or improvements necessitated by the development should be the responsibility of the developer unless otherwise noted.

Recommendations

Refer to attached diagram(s). Based upon opening year 2025.

□


NC 191 (Brevard Road)
<4800>
50
Roberts Lake Circle
Site Access
100 IPS
SITE
SR 3501 (Clayton Road)
<2000>
NC 146 (Long Shoals Road)
N
Clayton Road TIA
SC-2024-040
Existing Laneage
Recommended Laneage
Laneage Built By Others
NCDOT Recommendation
Existing Signal
Signal Proposed By Others
Developer Proposed Signal
XXX Storage
XXX NCDOT Recommended Storage
<XXX> Distance Between Intersections
IPS Internal Protected Stem
All Distances in Feet
Drawing Not to Scale
jwh/hre 4/26/2024

Traffic Impact Analysis

Clayton Road Multifamily

Buncombe County, NC

Prepared for:

Cox Universal Group

Kimley»Horn

Traffic Impact Analysis for

Clayton Road Multifamily

Buncombe County, North Carolina

Prepared for:

Cox Universal Group
Johnson City, TN

Prepared by:

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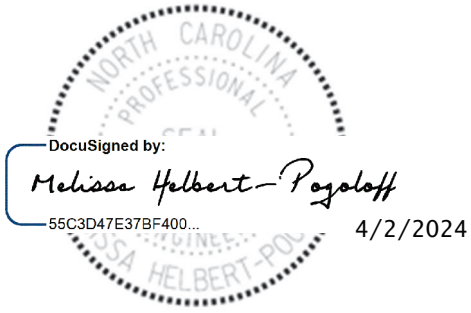


April 2024

016670000

Executive Summary

Kimley-Horn and Associates, Inc. has performed a Traffic Impact Analysis for the proposed Clayton Road Multifamily project, which is to be located off Clayton Road in Buncombe County, NC. The property is currently mostly vacant with homes that will be removed as part of this project. As currently envisioned will consist of 114 mid-rise multifamily units. The site is proposed to be accessed via one access on Clayton Road (opposite Roberts Lake Circle). Build-out of the development is anticipated by 2025.

This report presents trip generation, distribution, traffic analyses, and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development. The traffic conditions studied include the existing (2024) traffic condition and the projected (2025) background, build-out (2025) traffic conditions. The weekday AM and PM peak hours were studied.

Trip Generation

Site trips were generated using rates and equations from the *Trip Generation* (Institute of Transportation Engineers, Eleventh Edition, 2021). Trip generation is shown in Table ES-1. As shown in Table ES-1, the site is projected to generate approximately 498 net new daily trips, 39 net new AM peak hour trips, and 45 net new PM peak hour trips.

Table ES-1
Phase 1 ITE Traffic Generation (Vehicles)

Land Use Code	Land Use	Intensity		Daily	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
221	Multifamily Housing (Mid-Rise)	114	du	498	39	9	30	45	27	18
Total Net New External Trips				498	39	9	30	45	27	18

Capacity Analysis

Capacity analyses were performed using Synchro Version 11 software. Table ES-2 summarizes the operation of the study intersections for the AM and PM peak hour traffic conditions.

Table ES-1 - Level of Service Summary													
Intersection and Approach/Movement	**Traffic Control**	**Existing (2024) Traffic**		**Existing (2024) Traffic Modified Assumptions**		**Background (2025) Traffic**		**Background (2025) Traffic Modified Assumptions**		**Build-out (2025) Traffic**		**Build-out (2025) Traffic Modified Assumptions**	
		AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
NC 191 at Clayton Road	**Signalized**	**D (40.6)**	**F (80.9)**	**B (17.5)**	**C (27.3)**	**D (42.2)**	**F (85.6)**	**B (18.1)**	**C (29.4)**	**D (42.5)**	**F (86.4)**	**B (18.1)**	**C (30.4)**
Westbound		E (56.1)	F (107.4)	B (14.1)	C (24.4)	E (59.0)	F (116.8)	B (14.4)	C (26.7)	E (59.7)	F (118.2)	B (14.4)	C (28.6)
Northbound		D (47.1)	F (88.8)	C (27.8)	D (37.5)	D (48.6)	F (92.3)	C (28.4)	D (40.1)	D (48.8)	F (92.3)	C (28.4)	D (40.1)
Southbound		C (29.5)	E (56.4)	B (11.4)	B (18.9)	C (30.5)	E (59.4)	B (12.0)	C (20.3)	C (30.7)	E (60.7)	B (12.0)	C (21.7)
Clayton Road at Roberts Lake Cir/Site Driveway	**Unsignalized**	**- (-)**	**- (-)**	**N/A**		**- (-)**	**- (-)**	**N/A**		**- (-)**	**- (-)**	**N/A**	
Eastbound		B (11.6)	B (11.8)			B (11.7)	B (11.9)			B (12.3)	B (13.3)		
Westbound		N/A				N/A				C (19.4)	D (27.3)		
Northbound Left		A (8.1)	A (8.3)			A (8.1)	A (8.3)			A (8.1)	A (8.3)		
Southbound Left		N/A				N/A				A (8.0)	A (8.5)		
NC 146 at Clayton Road	**Signalized**	**B (18.0)**	**B (15.6)**	**N/A**		**B (18.3)**	**B (15.8)**	**N/A**		**B (19.4)**	**B (16.9)**	**N/A**	
Eastbound		B (19.6)	B (17.5)			C (20.0)	B (17.6)			B (19.4)	B (17.4)		
Westbound		B (14.0)	B (12.0)			B (14.2)	B (12.1)			B (16.1)	B (13.7)		
Northbound		C (24.3)	C (20.8)			C (24.7)	C (21.1)			C (26.1)	C (22.4)		

Proposed Improvements

The following roadway improvements are proposed to be performed in conjunction with the proposed development:

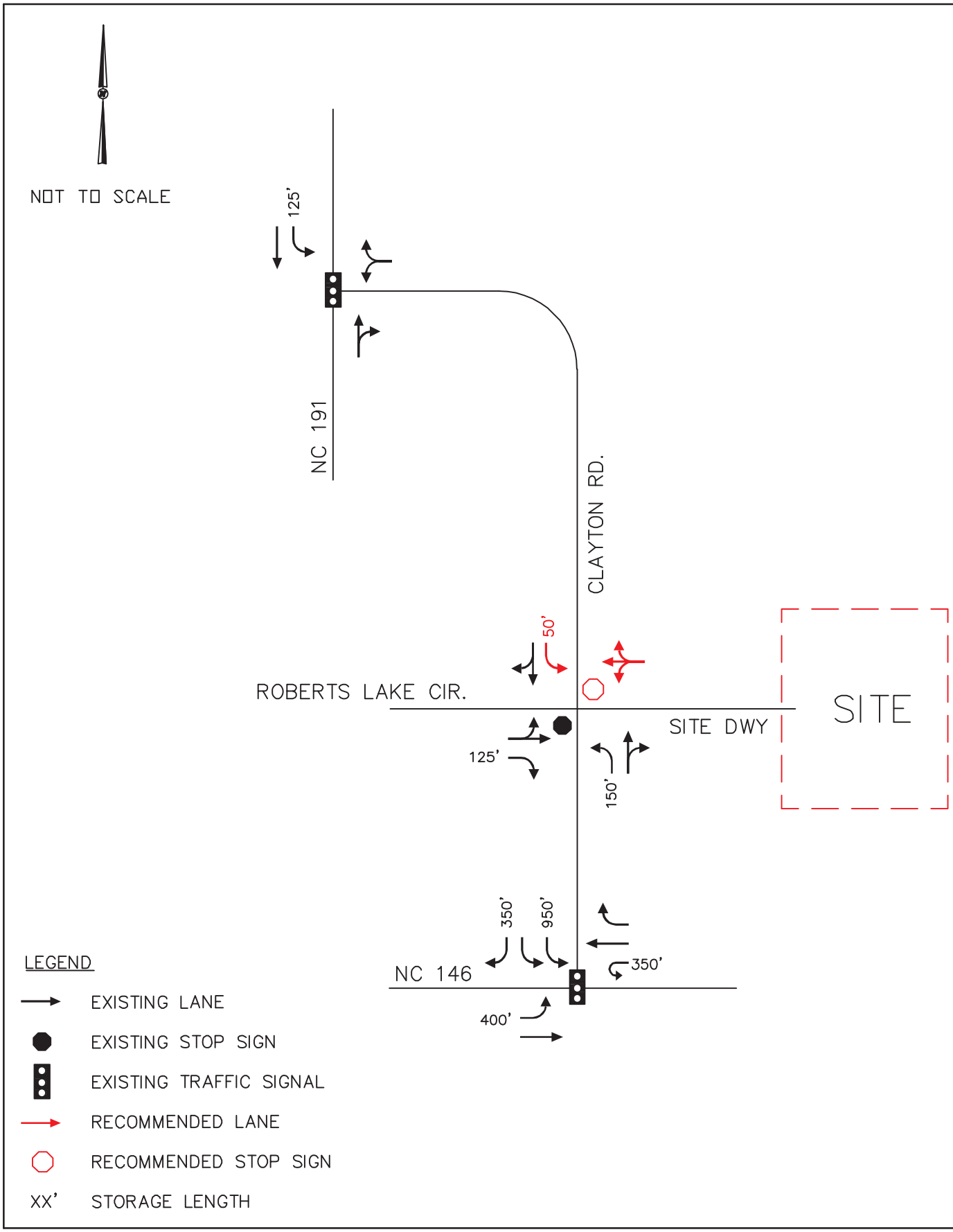
Clayton Road at Roberts Lake Circle/Site Driveway

- Construct the eastern leg with stop control and one ingress lane and one egress lane
- Stripe a southbound left-turn lane with 50 feet of storage within the existing available hatched pavement

Conclusions

With the recommended improvements in place, all of the study intersections are expected to operate acceptably in the build-out improved traffic conditions, with the exception of the NC 191 at Clayton Road intersection if no right-turn on red is used and if no permitted/protected phasing is used.

The recommended roadway laneage is shown on **Figure ES-1**.



Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	RECOMMENDED ROADWAY LANEAGE	FIGURE ES-1

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1.0 Introduction

Kimley-Horn and Associates, Inc. has performed a Traffic Impact Analysis for the proposed Clayton Road Multifamily project, which is to be located off Clayton Road in Buncombe County, NC. The property is currently mostly vacant with homes that will be removed as part of this project. As currently envisioned will consist of 114 mid-rise multifamily units. The site is proposed to be accessed via one access on Clayton Road (opposite Roberts Lake Circle). Build-out of the development is anticipated by 2025.

This report presents trip generation, distribution, traffic analyses, and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development. The traffic conditions studied include the existing (2024) traffic condition and the projected (2025) background, build-out (2025) traffic conditions. The weekday AM and PM peak hours were studied.

North Carolina Department of Transportation (NCDOT) and Buncombe County staff provided background data and were consulted regarding the elements to be covered in this analysis. The scoping checklist is included in **Appendix A** of this report.

2.0 Inventory

2.1 Study Area

The study area for this development includes the following intersections:

- NC 191 at Clayton Road
- Clayton Road at Clayton Road/Site Driveway
- NC 146 at Clayton Road

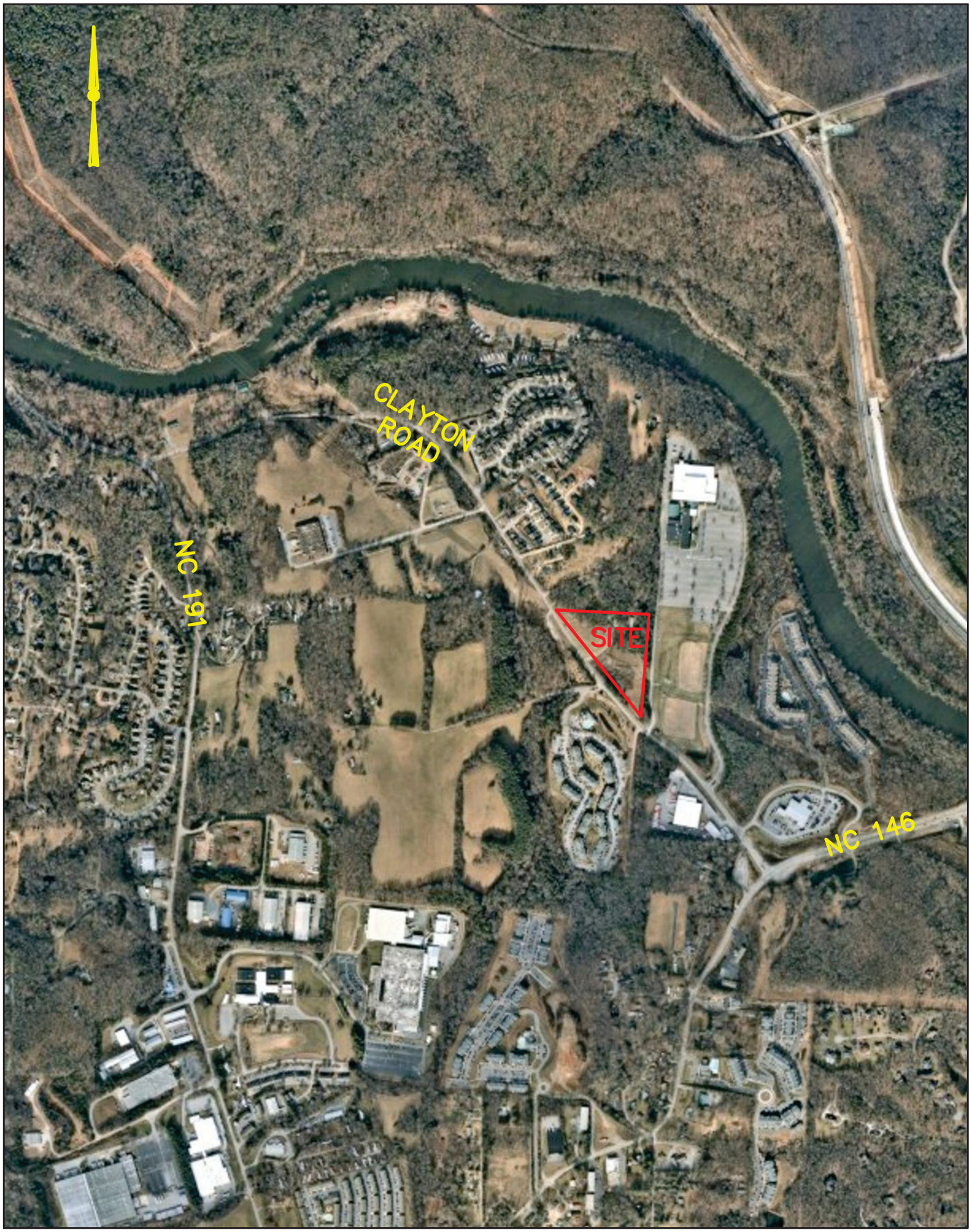
Figure 2.1 shows the site location. The conceptual site plan is shown on **Figure 2.2**.

2.2 Existing Conditions

The proposed Clayton Road Multifamily project is located off Clayton Road in Buncombe County, NC. Roadways in the study area include NC 191, NC 146, and Clayton Road. Table 2.0 below summarizes the characteristics for the study area roadways. The existing roadway laneage is shown in **Figure 2.3**.

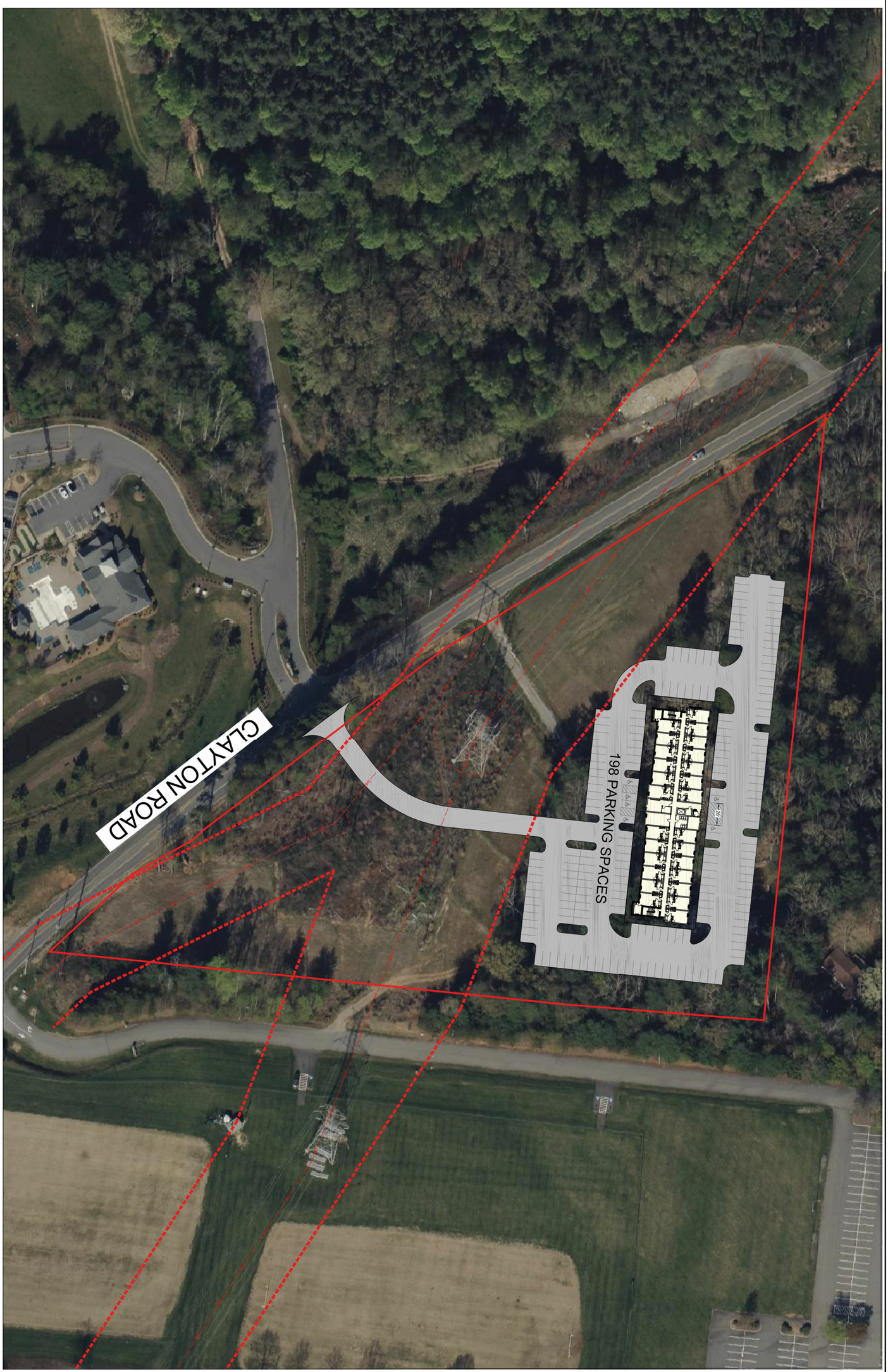
Table 2.0
Study Area Road Characteristics

Roadway	Cross-Section	Functional Classification	Speed Limit (MPH)	NCDOT AADT (Year)
NC 146	varies	Minor Arterial	35	24,500 (2022)
NC 191	2-lane Undivided	Minor Arterial	45	16,500 (2022)
Clayton Road	2-lane Undivided	Local	45	8,800 (2022)



Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	SITE LOCATION	FIGURE 2.1

\\kimley-horn.com\CL_GRE\GRE_TPTO\016670000_Clayton Road TIA\T5 - Report-Submittals\Figures\Clayton Road Multifamily.dwg



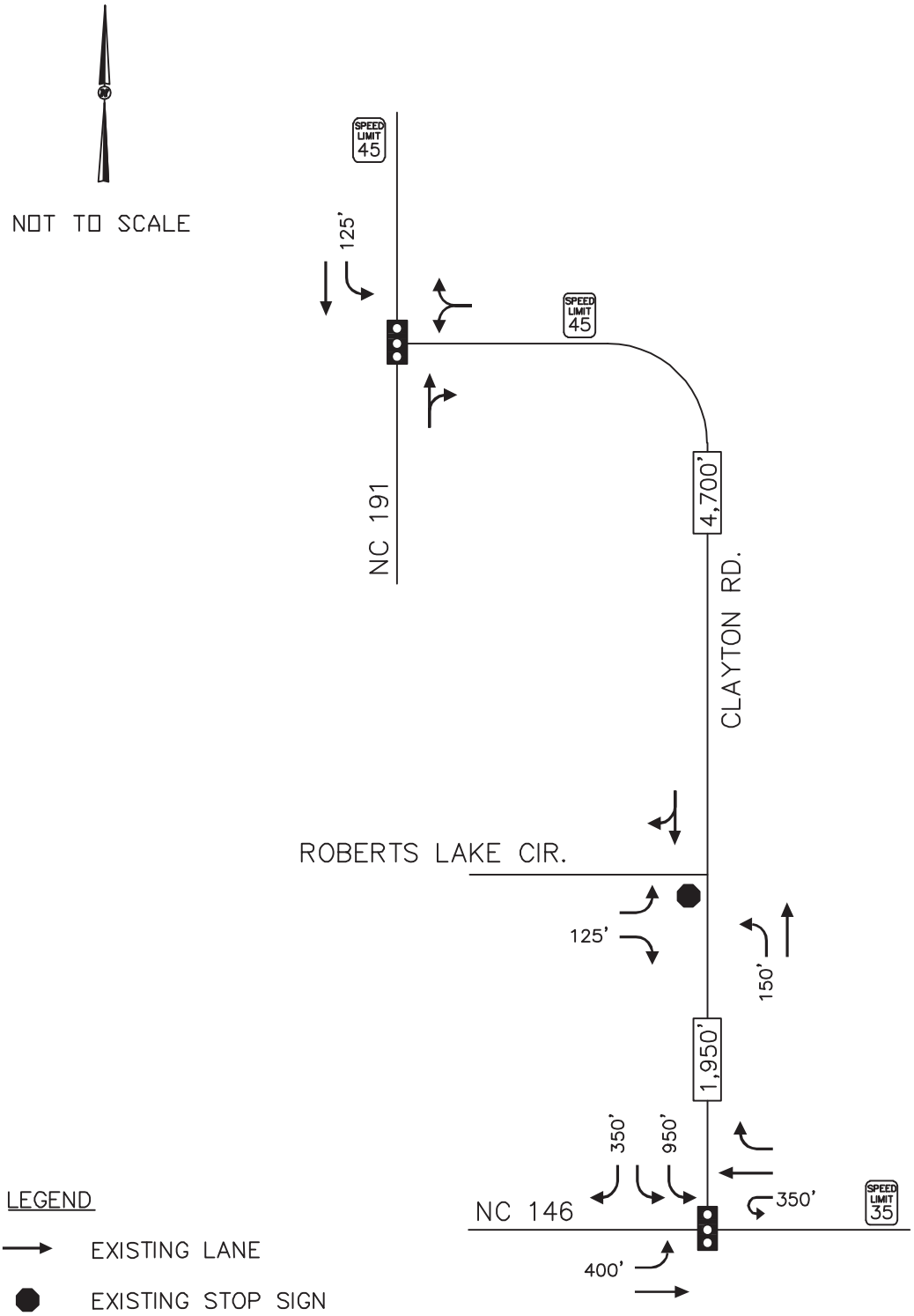
NOTE: THIS PLAN IS CONCEPTUAL IN NATURE AND SUBJECT TO CHANGE

SCALE 1" = 40'
0
20
40
80

SEAMONWHITESIDE

CONCEPTUAL SITE PLAN
ALTITUDE ASHEVILLE
BUNCOMBE COUNTY, NC
03/06/2024

Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	CONCEPTUAL SITE PLAN	FIGURE 2.2



Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	EXISTING ROADWAY LANEAGE	FIGURE 2.3

3.0 Traffic Generation

Site trips were generated using rates and equations from the *Trip Generation* (Institute of Transportation Engineers, Eleventh Edition, 2021). As currently envisioned will consist of 114 mid-rise multifamily units. Table 3.0 summarizes the estimated traffic generation for the proposed development.

Table 3.0
ITE Traffic Generation (Vehicles)

Land Use Code	Land Use	Intensity		Daily	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
221	Multifamily Housing (Mid-Rise)	114	du	498	39	9	30	45	27	18
Total Net New External Trips				498	39	9	30	45	27	18

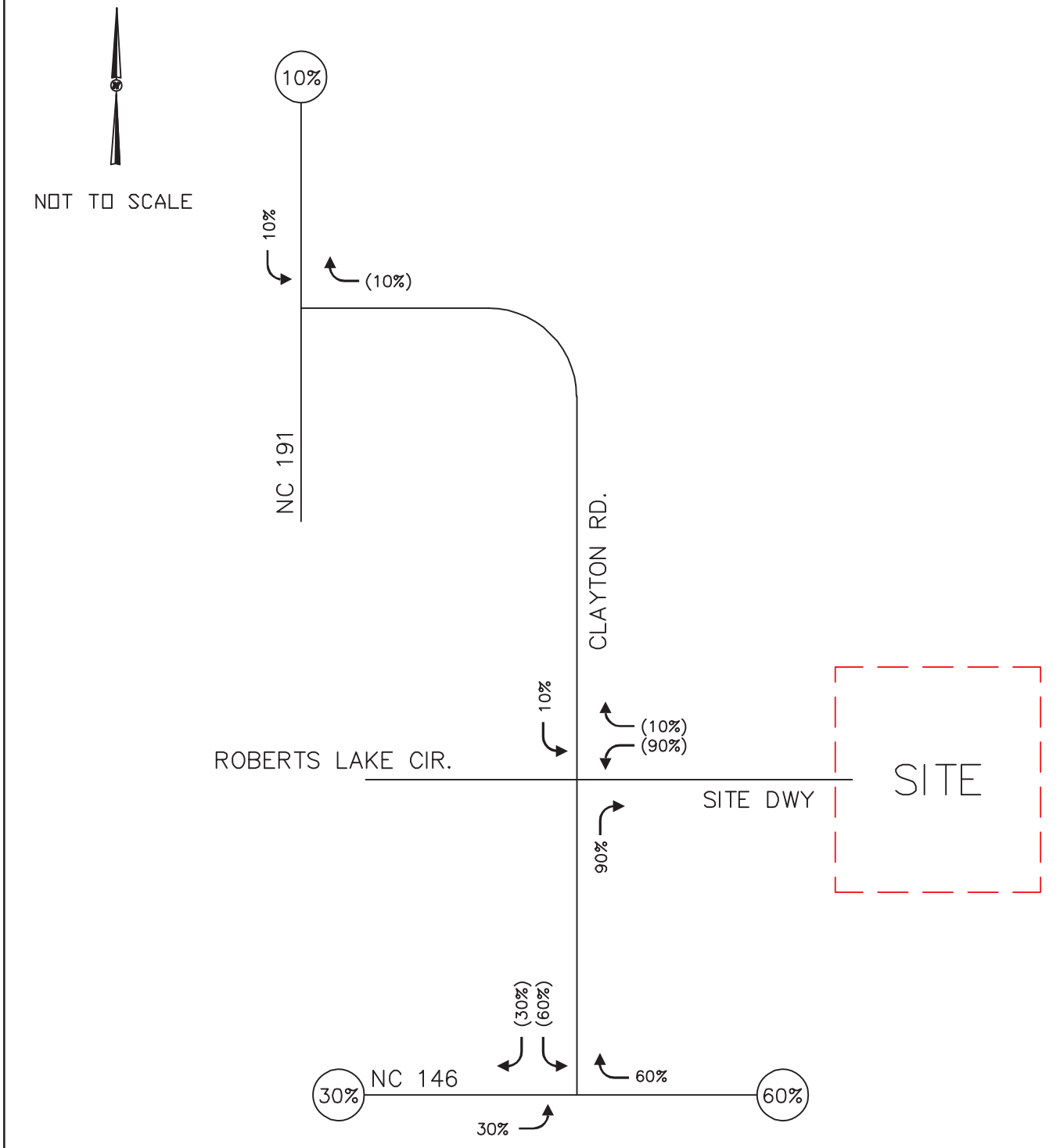
As shown in Table 3.0, the site is projected to generate approximately 498 net new daily trips, 39 net new AM peak hour trips, and 45 net new PM peak hour trips. The trip generation is included in **Appendix B**.

4.0 Site Traffic Distribution

The proposed site generated net new trips were assigned to the surrounding roadway network. The directional distribution and assignment are based on existing travel patterns and expected travel patterns to these uses.

- 60% to/from the east on NC 146
- 30% to/from the west on NC 146
- 10% to/from the north on NC 191

The site traffic distribution and assignment are shown in **Figure 4.1**.



LEGEND

(XX%) OVERALL DISTRIBUTION

XX% INBOUND PERCENT ASSIGNMENT

(XX%) OUTBOUND PERCENT ASSIGNMENT

Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	SITE TRAFFIC DISTRIBUTION AND PERCENT ASSIGNMENT	FIGURE 4.1

5.0 Projected Traffic Volumes

5.1 Existing Traffic

AM peak hour (7:00 to 9:00 AM) and PM peak hour (4:00 to 6:00 PM) turning movement counts were performed at the following existing intersections while area schools were in session:

- NC 191 at Clayton Road March 12, 2024
- Clayton Road at Clayton Road March 12, 2024
- NC 146 at Clayton Road March 12, 2024

The existing AM and PM peak hour traffic volumes are shown on **Figure 5.1** and **Figure 5.2**, respectively, and the traffic count data is included in **Appendix C**.

5.2 Historic Growth Traffic

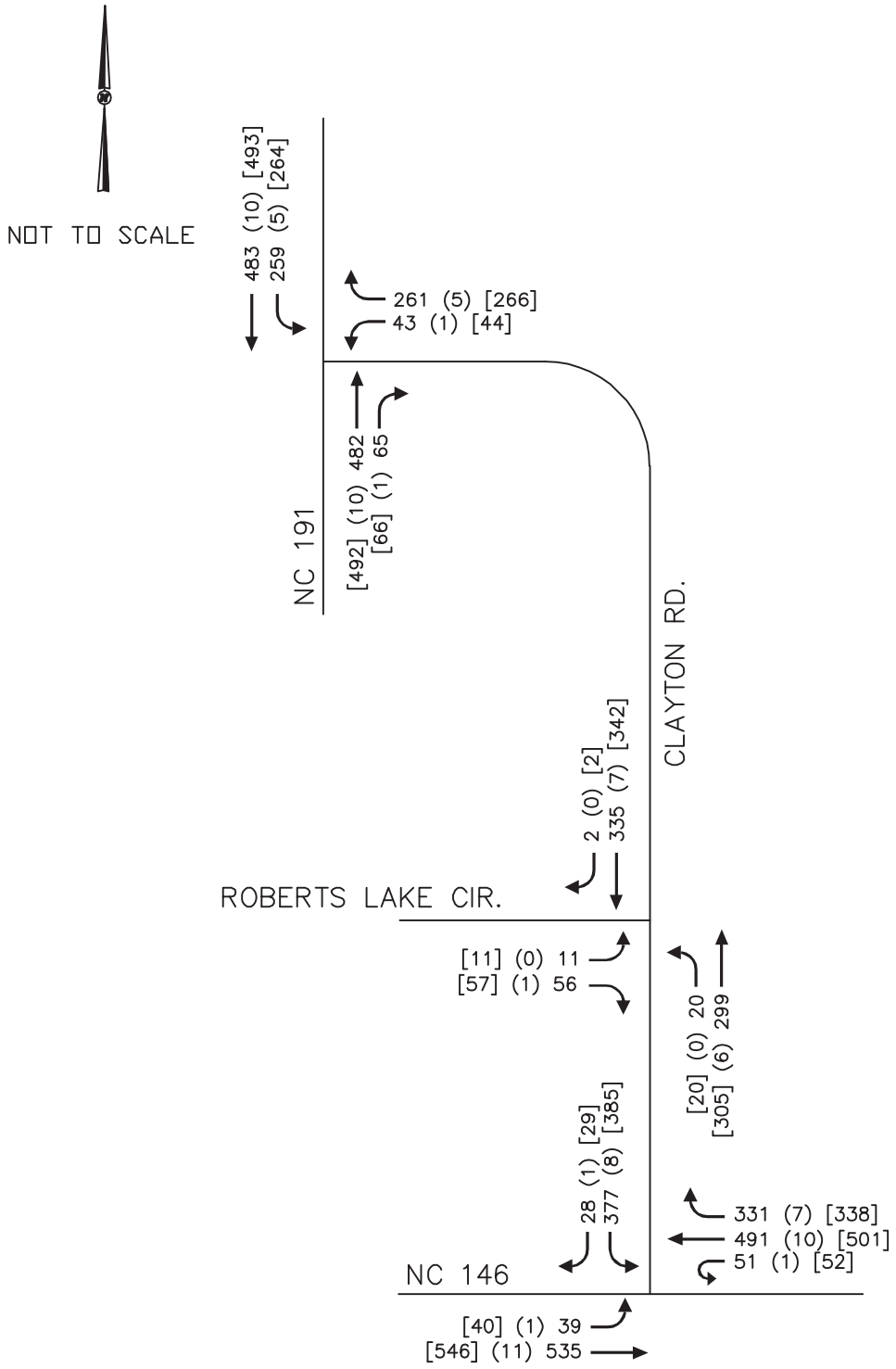
Historic growth traffic is the increase in traffic due to usage increases and non-specific growth throughout the area. An annual growth rate of 2% was applied to the existing volumes up to the studied horizon year of 2025. Projected future year (2025) background AM and PM peak hour traffic volumes are shown on **Figure 5.1** and **Figure 5.2**, respectively.

5.3 Site Traffic

The proposed site traffic was generated and assigned to the adjacent roadway network according to the distributions discussed previously in Section 4.0. The projected AM and PM peak hour site traffic volumes are shown on **Figure 5.3** and **Figure 5.4**, respectively.

5.4 Build-Out Traffic

To obtain the projected build-out traffic volumes, the projected site traffic volumes were added to the projected background traffic. Traffic volume calculations are detailed in intersection spreadsheets in Appendix D of this report. The projected (2025) AM and PM peak hour build-out traffic volumes are shown on **Figure 5.3** and **Figure 5.4**, respectively.



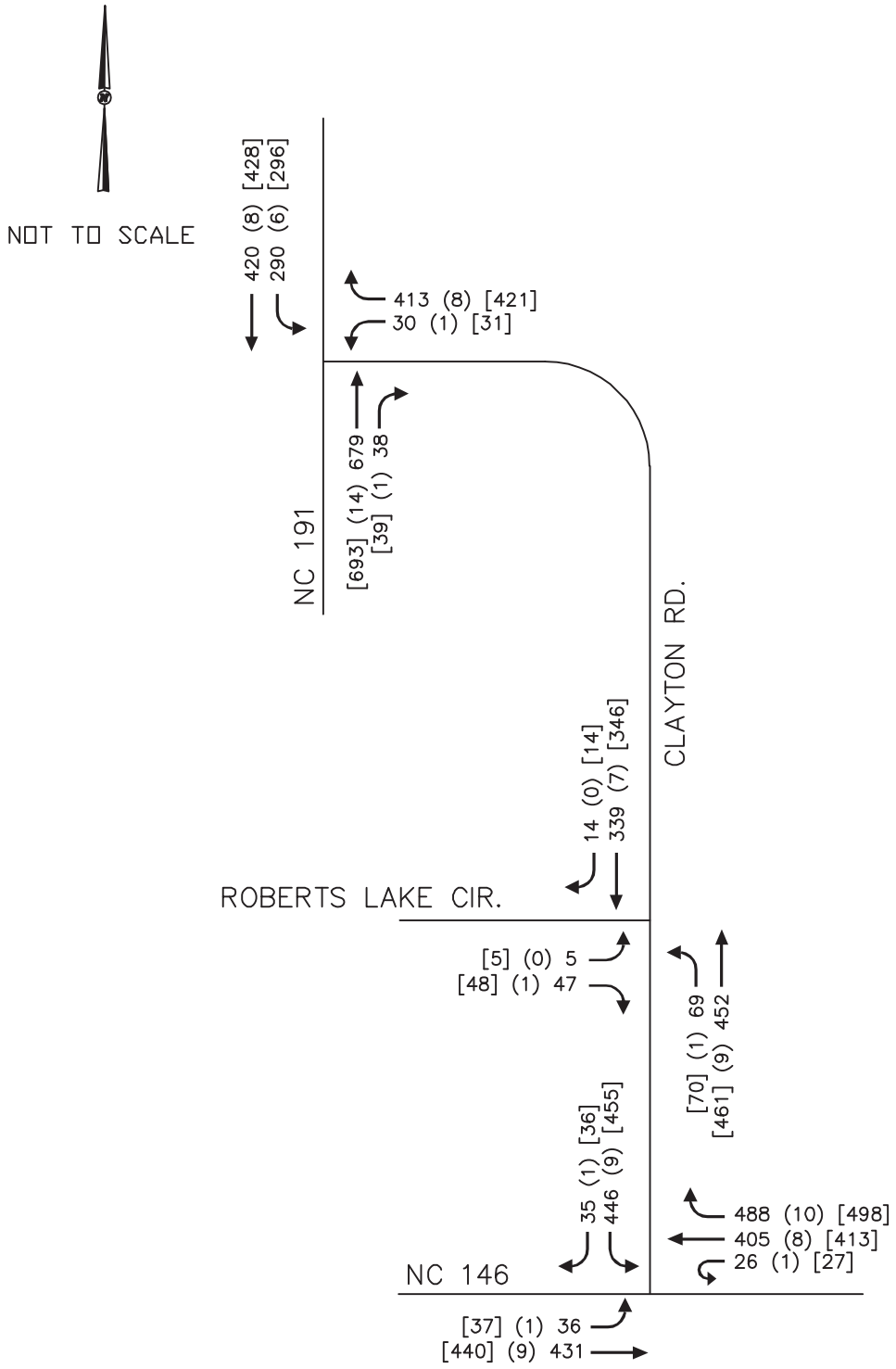
LEGEND

XX EXISTING TRAFFIC VOLUMES

(XX) BACKGROUND GROWTH

[XX] TOTAL BACKGROUND TRAFFIC

Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	EXISTING AND PROJECTED (2025) BACKGROUND AM PEAK HOUR TRAFFIC VOLUMES	FIGURE 5.1



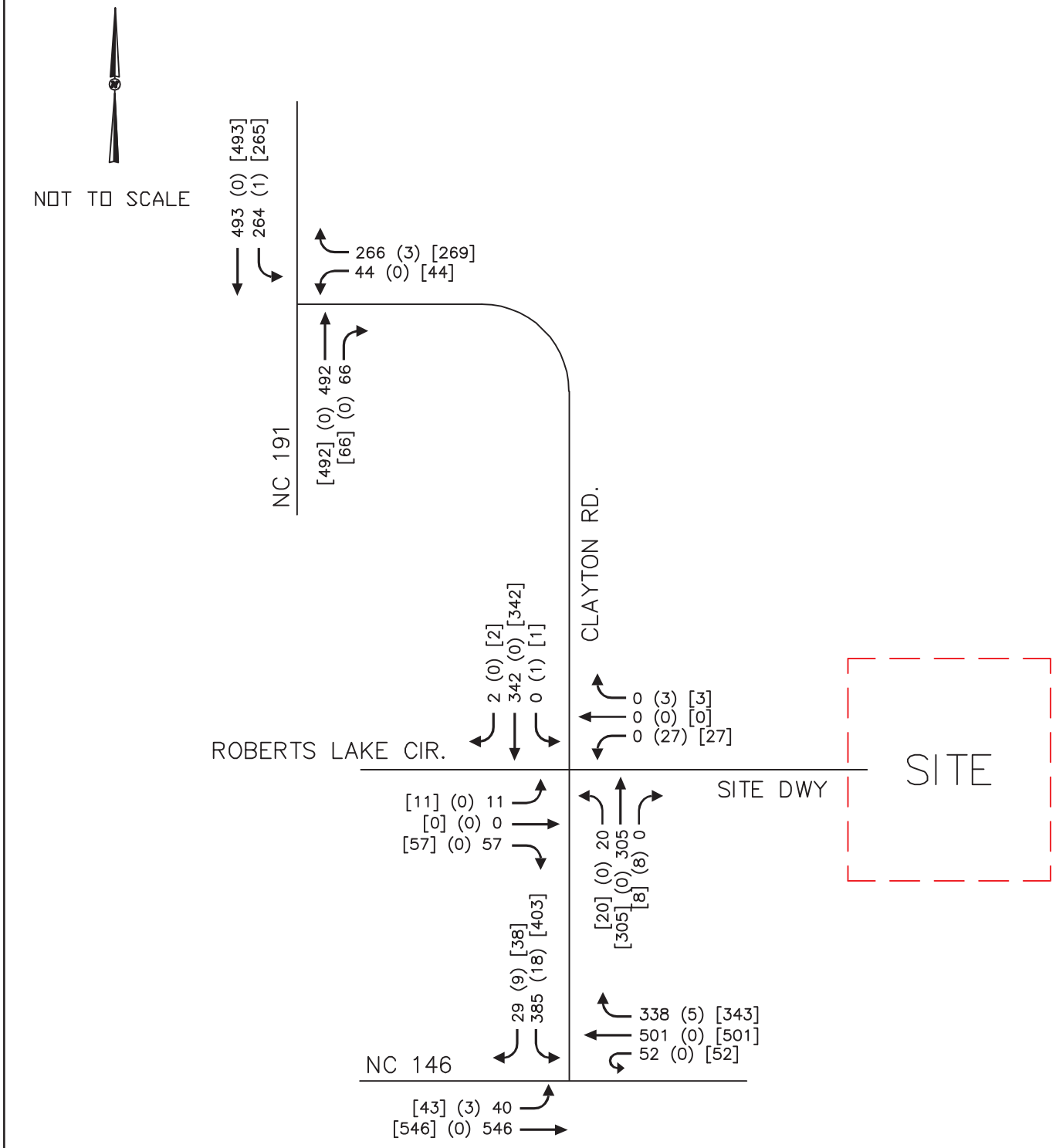
LEGEND

XX EXISTING TRAFFIC VOLUMES

(XX) BACKGROUND GROWTH

[XX] TOTAL BACKGROUND TRAFFIC

Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	EXISTING AND PROJECTED (2025) BACKGROUND PM PEAK HOUR TRAFFIC VOLUMES	FIGURE 5.2



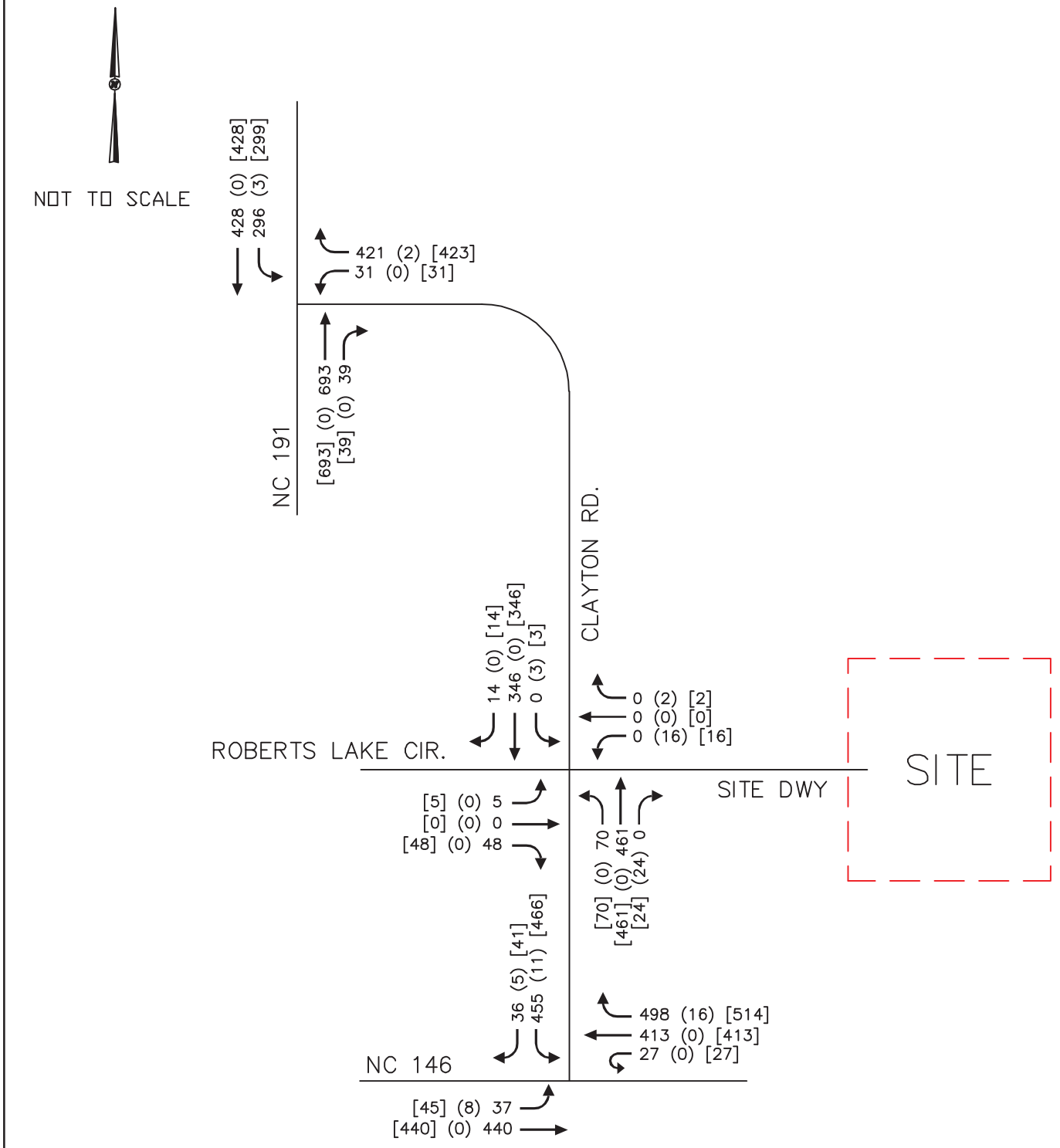
LEGEND

XX BACKGROUND TRAFFIC

(XX) SITE TRAFFIC

[XX] TOTAL BUILD-OUT TRAFFIC

Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	PROJECTED BUILD-OUT (2025) AM PEAK HOUR TRAFFIC VOLUMES	FIGURE 5.3



LEGEND

XX BACKGROUND TRAFFIC

(XX) SITE TRAFFIC

[XX] TOTAL BUILD-OUT TRAFFIC

Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	PROJECTED BUILD-OUT (2025) PM PEAK HOUR TRAFFIC VOLUMES	FIGURE 5.4

6.0 Capacity Analysis

Capacity analyses were performed for the AM and PM peak hours for the existing traffic condition (2024) and the projected (2025) background and build-out traffic conditions using Synchro/SimTraffic Version 11 software to determine the operating characteristics of the adjacent road network and the impacts of the proposed project.

Capacity is defined as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a set time duration. Capacity is combined with Level-of-Service (LOS) to describe the operating characteristics of a road segment or intersection. LOS is a qualitative measure that describes operational conditions and motorist perceptions within a traffic stream. The *Highway Capacity Manual* defines six levels of service, LOS A through LOS F, with A representing the shortest average delays and F representing the longest average delays. LOS D is the typically accepted standard for signalized intersections in urbanized areas. For signalized intersections, LOS is defined for the overall intersection operation.

For unsignalized intersections, only the movements that must yield right-of-way experience control delay. Therefore, LOS criteria for the overall intersection is not reported by Synchro/SimTraffic Version 11 or computable using methodology published in the *Highway Capacity Manual.* It is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. Table 6.0 lists the LOS control delay thresholds published in the *Highway Capacity Manual* for signalized and unsignalized intersections.

Table 6.0
Level-of-Service Control Delay Thresholds

Level-of-Service	Signalized Intersections – Control Delay Per Vehicle [sec/veh]	Unsignalized Intersections – Average Control Delay [sec/veh] & Qualitative Operational Description	
A	≤ 10	≤ 10	Short Delays
B	> 10 – 20	> 10 – 15	
C	> 20 – 35	> 15 – 25	
D	> 35 – 55	> 25 – 35	Moderate Delays
E	> 55 – 80	> 35 – 50	
F	> 80	> 50	Long Delays

The following assumptions were used in the analysis:

- A peak hour factor of 0.9 was used at all intersections in all scenarios.
- The NCDOT cycle length minimums were used in all scenarios.
- Existing yellow and red intervals were used in all scenarios.
- Right-turn on red is allowed on all approaches in the field, but it was modeled without right-turn on red in all scenarios to present a conservative analysis. The exception to this is at NC 191 and Clayton Road in the "Modified Assumptions" scenario discussed in the following subsection.
- Permitted-protected phasing is allowed on many approaches in the field, but all scenarios were modelled as protected only to present a conservative analysis. The exception to this is at NC 191 and Clayton Road in the "Modified Assumptions" scenario discussed in the following subsection.

Capacity analyses were performed for the existing (2024) traffic condition, projected (2025) background and build-out traffic for the following intersections:

- NC 191 at Clayton Road
- Clayton Road at Roberts Lake Circle/Site Driveway
- NC 146 at Clayton Road

The results of the capacity analysis are summarized in the following sub-sections. Synchro reports are included in **Appendix E-G**, SimTraffic queueing and blocking reports are included in **Appendix H**, and existing signal plans are included in **Appendix I**.

6.1 NC 191 at Clayton Road

Two scenarios are provided for this intersection. The first scenario models the intersection as required by NCDOT, which includes no right-turn on red and no permitted/protected phasing. The second is a modified analysis that keeps the right-turn on red and existing permitted/protected phasing since this project has a very minimal impact on this intersection. This project has a less than 0.3% impact at this intersection (4 vehicles in the AM and 5 in the PM).

In the first scenario, which includes the no right-turn on red and protected only phasing assumptions, analyses indicate that the signalized intersection of NC 191 at Clayton Road currently operates at LOS D in the AM peak hour and LOS F PM peak hour. The intersection is projected to remain operating at LOS D in the AM peak hour and LOS F PM peak hour in the future year (2025) scenarios with or without the proposed project. This project is not projected to worsen the LOS and has less than 0.3% impact at this intersection (4 vehicles in the AM and 5 in the PM). Therefore, no improvements are recommended to accommodate this scenario.

In the second scenario, which includes keeping the right-turn on red and permitted/protected phasing that currently exist, analyses indicate that the intersection currently operates with LOS B in the AM peak hour and LOS C in the PM peak hour and is expected to continue to do so in the future year (2025) scenarios with or without the proposed project in place. It is expected that this scenario more accurately models conditions, and it shows no operational concerns. Therefore, no improvements are recommended at this intersection with the development of this project.

Table 6.1 summarizes the operation of the intersection of NC 191 at Clayton Road for the existing (2024), projected (2025) background and build-out traffic conditions.

Table 6.1
NC 191 at Clayton Road (Signalized)

Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
Existing (2024) Traffic	Overall - D (40.6) WB - E (56.1) NB - D (47.1) SB - C (29.5)	Overall - F (80.9) WB - F (107.4) NB - F (88.8) SB - E (56.4)
Existing (2024) Traffic Modified Assumptions	Overall - B (17.5) WB - B (14.1) NB - C (27.8) SB - B (11.4)	Overall - C (27.3) WB - C (24.4) NB - D (37.5) SB - B (18.9)
Background (2025) Traffic	Overall - D (42.2) WB - E (59.0) NB - D (48.6) SB - C (30.5)	Overall - F (85.6) WB - F (116.8) NB - F (92.3) SB - E (59.4)
Background (2025) Traffic Modified Assumptions	Overall - B (18.1) WB - B (14.4) NB - C (28.4) SB - B (12.0)	Overall - C (29.4) WB - C (26.7) NB - D (40.1) SB - C (20.3)

Table 6.1 **NC 191 at Clayton Road (Signalized)**		
Condition	**AM Peak Hour LOS (Delay)**	**PM Peak Hour LOS (Delay)**
Build-out (2025) Traffic	Overall - D (42.5) WB - E (59.7) NB - D (48.8) SB - C (30.7)	Overall - F (86.4) WB - F (118.2) NB - F (92.3) SB - E (60.7)
Build-out (2025) Traffic Modified Assumptions	Overall - B (18.1) WB - B (14.4) NB - C (28.4) SB - B (12.0)	Overall - C (30.4) WB - C (28.6) NB - D (40.1) SB - C (21.7)

6.2 Clayton Road at Roberts Lake Circle/Site Driveway

Analyses indicate that the unsignalized intersection of Clayton Road at Roberts Lake Circle currently operates with short delays in the AM and PM peak hours. The intersection is projected to continue to operate with short delays in both peak hours without the proposed project in place. Based on the National Cooperative Highway Research Program (NCHRP) Report 457, left and right turn lanes into the site are not warranted. The turn lane warrants are included in **Appendix J**. Though a southbound left-turn lane into the site is not warranted, there is existing hatched where a lef-turn lane could be accommodated. This project proposes to restripe that hatched area to provide a 50' left turn lane, but no widening will be performed to accommodate the left-turn lane. The following improvements are recommended to accommodate this site:

- Construct the eastern leg with stop control and one ingress lane and one egress lane
- Stripe a southbound left-turn lane with 50 feet of storage within the existing available hatched pavement

With the recommended improvements in place, the intersection is projected to operate with short to moderate delays in both peak hours.

Table 6.3 summarizes the operation of the intersection of Clayton Road at Roberts Lake Circle/Site Driveway for the existing (2024), projected (2025) background and build-out traffic conditions.

Table 6.2
Clayton Road at Roberts Lake Circle/Site Driveway (Unsignalized)

Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
Existing (2024) Traffic	EB - B (11.6) NBL - A (8.1)	EB - B (11.8) NBL - A (8.3)
Background (2025) Traffic	EB - B (11.7) NBL - A (8.1)	EB - B (11.9) NBL - A (8.3)
Build-out (2025) Traffic	EB - B (12.3) WB - C (19.4) NBL - A (8.1) SBL - A (8.0)	EB - B (13.3) WB - D (27.3) NBL - A (8.3) SBL - A (8.5)

6.3 NC 146 at Clayton Road

Analyses indicate that the signalized intersection of NC 146 at Clayton Road currently operates at LOS B in the AM and PM peak hours. The intersection is projected to remain operating at LOS B in the AM and PM peak hours in the future year (2025) scenarios with or without the proposed project. Therefore, no improvements are recommended at this intersection with the development of this project.

Table 6.3 summarizes the operation of the intersection of NC 146 at Clayton Road for the existing (2024), projected (2025) background and build-out traffic conditions.

Table 6.3
NC 146 at Clayton Road (Signalized)

Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
Existing (2024) Traffic	Overall - B (18.0) EB - B (19.6) WB - B (14.0) NB - C (24.3)	Overall - B (15.6) EB - B (17.5) WB - B (12.0) NB - C (20.8)
Background (2025) Traffic	Overall - B (18.3) EB - C (20.0) WB - B (14.2) NB - C (24.7)	Overall - B (15.8) EB - B (17.6) WB - B (12.1) NB - C (21.1)
Build-out (2025) Traffic	Overall - B (19.4) EB - B (19.4) WB - B (16.1) NB - C (26.1)	Overall - B (16.9) EB - B (17.4) WB - B (13.7) NB - C (22.4)

7.0 Recommendations

Proposed Improvements

The following roadway improvements are proposed to be performed in conjunction with the proposed development:

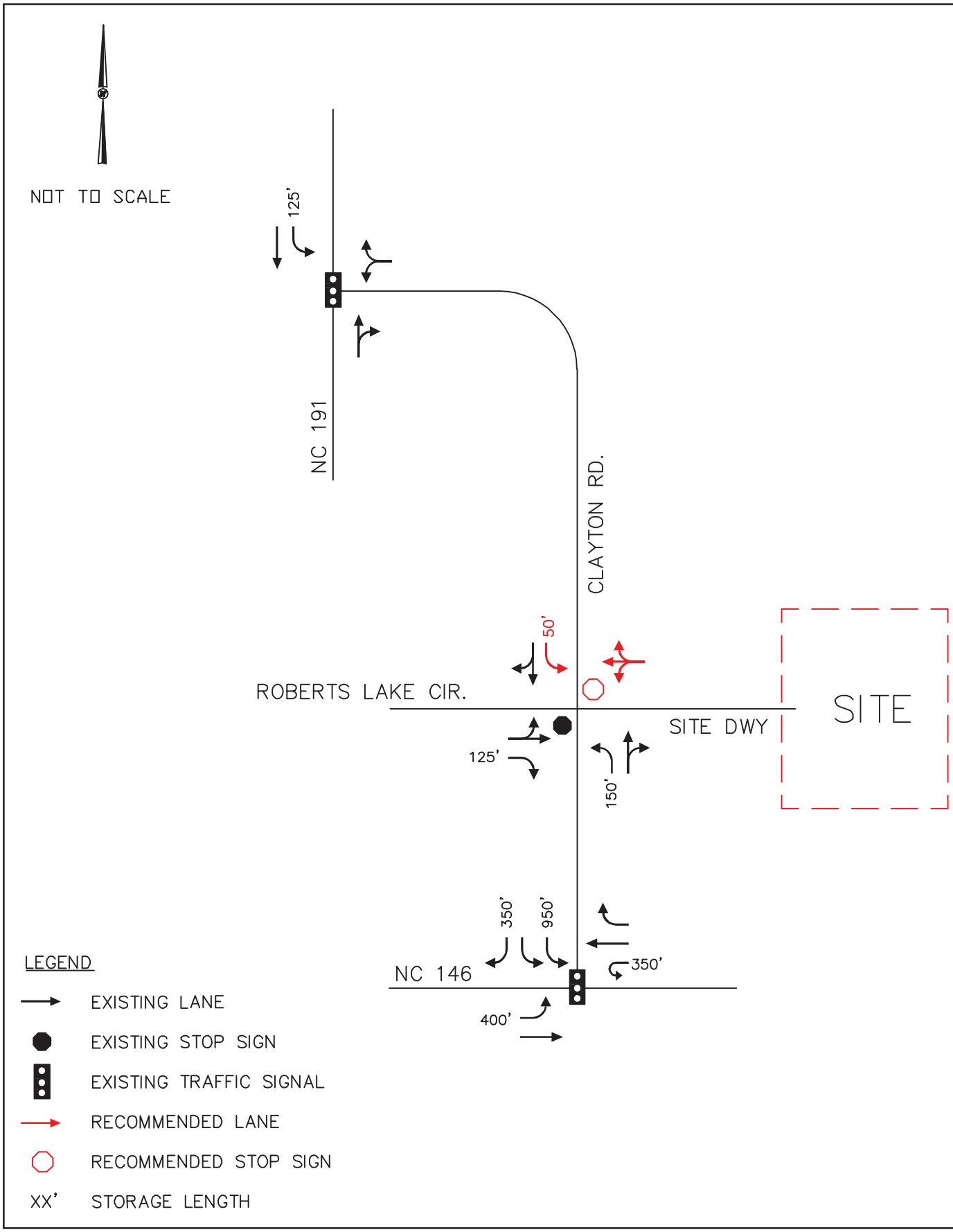
Clayton Road at Roberts Lake Circle/Site Driveway

- Construct the eastern leg with stop control and one ingress lane and one egress lane
- Stripe a southbound left-turn lane with 50 feet of storage within the existing available hatched pavement

Conclusions

With the recommended improvements in place, all of the study intersections are expected to operate acceptably in the build-out improved traffic conditions, with the exception of the NC 191 at Clayton Road intersection if no right-turn on red is used and if no permitted/protected phasing is used.

The recommended roadway laneage is shown on **Figure 7.1**.



Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	RECOMMENDED ROADWAY LANEAGE	FIGURE 7.1

Appendix

Appendix A:
NCDOT Scoping Checklist

NCDOT Traffic Impact Analysis Need Screening / Scoping Request

TIA Need Screening → TIA Scoping → TIA Submittal

A Traffic Impact Analysis (TIA) may be required for developments based on the site trip generation estimates, site context, or at the discretion of the NCDOT District Engineer. The Applicant or the TIA Consultant shall submit this form along with the site plan to the District Engineer to determine the TIA need and, if a TIA is required, initiate the TIA scoping process. Without an approved scope, the TIA is incomplete and will be rejected until the study is revised to conform to NCDOT's TIA requirements.

Project Name: Clayton Road Multifamily **Previous Name:** If Applicable

Location: 101 Clayton Road, south of Kay Lou Lane **County:** Buncombe **Municipality:**

Project Description: Constructing a multifamily site with 114 units.

Project Contact:	Applicant	TIA Consultant
Company Name	Cox Universal Group	Kimley-Horn
Contact Person	Philip Cox	Melissa Helbert-Pogoloff
Phone Number	423-282-6582	(864) 501 - 2730
Email	pcox@coxuniversalgroup.com	melissa.helbert@kimley-horn.com
Mailing Address	2304 Silverdale Drive, Suite 200 Johnson City, TN 37601	607 Pendleton Street, Suite 100 Greenville, SC 29601

Site Plan Prepared By: Seamon Whiteside **Site Plan Date:** 2/15/2024

See site plan/vicinity map requirements on page 2.

Parcel Size: 7.5 Acre(s) **Anticipated Build-Out Year:** 2025

Weekday Site Trip Generation - Do NOT adjust for mode split, pass-by, internal capture, or diverted trips.

ITE LUC	Proposed Land Use	Size	Unit	Daily Trips	Peak Hour Type	AM Peak Hour Trips			PM Peak Hour Trips			Data Source
						Enter	Exit	Total	Enter	Exit	Total	
221	Multifamily Midrise	114	du	498	Adj. Street	9	30	39	27	18	45	ITE Equation
Total												

Refer to the current *NCDOT Congestion Management Capacity Analysis Guidelines* for acceptable trip calculation methods and data sources.

**Explain local or other data sources, if used:

☐ The estimated site trips meet NCDOT's TIA trip threshold of 3,000 daily trips.

☒ The estimated site trips meet the municipal TIA trip threshold of 75 units

☐ This project is located in a known STIP and/ or local CIP project #

☐ This project includes a rezoning request.

☐ The proposed site access is located within 1,000 feet of an interchange.

☐ The Applicant requests for a new or modified control-of-access break.

☐ The Applicant requests for a new or modified median break.

Philip Cox — Applicant's Signature

Philip Cox — Print Name

3/4/2024 — Date

NCDOT Traffic Impact Analysis Need Screening / Scoping Request

TIA Need Screening → TIA Scoping → TIA Submittal

Site Plan/Vicinity Map Requirement for TIA Need Screening: While the site plan may not be finalized during the TIA scoping stage, the graphic representation of the proposed development shall provide adequate details on the development scope and context. More specifically, the site plan/map shall clearly show the location and type of each access point, spacing to adjacent and opposing driveways or intersections, internal street network, proposed buildings/parcels with their anticipated uses and sizes at full build-out and, if applicable, any nearby interstate, US, NC or Secondary Roads (SR).

Project Name: Clayton Road Multifamily **Project Reference Number:** _____

☒ **A TIA is Required by the Local Government.** In addition, the study area is expected to include NCDOT maintained transportation facilities.

☐ **A TIA is Required by NCDOT,** per the *Policy on Street and Driveway Access to North Carolina Highways*.

If either or both of the boxes above are checked, the Applicant/TIA Consultant is hereby requested to fill out as much as possible of the following TIA scoping checklist, and return it along with the supporting documents to NCDOT prior to the scoping meeting.

☐ **A TIA is NOT required**. This decision is based on the development information presented above. Changes in the development plan will require re-evaluation of the TIA need, and may necessitate a TIA. The Applicant should inform the District Engineer of any significant changes in a timely fashion to avoid delays or rejections of the driveway permit / encroachment agreement applications.

Additional Comments:

The TIA need decision is made by the NCDOT Division 13 District 2 on 3/4/2024.

Approved via email
NCDOT District Representative's Signature
Email concurrence may be used in lieu of the signature.

Nick Dorato
Print Name

NCDOT TIA Scoping Checklist

TIA Need Screening → TIA Scoping → TIA Submittal

Project Name: Clayton Road Multifamily **TIA Scoping Date:** _____

☒ **TIA Need Screening Forms are Attached.** Project Reference #: _____ Decision Date: _____

☒ **Site Plan and Access**

☒ Provide a site plan illustrating site access, internal and external roadways, buildings and land uses.
Refer to NCDOT's *Policy on Street and Driveway Access to North Carolina Highways* pages 14 and 15 for site plan requirements.

☒ Identify site access.

New Access	On Road	Access Type		Driveway Spacing		
	Road Name	Permitted Movements	Traffic Control	Distance (ft)	Direction	Nearest Intersection / Access
Access A	Clayton Road	Conventional Full-Mvmt	2-Way Stop	0		Roberts Lake Circle
Access B						
Access C						
Access D						
Access E						
Access F						
Access G						
Access H						

Existing Access	Existing Intersection of		Access Modification	**Proposed Interconnectivity** (If Applicable)		
	Road A	Road B		Connector #	Road Connected	Adjacent Development
Access 1			Please Select	Connector 1		
Access 2				Connector 2		
Access 3				Connector 3		
Access 4				Connector 4		

☒ Additional access clarifications and provisions (e.g., proposed control-of-access or median breaks, modifications of existing access, loading/unloading area access, bike/pedestrian accommodation).

Tying into the intersection of Clayton Road at Roberts Lake Circle as a proposed fourth leg on the east.

☐ **Proposed K-12 School Site**

☐ NCDOT MSTA School Traffic Calculator for Select School Type shall be used.

☐ Peak Hour Factors (PHFs) shall be adjusted/weighted for new school trips (0.5 PHF by default).

☐ Internal school circulation analysis is required, and should be submitted in advance or concurrent with the TIA submittal.

☐ Clarify traffic operation plans (e.g. traffic circulation pattern, pedestrian access, drop-off/pick-up zone location and configuration, queue storage area and, if applicable, staggered start times).

☒ Trip Generation

The TIA Consultant shall prepare trip generation estimates following the current *NCDOT Congestion Management Capacity Analysis Guidelines*, and submit the calculation sheets and supporting information to the District Engineer for approval prior to capacity analysis.

ITE LUC	Proposed Land Use	Size	Unit	Daily Trips	Peak Hour Type	AM Peak Hour Trips			PM Peak Hour Trips			Data Source
						Enter	Exit	Total	Enter	Exit	Total	
221	Multifamily Midrise	114	du	498	Adj. Street	9	30	39	27	18	45	ITE Equation
Unadjusted Site Trips												
Internal Capture Trips (Attach Calculation Sheets)												Please Select
Internal Capture % of Unadjusted Site Trips				%		%			%			
LUC	Proposed Land Use	Any Internal Trips?		Pass-By % of External Trips								
		Please Select		%		%			%			Please Select
				%		%			%			
				%		%			%			
				%		%			%			
				%		%			%			
Pass-By Trips (Attach Calculation Sheets)												
Adjacent Street Volumes												Please Select
Non-Pass-By Primary Trips												
Diverted Trips, if Applicable and Justifiable												Please Select

**Explain local or other data sources, if used:

☐ Existing Site Trip Information for Redevelopment Projects (Attach separate sheets as needed)

ITE LUC	Existing Land Use	Size	Unit	Daily Trips	Peak Hour Type	AM Peak Hour Trips			PM Peak Hour Trips			Data Source
						Enter	Exit	Total	Enter	Exit	Total	
					Please Select							Please Select
Total Existing Site Trips												

☒ Trip Distribution

☒ Trip distribution diagrams are submitted concurrently with this document (attach separate sheets).

☐ Trip distribution diagrams will be submitted separately, along with supporting information, to the District Engineer for review and approval prior to capacity analysis. The trip distribution shall be based on the current and anticipated traffic patterns, as well as instructions noted below.

60% to the east on NC 146
10% to the north on NC 191
30% to the west on NC 146

If required by the District Engineer, the following additional diagrams shall also be submitted:

☐ Mixed-Use Developments (separate diagrams for residential, commercial, and office trips)
☐ Inter-Development Trips (if 'internal" trips cross public streets)
☐ Pass-By Trips
☐ Diverted Trips
☐ Each Analysis Period

☐ Mode Split

☐ Provide Data Source and Justification

Mode / Period	Auto		
AM Peak	%	%	%
PM Peak	%	%	%
Daily	%	%	%
	%	%	%

☐ Identify proper infrastructure and accommodation for other modes of travel.

☒ Analysis Peak Periods:

☒ Weekday AM Peak _____
☒ Weekday PM Peak _____
☐ Weekday Midday Peak _____
☐ Weekday PM School Peak _____
☐ Weekend _____ Peak _____
☐ Other _____

☒ Study Area Intersections and Data Collection

The study area shall include the site access intersections (both new and existing) identified under "Site Plan and Access" on page 1, as well as the following external and, if applicable, internal intersections.

External Intersection	Intersection of		Traffic Control	Intersection Turning Movement Counts			Notes
	Road A	Road B		New / Existing	Date of Counts	Growth Adjustment	
#1	Roberts Lake Cir	Clayton Road	2-Way Stop	Require New Counts			
#2	NC 146	Clayton Road	Signal	Require New Counts			
#3	NC 191	Clayton Road	Signal	Require New Counts			
#4							
#5							
#6							
#7							
#8							
#9							
#10							
#11							
#12							

Internal Intersection	Intersection of		Access Type		Intersection Spacing		
	Road A	Road B	Traffic Control	Permitted Movements	Distance (ft)	Direction	Nearest Intersection
#101			Please Select	Please Select		Please Select	
#102							
#103							
#104							
#105							

The following data will be collected:

☒ New traffic turning movement counts in ☒ 15-min intervals ☐ 5-min intervals (near schools)
Unless otherwise noted above, new traffic counts shall be collected at the existing study intersections during the analysis periods. Weekday counts shall avoid Mondays, Fridays, holidays, school breaks, road closures, and major weather events.

☐ To account for the impact of existing and/or proposed school traffic, PHFs will be adjusted for:

intersections numbered: _____

and access points numbered: _____

☐ Traffic Forecast Data for TIP: _____

☒ Roadway/Intersection Configuration & Traffic Control

☒ Traffic Signal Phasing & Timing Data

☐ Crash Data: _____ Period: _____

☐ Other:

☒ Future Year Conditions

☒ Project Build-Out Year: 2025

☒ Future Analysis Year(s): 2025

☐ Identify below any funded/committed future transportation improvements, as well as any approved but incomplete developments near the site.

Funded STIP / Local CIP Project	Project Description	Year Complete

Nearby Approved Development	Location	Future Land Use (exclude any completed phases)	Committed Improvements

☒ Annual Growth Factor: 2 %

Justification/Data Source: NCDOT Historic Growth Rate Data (Attached)

☒ Local Comprehensive Transportation Plan Compliance

☒ Identify Applicable Local Transportation Planning Documents

French Broad River MPO 2045 MTP

☐ Identify Applicable Roadways inside the Study Area

Road Name	Classification	Speed Limit	Proposed Cross-Section	Proposed Right-of-Way	Compliance Requirements	Affect Study Intersection #

☒ Study Method

The traffic analysis shall follow the current *NCDOT Congestion Management Capacity Analysis Guidelines*, *Policy on Street and Driveway Access to North Carolina Highways*, and use the current approved version of analysis software (e.g. Synchro/SimTraffic, HCS, Sidra Intersection, TransModeler).

The study shall include the following analysis scenarios for each analysis period.

1. Existing Conditions
2. Future No-Build Conditions (existing + background growth + approved developments + committed or funded improvements)
3. Future Build Conditions (future no-build + site trips)
4. Future Build with Improvements Conditions (future build traffic with improvements to mitigate the proposed development's impacts) and, if applicable:

☐ 5. TIP Design Year Analysis _____

☐ 6. Alternative Access Scenario (without proposed control-of-access or median break / modification)

The following additional analysis/outputs should be provided as warranted:

☐ Signal Warrant Analysis for accesses/intersections _____
☐ Multi-Modal Level of Service Analysis
☐ School Loading Zone Traffic Simulation
☐ Phasing Analysis (scope separately as needed)
☐ Safety/Crash Analysis
☐ Control-of-Access Modification Justification
☐ Median Break / Modification Justification
☐ Other _____

☒ Submittals

In addition to the hardcopies required below, the TIA Consultant shall provide the District Engineer and, if required, the local government an electronic copy of the study documents, including the latest site plan, figures and appendices, in searchable PDF files and the original traffic analysis files (e.g., Synchro, HCS). To expedite review, the NCDOT electronic submittals shall also be delivered concurrently to:

☐ Div. Traffic Engr ☐ Regional Traffic Engr ☐ Congestion Management ☐ Other _____

Submittals	NCDOT		Local Government	
	Electronic	Hardcopy	Electronic	Hardcopy
Trip Generation & Distribution	Required		Please Select	
Draft TIA Report	Required			
Final Sealed TIA Report	Required			

☐ **Additional Comments (**municipal TIA requirements, approved variations from NCDOT guidelines)

Agreement by All Parties

The undersigned agree to the contents and methodology described above for completing the required traffic impact analysis for the proposed development identified herein. Any changes to the above methodology contemplated by the Applicant or the TIA Consultant must be submitted to the District Engineer in writing. If approved by NCDOT, then such changes may be accepted for the TIA report. Subsequent revisions to the development plan (e.g. land use, density, site access, or schedule) may require additional scoping and analysis, and may modify the TIA requirements.

This agreement shall become effective on the date approved by NCDOT, and shall expire ____ months after the effective date or upon significant changes to the roadway network and/or development assumptions, whichever occurs first. Once expired, renewal or re-scoping will be required for subsequent TIA submittals.

APPLICANT

Signature	Print Name	Date
Philip Cox	Philip Cox	3/7/2024

TIA CONSULTANT

Signature	Print Name	Date
Melissa Helbert-Pogoloff	Melissa Helbert-Pogoloff	3/7/2024

LOCAL GOVERNMENT REPRESENTATIVE (If Applicable)

Signature	Print Name	Date
Deferred to NCDOT		

Email concurrence may be used in lieu of the signature.

NCDOT DISTRICT REPRESENTATIVE

Reviewed and approved by the NCDOT Division 13 District 2 on 3/7/2024.

Signature	Print Name
Approved via Email	Nick Dorato

Email concurrence may be used in lieu of the signature.

NCDOT TIA Submittal Checklist

TIA Need Screening → TIA Scoping → TIA Submittal

Submittal: Final Sealed TIA Report **Document Date:** 4/2/2024

Project Name: Clayton Road Multifamily **Previous Name:** If Applicable

NCDOT Division: 13 **District:** 2 **County:** Buncombe **Municipality:**

TIA Consultant: Melissa Helbert-Pogoloff Submitted By: Melissa Helbert-Pogoloff

Phone Number: 864-501-2730 Email: melissa.helbert@kimley-horn.com

TIA Scoping Checklist Approval Date: 3/4/2024 **Unadjusted Daily Site Trips:** 498

☒ The approved TIA Scoping Checklist is included in this submittal.

☐ LOS D or better is expected at all study intersections after proposed mitigations.

☒ The study report is sealed by a NC Professional Engineer with expertise in traffic engineering.

☒ This study has identified all known deficiencies with and without the proposed development.

☒ This study has identified mitigation measures to adequately accommodate the site trips.

Explain here if any of the boxes above are unchecked:
The intersection of NC 191 at Clayton Road operates at LOS F today if NCDOT study parameters are followed (No right-turn on red and no permitted/protected phasing). Two scenarios are provided that show the intersection operations under current operating conditions as well as with standard NCDOT paramters.

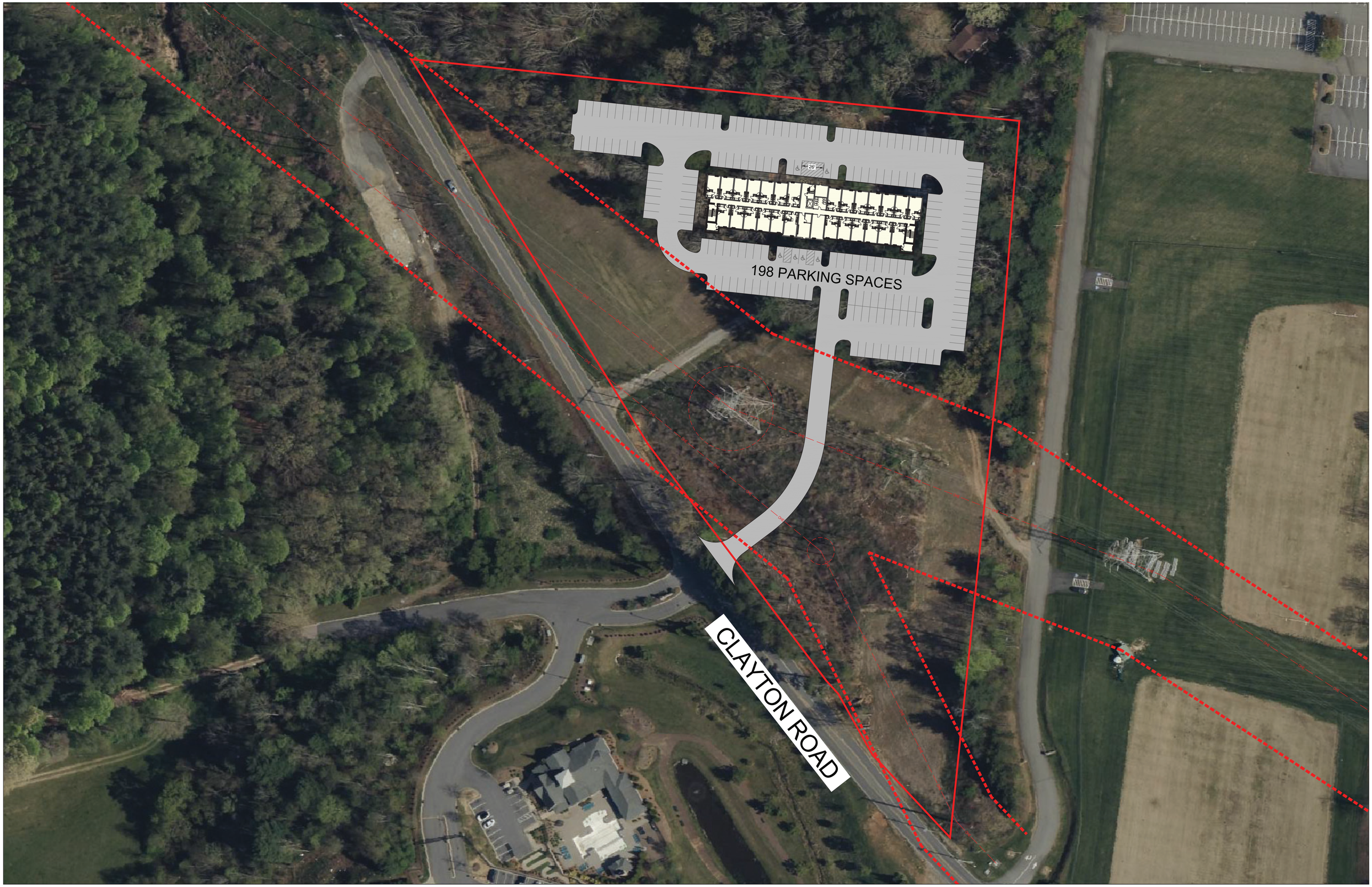
The undersigned affirms that, except for the deviations noted below, the TIA submittal conforms to the current *NCDOT Congestion Management Capacity Analysis Guidelines*, *Policy on Street and Driveway Access to North Carolina Highways*, and the TIA Scoping Checklist approved by the NCDOT District Office. The undersigned also acknowledges that the TIA will be rejected if the deviations and justifications are not properly documented and approved by NCDOT.

Deviations and Justifications (e.g., changes in site plan, development schedule, site trip and off-site trip estimates, study area, data collection, analysis period and method. Attached separate sheets if needed.)

Melissa Helbert-Pogoloff — TIA Consultant's Signature (Professional Engineer of TIA Record)

Melissa Helbert-Pogoloff — Print Name

4/2/2024 — Date



0 20 40 80
SCALE: 1" = 40'

N
W E
S

NOTE: THIS PLAN IS CONCEPTUAL IN NATURE AND SUBJECT TO CHANGE

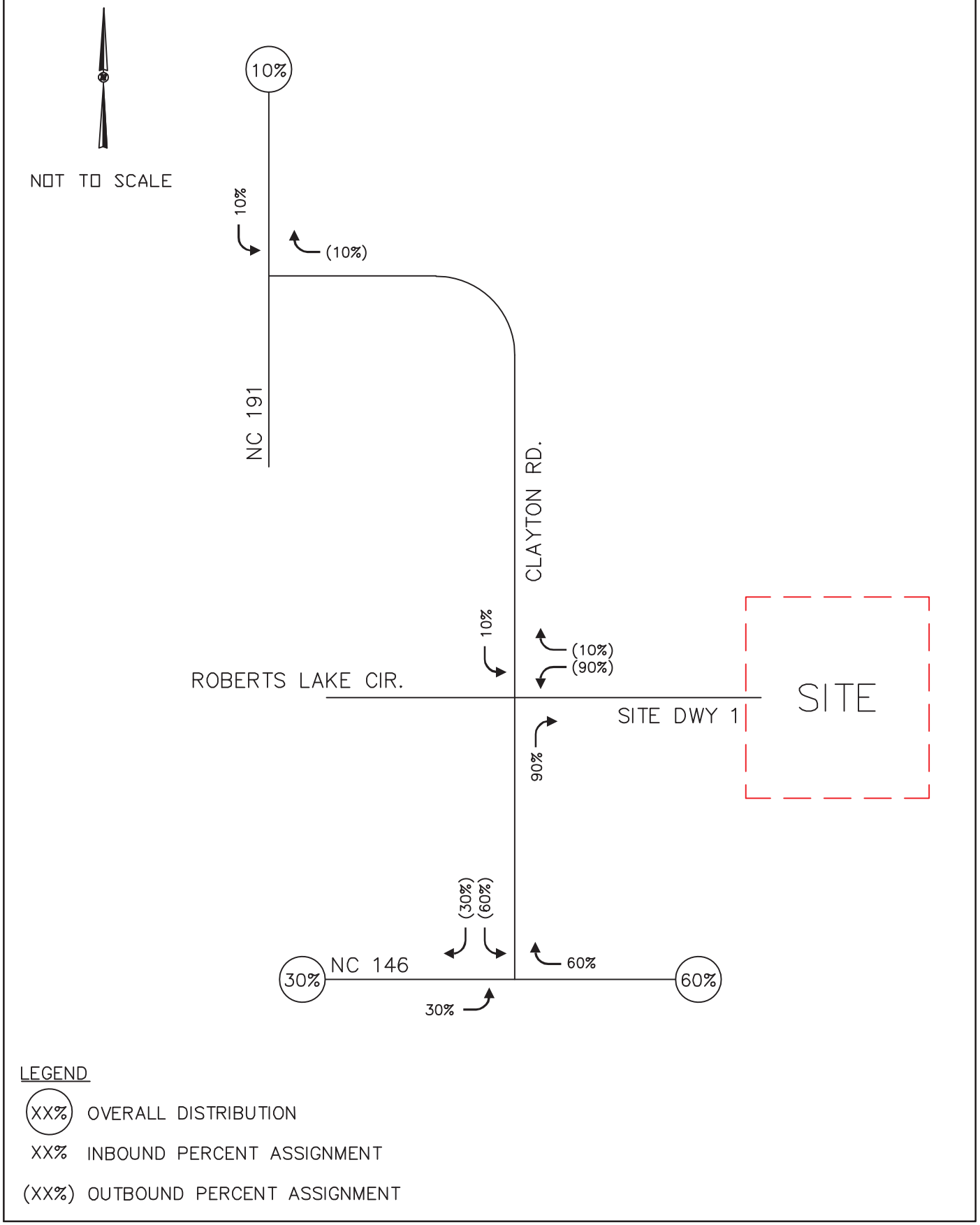
SEAMONWHITESIDE

CONCEPTUAL SITE PLAN

ALTITUDE ASHEVILLE
BUNCOMBE COUNTY, NC
03/06/2024

Clayton Road TIA Study Area

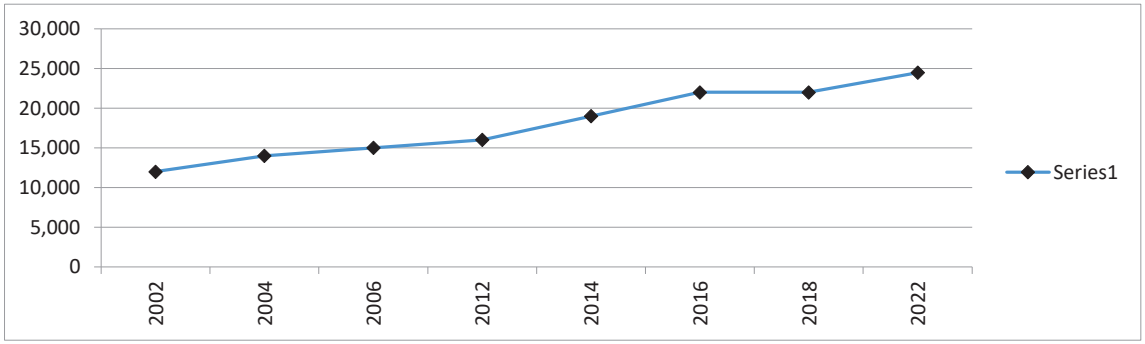
Clayton Road at
NC 146 (Long Shoals Road)



Kimley»Horn	CLAYTON ROAD MULTIFAMILY BUNCOMBE COUNTY, NC TRAFFIC IMPACT ANALYSIS	SITE TRAFFIC DISTRIBUTION AND PERCENT ASSIGNMENT	FIGURE 2

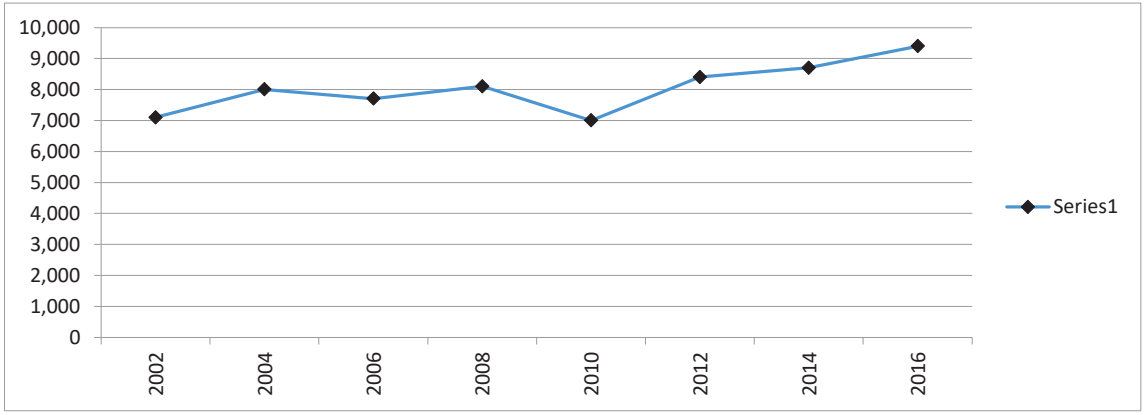
Annual Average Daily Traffic (AADT) from the North Carolina Department of Transportation (NCDOT)

Location ID	0110000149
Route	NC 146
Location	East of Clayton Road
2002	12,000
2004	14,000
2006	15,000
2012	16,000
2014	19,000
2016	22,000
2018	22,000
2022	24,500



Effective Annual Growth for NC 146 East of Clayton Road is 3.6%
6 Year (2016-2022) - Effective Annual Growth for NC 146 East of Clayton Road is 1.8%
10 Year (2012-2022) - Effective Annual Growth for NC 146 East of Clayton Road is 4.4%

Location ID	110000220
Route	NC 146
Location	East of NC 191
2002	7,100
2004	8,000
2006	7,700
2008	8,100
2010	7,000
2012	8,400
2014	8,700
2016	9,400
2018	9,100
2020	8,400
2022	9,900



Effective Annual Growth for NC 146 East of NC 191 is 1.7%
6 Year (2016-2022) - Effective Annual Growth for NC 146 East of NC 191 is 0.9%
10 Year (2012-2022) - Effective Annual Growth for NC 146 East of NC 191 is 1.7%

Appendix B:
Trip Generation

Clayton Road Multifamily

Table 1 - Trip Generation

Land Use	Intensity	Daily			AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out	Total	In	Out
221 Multifamily Housing (Mid-Rise)	114 d.u.	498	249	249	39	9	30	45	27	18
Subtotal		**498**	**249**	**249**	**39**	**9**	**30**	**45**	**27**	**18**

Appendix C:
Traffic Count Data

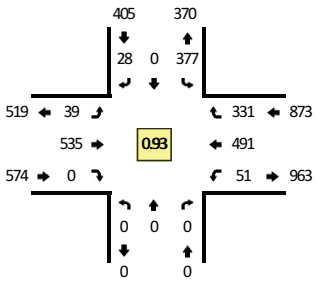
Type of peak hour being reported: Intersection Peak

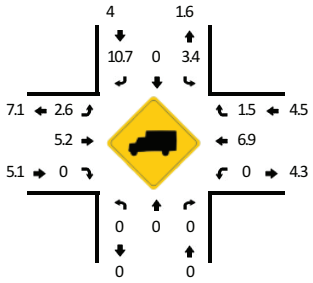
Method for determining peak hour: Total Entering Volume

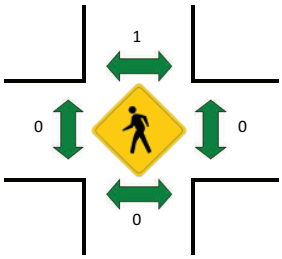
LOCATION: Clayton Rd -- NC 146
CITY/STATE: Avery Creek, NC

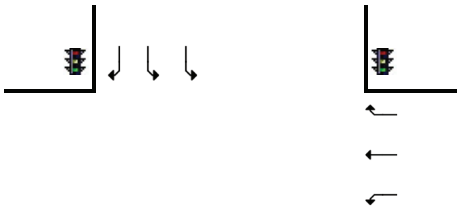
QC JOB #: 16515001
DATE: Tue, Mar 12 2024

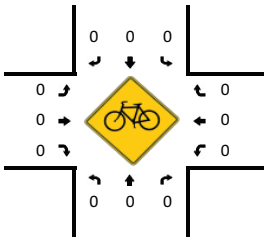
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

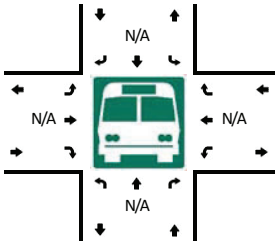


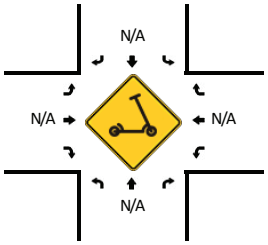












15-Min Count Period Beginning At	Clayton Rd (Northbound)				Clayton Rd (Southbound)				NC 146 (Eastbound)				NC 146 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	65	0	3	0	5	119	0	0	0	75	36	8	311	
7:15 AM	0	0	0	0	93	0	9	0	10	150	0	0	0	112	78	10	462	
7:30 AM	0	0	0	0	102	0	4	0	6	138	0	0	0	142	71	14	477	
7:45 AM	0	0	0	0	99	0	9	0	10	141	0	0	0	135	89	16	499	1749
8:00 AM	0	0	0	0	83	0	6	0	13	106	0	0	0	102	93	11	414	1852
8:15 AM	0	0	0	0	102	0	3	0	7	107	0	0	0	90	76	7	392	1782
8:30 AM	0	0	0	0	66	0	2	0	5	113	0	0	0	94	81	6	367	1672
8:45 AM	0	0	0	0	68	0	8	0	10	80	0	0	0	79	86	8	339	1512

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	396	0	36	0	40	564	0	0	0	540	356	64	1996
Heavy Trucks	0	0	0		4	0	0		4	36	0		0	28	4		76
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/18/2024 10:14 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

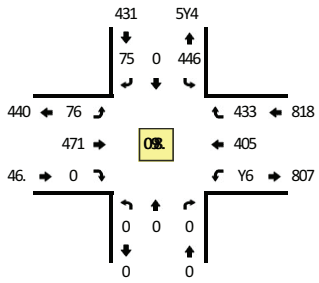
Type of peak hour being reported: Intersection Peak

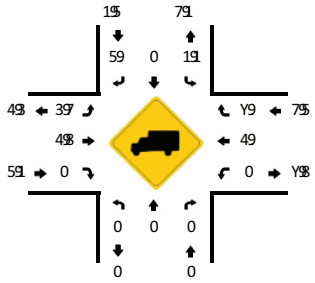
Method for determining peak hour: Total Entering Volume

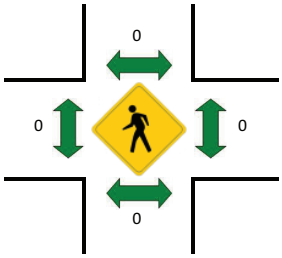
LOCATION: Clayton Rd -- NC 146
CIT/SvTATE: A, ery CreekDNC

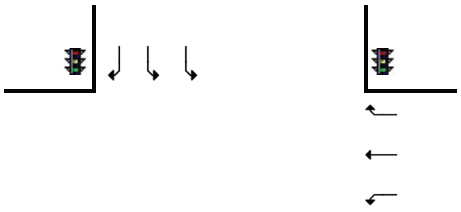
QC JOB #: 1651500Y
2ATE: TueDMar 1Y Y0Y4

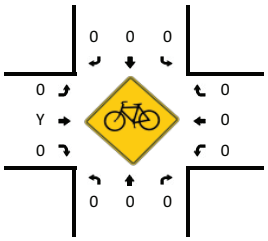
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:70 PM -- 5:45 PM

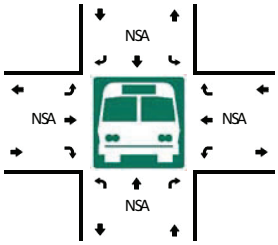


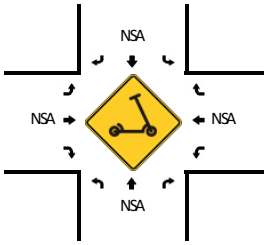












15-Min Count Period Beginning At	Clayton Rd (Northbound)				Clayton Rd (vouthbound)				NC 146 (Eastbound)				NC 146 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	110	0	8	0	5	107	0	0	0	116	105	3	456	
4:15 PM	0	0	0	0	105	0	8	0	.	84	0	0	0	83	170	6	448	
4:70 PM	0	0	0	0	36	0	5	0	4	1Y3	0	0	0	38	1Y0	6	473	
4:45 PM	0	0	0	0	110	0	Y	0	6	101	0	0	0	108	113	7	448	1. 8Y
5:00 PM	0	0	0	0	11.	0	17	0	1Y	178	0	0	0	. 3	117	6	4. 3	1314
5:15 PM	0	0	0	0	107	0	.	0	8	83	0	0	0	11Y	118	8	45.	13YY
5:70 PM	0	0	0	0	116	0	17	0	8	87	0	0	0	106	173	3	437	136.
5:45 PM	0	0	0	0	58	0	6	0	4	117	0	0	0	1Y1	110	3	4Y1	1378

Peak 15-Min Flowrates	Northbound				vouthbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	464	0	5Y	0	76	7. Y	0	0	0	4Y4	55Y	7Y	187Y
Hea, y Trucks	0	0	0		4	0	4		4	16	0		0	Y0	16		64
Buses																	
Pedestrians		0				0				0				0			0
Bicycles vcooters	0	0	0		0	0	0		0	0	0		0	0	0		0

Comments:

Report generated on 7S13SY0Y4 10:14 AM

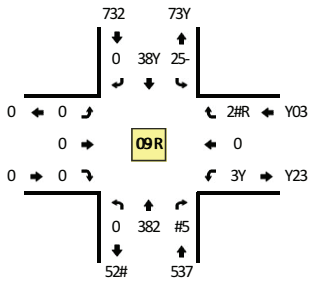
vOURCE: Quality CountsDLLC (http:SSwww9qualitycounts9net) 1-3. . -530-YY1Y

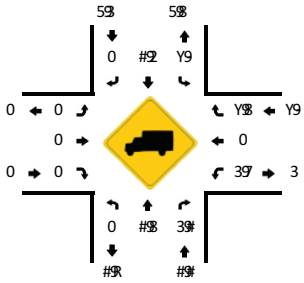
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

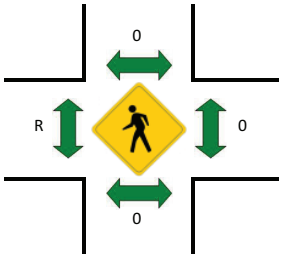
LOCATION: NC R- R 11Clayton 4d | **6 C QQJ B:** R#5R500Y
CIT/SvTATE: J uncombe, NC | **DATE:** Tue, Mar R2 2023

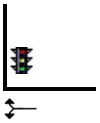
Peak1 our: 7:R5 AM 118:R5 AM
Peak R51Min: 7:35 AM 118:00 AM

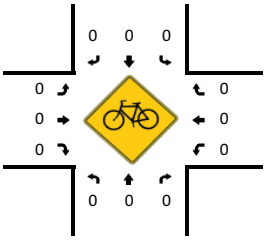
TRUE DATA TO IMPROVE MOBILITY

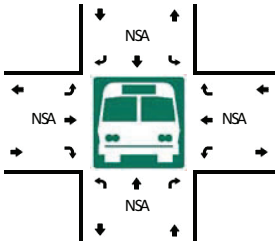


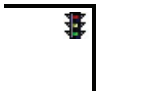


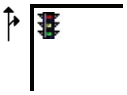


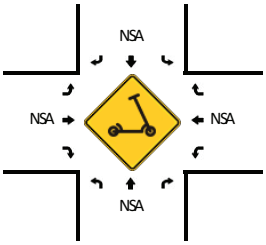












R51Min Count Period J eginning At	NC R- R HNorthbound(				NC R- R Hvouthbound(				Clayton 4d HEastbound(				Clayton 4d H) estbound(				Total	. ourly Totals
	Left	Thru	4ight	W	Left	Thru	4ight	W	Left	Thru	4ight	W	Left	Thru	4ight	W		
7:00 AM	0	R00	R7	0	3R	- -	0	0	0	0	0	0	8	0	YY	0	2- 8	
7:R5 AM	0	R2Y	R5	0	70	- #	0	0	0	0	0	0	#	0	5-	0	Y#-	
7:Y0 AM	0	RR0	22	0	#Y	RY0	0	0	0	0	0	0	R#	0	5-	0	300	
7:35 AM	0	R2-	R#	0	#7	R3Y	0	0	0	0	0	0	R2	0	#-	0	3Y#	R50Y
8:00 AM	0	R20	R2	0	5-	RR3	0	0	0	0	0	0	-	0	73	0	Y88	R5- Y
8:R5 AM	0	R0#	8	0	5-	R05	0	0	0	0	0	0	RR	0	#R	0	Y50	R573
8:Y0 AM	0	R23	5	0	52	8R	0	0	0	0	0	0	7	0	53	0	Y2Y	R3- 7
8:35 AM	0	- R	#	0	3-	R20	0	0	0	0	0	0	2	0	#5	0	YYY	RY- 3

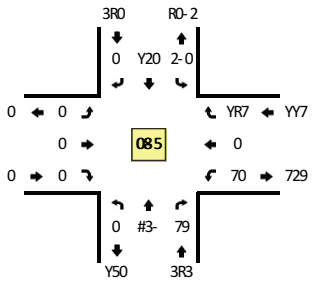
Peak R51Min UoF rates	Northbound				vouthbound				Eastbound				) estbound				Total
	Left	Thru	4ight	W	Left	Thru	4ight	W	Left	Thru	4ight	W	Left	Thru	4ight	W	
All Vehicles	0	5R#	#3	0	2#8	572	0	0	0	0	0	0	38	0	27#	0	R733
. eawy Trucks	0	Y#	3		8	28	0		0	0	0		0	0	20		- #
J uses																	
Pedestrians		0				0				0				0			0
J icycles vcooters	0	0	0		0	0	0		0	0	0		0	0	0		0

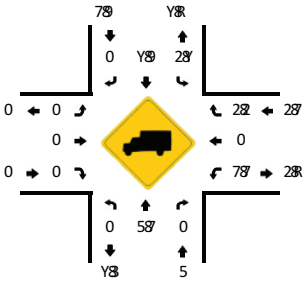
Comments:

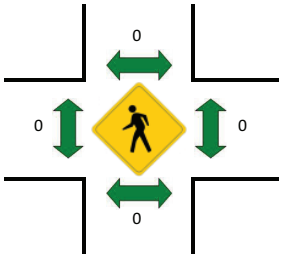
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

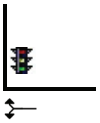
LOCATION: NC R- R 11Clayton 4d | **6 C QQJ B:** R#5R500Y
CIT/SvTATE: J uncombe, NC | **DATE:** Tue, Mar R2 202Y

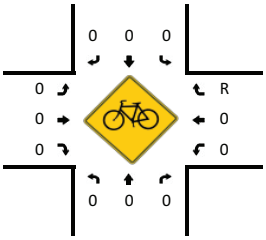
Peak1 our: Y:Y5 PM 115:Y5 PM
Peak R51Min: 5:R5 PM 115:70 PM

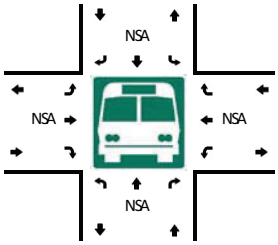


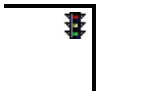


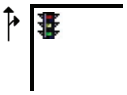


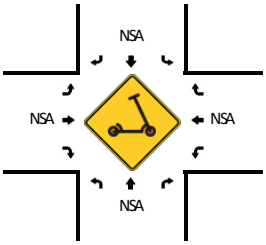












R51Min Count Period J eginning At	NC R- R HNorthbound(				NC R- R HvouthbOund(				Clayton 4d HEastbound(				Clayton 4d H) estbound(				Total	. ourly Totals
	Left	Thru	4ight	W	Left	Thru	4ight	W	Left	Thru	4ight	W	Left	Thru	4ight	W		
Y:00 PM	0	R52	R5	0	32	R02	0	0	0	0	0	0	-	0	3#	0	Y2#	
Y:R5 PM	0	R75	R0	0	93	R05	0	0	0	0	0	0	3	0	R2R	0	Y#5	
Y:70 PM	0	R##	Y	0	39	R03	0	0	0	0	0	0	#	0	93	0	YY9	
Y:Y5 PM	0	RY9	-	0	35	RR2	0	0	0	0	0	0	R5	0	RR-	0	Y39	R9R3
5:00 PM	0	R53	9	0	37	R00	0	0	0	0	0	0	3	0	- 2	0	Y73	R929
5:R5 PM	0	R3-	R0	0	33	R20	0	0	0	0	0	0	Y	0	R0R	0	Y- R	R95Y
5:70 PM	0	R- 5	RR	0	#5	99	0	0	0	0	0	0	Y	0	R0R	0	Y#Y	R930
5:Y5 PM	0	RY3	5	0	52	RR2	0	0	0	0	0	0	RR	0	93	0	YRY	R90#

Peak R51Min UoF rates	Northbound				vouthbound				Eastbound				) estbound				Total
	Left	Thru	4ight	W	Left	Thru	4ight	W	Left	Thru	4ight	W	Left	Thru	4ight	W	
All Vehicles	0	3R#	Y0	0	709	Y90	0	0	0	0	0	0	R#	0	Y0Y	0	R- #Y
. eawy Trucks	0	5#	0		9	20	0		0	0	0		0	0	0		9Y
J uses																	
Pedestrians		0				0				0				0			0
J icycles vcooters	0	0	0		0	0	0		0	0	0		0	0	Y		Y

Comments:

4eport generated on 7SR9S202Y R0:R5 AM | vOW4CE: 6 uality Counts, LLC Hhttp:SSF F F 8qualitycounts8net(R19331590122R2

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Clayton Rd -- Roberts Lake Cir

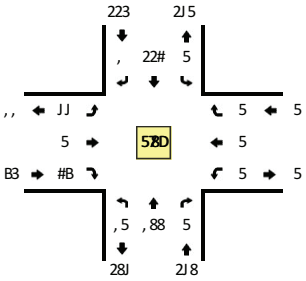
CITOY/TATE: ArdenSNC

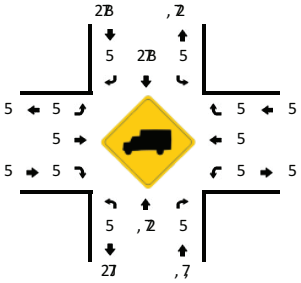
1 C 4O6 Q; J B#J #55B

v ATE: TueSMar J , , 5, D

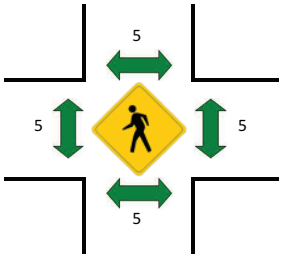
Peak-9 our: 3:J # AM -- . :J # AM

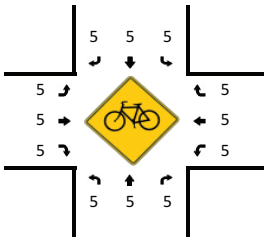
Peak J #-Min: 3:D# AM -- . :55 AM

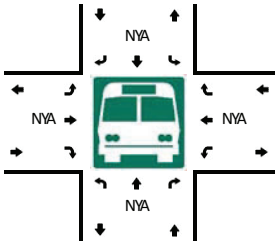


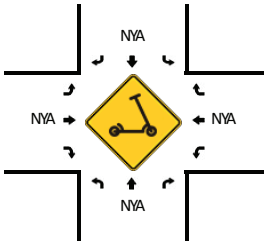


TRUE DATA TO IMPROVE MOBILITY









J #-Min Count Period 6eginning At	Clayton Rd HNorthbound(				Clayton Rd H/outhbound(				Roberts Lake Cir HEastbound(				Roberts Lake Cir H) estbound(				Total	9ourly Totals
	Left	Thru	Right	W	Left	Thru	Right	W	Left	Thru	Right	W	Left	Thru	Right	W		
3:55 AM	D	2,	5	5	5	BB	J	5	B	5	J J	5	5	5	5	5	J , 5	
3:J # AM	D	B.	5	5	5	38	J	5	2	5	J #	5	5	5	5	5	J 35	
3:25 AM	D	B.	5	5	5	. 3	5	5	D	5	J B	5	5	5	5	5	J 38	
3:D# AM	3	. 2	5	5	5	8,	5	5	5	5	J 5	5	5	5	5	5	J 8,	BBJ
. :55 AM	#	. 5	5	5	5	33	J	5	D	5	J #	5	5	5	5	5	J . ,	3, 2
. :J # AM	D	BB	5	5	5	. 5	5	5	2	5	J #	5	5	5	5	5	J B.	3, J
. :25 AM	2	BJ	5	5	5	BD	5	5	D	5	8	5	5	5	5	5	J DJ	B. 2
. :D# AM	B	B.	5	5	5	#8	5	5	,	5	J B	5	5	5	5	5	J #J	BD,

Peak J #-Min UoF rates	Northbound				/outhbound				Eastbound				) estbound				Total
	Left	Thru	Right	W	Left	Thru	Right	W	Left	Thru	Right	W	Left	Thru	Right	W	
All Vehicles	, .	22,	5	5	5	2B.	5	5	5	5	D5	5	5	5	5	5	3B.
9eavy Trucks 6uses	5	5	5		5	.	5		5	5	5		5	5	5		.
Pedestrians		5				5				5				5			5
6icycles /cooters	5	5	5		5	5	5		5	5	5		5	5	5		5

Comments:

Report generated on 2YJ . Y, 5, D J 5:J # AM

/OWRCE: 1 uality CountsSLLC Hhttp:YYF F F 7quality counts7net(J -. 33-#. 5-, , J ,

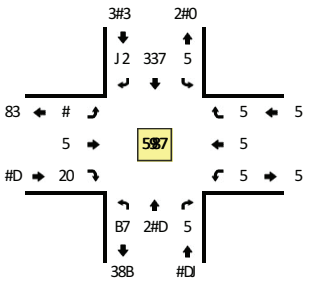
Type of peak hour being reported: Intersection Peak

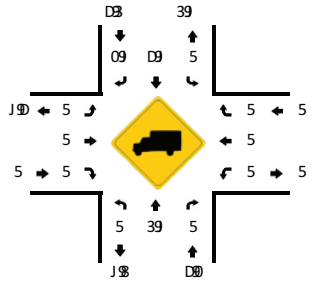
Method for determining peak hour: Total Entering Volume

LOCATION: Clayton Rd -- Roberts Lake Cir
CITY/STATE: ArdenvNC

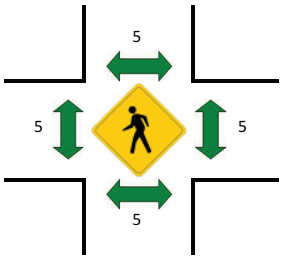
1C4O6 Q; J B#J #550
, ATE: TuevMar J D D5D2

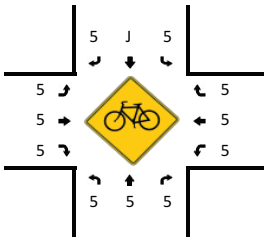
Peak-. our: 2:2# PM -- #:2# PM
Peak J #-Min: #:35 PM -- #:2# PM

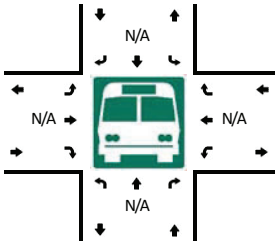


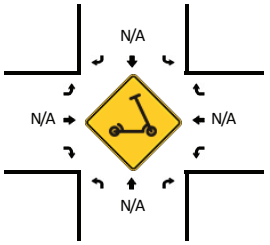


TRUE DATA TO IMPROVE MOBILITY









J #-Min Count Period 6eginning At	Clayton Rd HNorthbound(				Clayton Rd HSouthbound(				Roberts Lake Cir HEastbound(				Roberts Lake Cir H) estbound(				Total	. ourly Totals
	Left	Thru	Right	W	Left	Thru	Right	W	Left	Thru	Right	W	Left	Thru	Right	W		
2:55 PM	#	8B	5	5	5	J 5B	5	5	5	5	J 5	5	5	5	5	5	D50	
2:J # PM	J 5	J 32	5	5	5	8D	#	5	J	5	B	5	5	5	5	5	D38	
2:35 PM	0	J J 3	5	5	5	87	2	5	J	5	0	5	5	5	5	5	DDJ	
2:2# PM	8	J J 7	5	5	5	7#	3	5	J	5	B	5	5	5	5	5	D3D	878
#:55 PM	J D	J J D	5	5	5	83	D	5	5	5	0	5	5	5	5	5	DJ B	750
#:J # PM	J 7	J 5J	5	5	5	8D	B	5	J	5	J 5	5	5	5	5	5	DJ 7	888
#:35 PM	35	J D5	5	5	5	07	3	5	3	5	D2	5	5	5	5	5	D#7	7DB
#:2# PM	J J	73	5	5	5	BD	3	5	5	5	0	5	5	5	5	5	J 0B	805

Peak J #-Min UoF rates	Northbound				Southbound				Eastbound				) estbound				Total
	Left	Thru	Right	W	Left	Thru	Right	W	Left	Thru	Right	W	Left	Thru	Right	W	
All Vehicles	J D5	285	5	5	5	3J B	J D	5	J D	5	7B	5	5	5	5	5	J 53B
. eavy Trucks 6uses	5	D5	5		5	8	5		5	5	5		5	5	5		D8
Pedestrians		5				5				5				5			5
6icycles Scooters	5	5	5		5	5	5		5	5	5		5	5	5		5

Comments:

Report generated on 3/J 8/D5D2 J 5:J # AM

SOWRCE: 1uality CountsvLLC Hhttp://F F F 9quality counts9net(J -800-#85-DDJ D

Appendix D:
Intersection Spreadsheets

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #1

NC 191 at Clayton Road

AM PEAK HOUR

	NC 191 Northbound				NC 191 Southbound				Eastbound				Clayton Road Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2024 Traffic Volumes	0	0	482	65	0	259	483	0	0	0	0	0	0	43	0	261
Count Balancing																
Pedestrians			0				0				0				1	
Conflicting Pedestrians		1		0		0		1		0		0		0		0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles				0				0				0				0
Heavy Vehicles	0	0	33	3	0	10	30	0	0	0	0	0	0	2	0	10
Heavy Vehicle %	2%	2%	7%	5%	2%	4%	6%	2%	2%	2%	2%	2%	2%	5%	2%	4%
Peak Hour Factor			0.90				0.90				0.90				0.90	
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2024 Volumes	**0**	**0**	**482**	**65**	**0**	**259**	**483**	**0**	**0**	**0**	**0**	**0**	**0**	**43**	**0**	**261**
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Background Growth	0	0	10	1	0	5	10	0	0	0	0	0	0	1	0	5
2025 No-Build Traffic	**0**	**0**	**492**	**66**	**0**	**264**	**493**	**0**	**0**	**0**	**0**	**0**	**0**	**44**	**0**	**266**
Trip Distribution IN						10%										
Trip Distribution OUT																(10%)
Balancing Adjustment																
Residential Trips	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
Total Primary Site Trips	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
2025 Build Traffic	**0**	**0**	**492**	**66**	**0**	**265**	**493**	**0**	**0**	**0**	**0**	**0**	**0**	**44**	**0**	**269**
2025 Build Heavy Vehicle %	**2%**	**2%**	**7%**	**5%**	**2%**	**4%**	**6%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**5%**	**2%**	**4%**

PM PEAK HOUR

	NC 191 Northbound				NC 191 Southbound				Eastbound				Clayton Road Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2024 Traffic Volumes	0	0	679	38	0	290	420	0	0	0	0	0	0	30	0	413
Count Balancing																
Pedestrians			0				0				0				0	
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Conflicting Bicycles				0				0				0				0
Heavy Vehicles	0	0	36	0	0	7	20	0	0	0	0	0	0	1	0	9
Heavy Vehicle %	2%	2%	5%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	3%	2%	2%
Peak Hour Factor			0.9				0.90				0.90				0.90	
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2024 Volumes	**0**	**0**	**679**	**38**	**0**	**290**	**420**	**0**	**0**	**0**	**0**	**0**	**0**	**30**	**0**	**413**
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Background Growth	0	0	14	1	0	6	8	0	0	0	0	0	0	1	0	8
2025 No-Build Traffic	**0**	**0**	**693**	**39**	**0**	**296**	**428**	**0**	**0**	**0**	**0**	**0**	**0**	**31**	**0**	**421**
Trip Distribution IN						10%										
Trip Distribution OUT																(10%)
Balancing Adjustment																
Residential Trips	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2
Total Primary Site Trips	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2
2025 Build Traffic	**0**	**0**	**693**	**39**	**0**	**299**	**428**	**0**	**0**	**0**	**0**	**0**	**0**	**31**	**0**	**423**
2025 Build Heavy Vehicle %	**2%**	**2%**	**5%**	**2%**	**2%**	**2%**	**5%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**3%**	**2%**	**2%**

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #2

Clayton Road at Roberts Lake Circle/Site Driveway

AM PEAK HOUR

	Clayton Road Northbound				Clayton Road Southbound				Roberts Lake Circle Eastbound				Site Driveway Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2024 Traffic Volumes	0	20	299	0	0	0	335	2	0	11	0	56	0	0	0	0
Count Balancing																
Pedestrians			0				0				0				0	
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles				0				0				0				0
Heavy Vehicles	0	0	7	0	0	0	12	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor			0.90				0.90				0.90				0.90	
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2024 Volumes	**0**	**20**	**299**	**0**	**0**	**0**	**335**	**2**	**0**	**11**	**0**	**56**	**0**	**0**	**0**	**0**
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Background Growth	0	0	6	0	0	0	7	0	0	0	0	1	0	0	0	0
2025 No-Build Traffic	**0**	**20**	**305**	**0**	**0**	**0**	**342**	**2**	**0**	**11**	**0**	**57**	**0**	**0**	**0**	**0**
Trip Distribution IN				90%		10%										
Trip Distribution OUT														(90%)		(10%)
Balancing Adjustment																
Residential Trips	0	0	0	8	0	1	0	0	0	0	0	0	0	27	0	3
Total Primary Site Trips	0	0	0	8	0	1	0	0	0	0	0	0	0	27	0	3
2025 Build Traffic	**0**	**20**	**305**	**8**	**0**	**1**	**342**	**2**	**0**	**11**	**0**	**57**	**0**	**27**	**0**	**3**
2025 Build Heavy Vehicle %	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**4%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**

PM PEAK HOUR

	Clayton Road Northbound				Clayton Road Southbound				Roberts Lake Circle Eastbound				Site Driveway Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2024 Traffic Volumes	0	69	452	0	0	0	339	14	0	5	0	47	0	0	0	0
Count Balancing																
Pedestrians			0				0				0				0	
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Bicycles	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Conflicting Bicycles				0				1				0				0
Heavy Vehicles	0	0	14	0	0	0	7	1	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	3%	2%	2%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor			0.9				0.90				0.90				0.90	
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2024 Volumes	**0**	**69**	**452**	**0**	**0**	**0**	**339**	**14**	**0**	**5**	**0**	**47**	**0**	**0**	**0**	**0**
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Background Growth	0	1	9	0	0	0	7	0	0	0	0	1	0	0	0	0
2025 No-Build Traffic	**0**	**70**	**461**	**0**	**0**	**0**	**346**	**14**	**0**	**5**	**0**	**48**	**0**	**0**	**0**	**0**
Trip Distribution IN				90%		10%										
Trip Distribution OUT														(90%)		(10%)
Balancing Adjustment																
Residential Trips	0	0	0	24	0	3	0	0	0	0	0	0	0	16	0	2
Total Primary Site Trips	0	0	0	24	0	3	0	0	0	0	0	0	0	16	0	2
2025 Build Traffic	**0**	**70**	**461**	**24**	**0**	**3**	**346**	**14**	**0**	**5**	**0**	**48**	**0**	**16**	**0**	**2**
2025 Build Heavy Vehicle %	**2%**	**2%**	**3%**	**2%**	**2%**	**2%**	**2%**	**7%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #3

NC 146 at Clayton Road

AM PEAK HOUR

	Northbound				Clayton Road Southbound				NC 146 Eastbound				NC 146 Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2024 Traffic Volumes	0	0	0	0	0	377	0	28	0	39	535	0	51	0	491	331
Count Balancing																
Pedestrians		1				0				0				0		
Conflicting Pedestrians		0		0		0		0		0		1		1		0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles				0				0				0				0
Heavy Vehicles	0	0	0	0	0	13	0	3	0	1	28	0	0	0	34	5
Heavy Vehicle %	2%	2%	2%	2%	2%	3%	2%	11%	2%	3%	5%	2%	2%	2%	7%	2%
Peak Hour Factor		0.90				0.90				0.90				0.90		
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2024 Volumes	**0**	**0**	**0**	**0**	**0**	**377**	**0**	**28**	**0**	**39**	**535**	**0**	**51**	**0**	**491**	**331**
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Background Growth	0	0	0	0	0	8	0	1	0	1	11	0	1	0	10	7
2025 No-Build Traffic	**0**	**0**	**0**	**0**	**0**	**385**	**0**	**29**	**0**	**40**	**546**	**0**	**52**	**0**	**501**	**338**
Trip Distribution IN										30%						60%
Trip Distribution OUT						(60%)		(30%)								
Balancing Adjustment																
Residential Trips	0	0	0	0	0	18	0	9	0	3	0	0	0	0	0	5
Total Primary Site Trips	0	0	0	0	0	18	0	9	0	3	0	0	0	0	0	5
2025 Build Traffic	**0**	**0**	**0**	**0**	**0**	**403**	**0**	**38**	**0**	**43**	**546**	**0**	**52**	**0**	**501**	**343**
2025 Build Heavy Vehicle %	**2%**	**2%**	**2%**	**2%**	**2%**	**3%**	**2%**	**8%**	**2%**	**2%**	**5%**	**2%**	**2%**	**2%**	**7%**	**2%**

PM PEAK HOUR

	Northbound				Clayton Road Southbound				NC 146 Eastbound				NC 146 Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2024 Traffic Volumes	0	0	0	0	0	446	0	35	0	36	431	0	26	0	405	488
Count Balancing																
Pedestrians		0				0				0				0		
Conflicting Pedestrians		0		0		0		0		0		0		0		0
Bicycles	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Conflicting Bicycles				0				0				2				0
Heavy Vehicles	0	0	0	0	0	5	0	2	0	3	21	0	0	0	19	13
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	6%	2%	8%	5%	2%	2%	2%	5%	3%
Peak Hour Factor		0.9				0.90				0.90				0.90		
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2024 Volumes	**0**	**0**	**0**	**0**	**0**	**446**	**0**	**35**	**0**	**36**	**431**	**0**	**26**	**0**	**405**	**488**
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Background Growth	0	0	0	0	0	9	0	1	0	1	9	0	1	0	8	10
2025 No-Build Traffic	**0**	**0**	**0**	**0**	**0**	**455**	**0**	**36**	**0**	**37**	**440**	**0**	**27**	**0**	**413**	**498**
Trip Distribution IN										30%						60%
Trip Distribution OUT						(60%)		(30%)								
Balancing Adjustment																
Residential Trips	0	0	0	0	0	11	0	5	0	8	0	0	0	0	0	16
Total Primary Site Trips	0	0	0	0	0	11	0	5	0	8	0	0	0	0	0	16
2025 Build Traffic	**0**	**0**	**0**	**0**	**0**	**466**	**0**	**41**	**0**	**45**	**440**	**0**	**27**	**0**	**413**	**514**
2025 Build Heavy Vehicle %	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**5%**	**2%**	**7%**	**5%**	**2%**	**2%**	**2%**	**5%**	**3%**

Appendix E:
Synchro Output:
Existing (2024)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	261	482	65	259	483
Future Volume (vph)	43	261	482	65	259	483
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1505	0	1786	0	1692	1748
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1505	0	1786	0	1692	1748
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	7%	5%	4%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	338	0	608	0	288	537
Turn Type	Prot		NA		Prot	NA
Protected Phases	4		6		5	2
Permitted Phases						
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	28.0		40.0		22.0	62.0
Total Split (%)	31.1%		44.4%		24.4%	68.9%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	21.6		31.1		16.2	52.4
Actuated g/C Ratio	0.26		0.37		0.19	0.62
v/c Ratio	0.88		0.92		0.89	0.49
Control Delay	56.1		47.1		64.7	10.6
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	56.1		47.1		64.7	10.6
LOS	E		D		E	B
Approach Delay	56.1		47.1			29.5
Approach LOS	E		D			C
Queue Length 50th (ft)	185		314		162	146
Queue Length 95th (ft)	#339		#516		#310	220
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	417		754		347	1203
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.81		0.81		0.83	0.45

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 84.2	

Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 40.6	Intersection LOS: D
Intersection Capacity Utilization 74.7%	ICU Level of Service D
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: NC 191 & Clayton Road

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	261	482	65	259	483
Future Volume (vph)	43	261	482	65	259	483
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1505	0	1786	0	1692	1748
Flt Permitted	0.993				0.192	
Satd. Flow (perm)	1505	0	1786	0	342	1748
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	290		10			
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	7%	5%	4%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	338	0	608	0	288	537
Turn Type	Prot		NA		D.P+P	NA
Protected Phases	4		6		5	2
Permitted Phases					6	
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	23.0		46.0		21.0	67.0
Total Split (%)	25.6%		51.1%		23.3%	74.4%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	10.2		24.2		33.6	39.0
Actuated g/C Ratio	0.17		0.40		0.56	0.65
v/c Ratio	0.68		0.84		0.71	0.47
Control Delay	14.1		27.8		19.8	6.9
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	14.1		27.8		19.8	6.9
LOS	B		C		B	A
Approach Delay	14.1		27.8			11.4
Approach LOS	B		C			B
Queue Length 50th (ft)	14		156		30	65
Queue Length 95th (ft)	107		407		134	179
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	683		1318		606	1606
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.49		0.46		0.48	0.33

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 60	

Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 74.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: NC 191 & Clayton Road

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	56	20	299	335	4
Future Volume (vph)	11	56	20	299	335	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	125	150			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		75			
Satd. Flow (prot)	1770	1583	1770	1863	1825	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1770	1583	1770	1863	1825	0
Link Speed (mph)	25			45	45	
Link Distance (ft)	1091			2021	1129	
Travel Time (s)	29.8			30.6	17.1	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	62	22	332	376	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	56	20	299	335	4
Future Vol, veh/h	11	56	20	299	335	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	12	62	22	332	372	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	750	374	376	0	-	0
Stage 1	374	-	-	-	-	-
Stage 2	376	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	379	672	1182	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	372	672	1182	-	-	-
Mov Cap-2 Maneuver	372	-	-	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1182	-	372	672	-	-
HCM Lane V/C Ratio	0.019	-	0.033	0.093	-	-
HCM Control Delay (s)	8.1	-	15	10.9	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.3	-	-

Lane Group	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	39	535	51	491	331	377	28
Future Volume (vph)	39	535	51	491	331	377	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)		-9%		5%		-9%	
Storage Length (ft)	400		350		0	950	350
Storage Lanes	1		1		1	1	1
Taper Length (ft)	100		150			100	
Satd. Flow (prot)	1831	1891	1725	1731	1544	3553	1520
Flt Permitted	0.950		0.950			0.950	
Satd. Flow (perm)	1831	1891	1725	1731	1544	3553	1520
Right Turn on Red					No		No
Satd. Flow (RTOR)							
Link Speed (mph)		35		35		45	
Link Distance (ft)		1035		1129		2021	
Travel Time (s)		20.2		22.0		30.6	
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	5%	2%	7%	2%	3%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)		0%		0%		0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	43	594	57	546	368	419	31
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	1	6	4	4	5
Permitted Phases					6		4
Detector Phase	5	2	1	6	4	4	5
Switch Phase							
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	14.0	18.0	14.0	18.0	14.0	14.0	14.0
Total Split (s)	14.0	53.0	14.0	53.0	23.0	23.0	14.0
Total Split (%)	15.6%	58.9%	15.6%	58.9%	25.6%	25.6%	15.6%
Yellow Time (s)	3.3	4.6	3.0	4.6	3.3	3.3	3.3
All-Red Time (s)	3.4	2.7	3.3	2.7	3.5	3.5	3.4
Lost Time Adjust (s)	-1.7	-2.3	-1.3	-2.3	-1.8	-1.8	-1.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes
Recall Mode	None	Min	None	Min	None	None	None
Act Effct Green (s)	9.8	27.1	9.5	27.1	50.0	14.1	29.6
Actuated g/C Ratio	0.17	0.46	0.16	0.46	0.84	0.24	0.50
v/c Ratio	0.14	0.69	0.21	0.69	0.28	0.50	0.04
Control Delay	30.9	18.8	31.6	19.4	3.1	25.0	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	18.8	31.6	19.4	3.1	25.0	14.1
LOS	C	B	C	B	A	C	B
Approach Delay		19.6		14.0		24.3	
Approach LOS		B		B		C	
Queue Length 50th (ft)	15	187	21	174	43	76	7
Queue Length 95th (ft)	51	326	64	308	70	145	27
Internal Link Dist (ft)		955		1049		1941	
Turn Bay Length (ft)	400		350			950	350
Base Capacity (vph)	312	1508	294	1380	1333	1214	766
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.39	0.19	0.40	0.28	0.35	0.04

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 59.2	

Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 57.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: NC 146 & Clayton Road

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	413	679	38	290	420
Future Volume (vph)	30	413	679	38	290	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1525	0	1836	0	1725	1764
Flt Permitted	0.997				0.950	
Satd. Flow (perm)	1525	0	1836	0	1725	1764
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	2%	5%	2%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	492	0	796	0	322	467
Turn Type	Prot		NA		Prot	NA
Protected Phases	4		6		5	2
Permitted Phases						
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	44.0		58.0		28.0	86.0
Total Split (%)	33.8%		44.6%		21.5%	66.2%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	39.0		53.0		23.0	81.0
Actuated g/C Ratio	0.30		0.41		0.18	0.62
v/c Ratio	1.08		1.06		1.06	0.42
Control Delay	107.4		88.8		117.8	14.0
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	107.4		88.8		117.8	14.0
LOS	F		F		F	B
Approach Delay	107.4		88.8			56.4
Approach LOS	F		F			E
Queue Length 50th (ft)	~461		~738		~297	190
Queue Length 95th (ft)	#678		#983		#484	264
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	457		748		305	1099
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	1.08		1.06		1.06	0.42

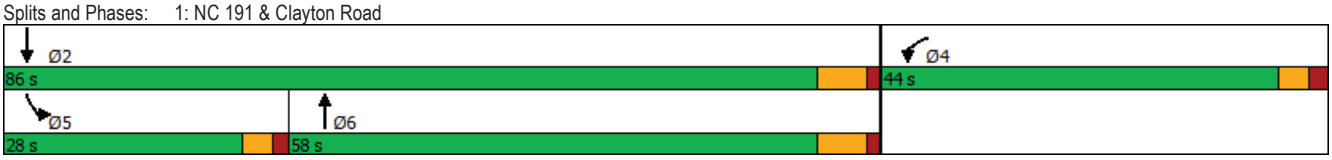
Intersection Summary	
Area Type:	Other
Cycle Length: 130	
Actuated Cycle Length: 130	

Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 80.9	Intersection LOS: F
Intersection Capacity Utilization 93.8%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: NC 191 & Clayton Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	413	679	38	290	420
Future Volume (vph)	30	413	679	38	290	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1525	0	1836	0	1725	1764
Flt Permitted	0.997				0.113	
Satd. Flow (perm)	1525	0	1836	0	205	1764
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	393		4			
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	2%	5%	2%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	492	0	796	0	322	467
Turn Type	Prot		NA		D.P+P	NA
Protected Phases	4		6		5	2
Permitted Phases					6	
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	22.0		48.0		20.0	68.0
Total Split (%)	24.4%		53.3%		22.2%	75.6%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	12.5		36.9		50.3	55.5
Actuated g/C Ratio	0.16		0.47		0.64	0.71
v/c Ratio	0.86		0.92		0.82	0.37
Control Delay	24.4		37.5		37.8	5.8
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	24.4		37.5		37.8	5.8
LOS	C		D		D	A
Approach Delay	24.4		37.5			18.9
Approach LOS	C		D			B
Queue Length 50th (ft)	49		372		107	81
Queue Length 95th (ft)	#217		#649		#258	140
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	648		1048		438	1416
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.76		0.76		0.74	0.33

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 78.4	

Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 93.8%	ICU Level of Service F
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: NC 191 & Clayton Road

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	5	47	69	452	339	14
Future Volume (vph)	5	47	69	452	339	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	125	150			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		75			
Satd. Flow (prot)	1770	1583	1770	1845	1850	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1770	1583	1770	1845	1850	0
Link Speed (mph)	25			45	45	
Link Distance (ft)	1091			2021	1129	
Travel Time (s)	29.8			30.6	17.1	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	3%	2%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	52	77	502	393	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	47	69	452	339	14
Future Vol, veh/h	5	47	69	452	339	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	3	2	7
Mvmt Flow	6	52	77	502	377	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1041	385	393	0	-	0
Stage 1	385	-	-	-	-	-
Stage 2	656	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	255	663	1166	-	-	-
Stage 1	688	-	-	-	-	-
Stage 2	516	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	238	663	1166	-	-	-
Mov Cap-2 Maneuver	238	-	-	-	-	-
Stage 1	643	-	-	-	-	-
Stage 2	516	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.8	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1166	-	238	663	-	-
HCM Lane V/C Ratio	0.066	-	0.023	0.079	-	-
HCM Control Delay (s)	8.3	-	20.5	10.9	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	0.3	-	-

Lane Group	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	36	431	26	405	488	446	35
Future Volume (vph)	36	431	26	405	488	446	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)		-9%		5%		-9%	
Storage Length (ft)	400		350		0	950	350
Storage Lanes	1		1		1	1	1
Taper Length (ft)	100		150			100	
Satd. Flow (prot)	1747	1891	1725	1764	1529	3588	1592
Flt Permitted	0.950		0.950			0.950	
Satd. Flow (perm)	1747	1891	1725	1764	1529	3588	1592
Right Turn on Red					No		No
Satd. Flow (RTOR)							
Link Speed (mph)		35		35		45	
Link Distance (ft)		1035		1129		2021	
Travel Time (s)		20.2		22.0		30.6	
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	5%	2%	5%	3%	2%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)		0%		0%		0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	40	479	29	450	542	496	39
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	1	6	4	4	5
Permitted Phases					6		4
Detector Phase	5	2	1	6	4	4	5
Switch Phase							
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	14.0	18.0	14.0	18.0	14.0	14.0	14.0
Total Split (s)	14.0	47.0	14.0	47.0	29.0	29.0	14.0
Total Split (%)	15.6%	52.2%	15.6%	52.2%	32.2%	32.2%	15.6%
Yellow Time (s)	3.3	4.6	3.0	4.6	3.3	3.3	3.3
All-Red Time (s)	3.4	2.7	3.3	2.7	3.5	3.5	3.4
Lost Time Adjust (s)	-1.7	-2.3	-1.3	-2.3	-1.8	-1.8	-1.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes
Recall Mode	None	Min	None	Min	None	None	None
Act Effct Green (s)	9.9	25.7	9.5	23.1	47.9	16.0	31.5
Actuated g/C Ratio	0.17	0.45	0.17	0.40	0.84	0.28	0.55
v/c Ratio	0.13	0.56	0.10	0.63	0.42	0.49	0.04
Control Delay	30.0	16.4	30.3	20.2	4.2	21.5	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	16.4	30.3	20.2	4.2	21.5	11.1
LOS	C	B	C	C	A	C	B
Approach Delay		17.5		12.0		20.8	
Approach LOS		B		B		C	
Queue Length 50th (ft)	13	88	10	140	74	82	7
Queue Length 95th (ft)	48	279	39	268	122	155	28
Internal Link Dist (ft)		955		1049		1941	
Turn Bay Length (ft)	400		350			950	350
Base Capacity (vph)	310	1438	306	1341	1354	1702	886
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.33	0.09	0.34	0.40	0.29	0.04

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 57.1

Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 15.6	Intersection LOS: B
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: NC 146 & Clayton Road

Appendix F:
Synchro Output:
Background (2025)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	44	266	492	66	264	493
Future Volume (vph)	44	266	492	66	264	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1505	0	1786	0	1692	1748
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1505	0	1786	0	1692	1748
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	7%	5%	4%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	345	0	620	0	293	548
Turn Type	Prot		NA		Prot	NA
Protected Phases	4		6		5	2
Permitted Phases						
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	28.0		40.0		22.0	62.0
Total Split (%)	31.1%		44.4%		24.4%	68.9%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	21.9		31.8		16.4	53.2
Actuated g/C Ratio	0.26		0.37		0.19	0.62
v/c Ratio	0.89		0.93		0.90	0.50
Control Delay	59.0		48.6		67.5	10.8
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	59.0		48.6		67.5	10.8
LOS	E		D		E	B
Approach Delay	59.0		48.6			30.5
Approach LOS	E		D			C
Queue Length 50th (ft)	190		323		165	150
Queue Length 95th (ft)	#349		#530		#316	226
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	410		742		341	1183
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.84		0.84		0.86	0.46

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 85.2	

Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 42.2	Intersection LOS: D
Intersection Capacity Utilization 75.9%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: NC 191 & Clayton Road

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	44	266	492	66	264	493
Future Volume (vph)	44	266	492	66	264	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1505	0	1786	0	1692	1748
Flt Permitted	0.993				0.185	
Satd. Flow (perm)	1505	0	1786	0	330	1748
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	296		10			
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	7%	5%	4%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	345	0	620	0	293	548
Turn Type	Prot		NA		D.P+P	NA
Protected Phases	4		6		5	2
Permitted Phases					6	
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	23.0		46.0		21.0	67.0
Total Split (%)	25.6%		51.1%		23.3%	74.4%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	10.3		24.8		34.4	39.8
Actuated g/C Ratio	0.17		0.41		0.56	0.65
v/c Ratio	0.69		0.85		0.73	0.48
Control Delay	14.4		28.4		21.4	6.9
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	14.4		28.4		21.4	6.9
LOS	B		C		C	A
Approach Delay	14.4		28.4			12.0
Approach LOS	B		C			B
Queue Length 50th (ft)	14		162		33	67
Queue Length 95th (ft)	109		418		142	184
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	681		1300		597	1594
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.51		0.48		0.49	0.34

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 60.9	

Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 75.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: NC 191 & Clayton Road

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	57	20	305	342	4
Future Volume (vph)	11	57	20	305	342	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	125	150			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		75			
Satd. Flow (prot)	1770	1583	1770	1863	1825	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1770	1583	1770	1863	1825	0
Link Speed (mph)	25			45	45	
Link Distance (ft)	1091			2021	1129	
Travel Time (s)	29.8			30.6	17.1	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	63	22	339	384	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	57	20	305	342	4
Future Vol, veh/h	11	57	20	305	342	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	12	63	22	339	380	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	765	382	384	0	-	0
Stage 1	382	-	-	-	-	-
Stage 2	383	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	371	665	1174	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	689	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	364	665	1174	-	-	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	677	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1174	-	364	665	-	-
HCM Lane V/C Ratio	0.019	-	0.034	0.095	-	-
HCM Control Delay (s)	8.1	-	15.2	11	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.3	-	-

Lane Group	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	40	546	52	501	338	385	29
Future Volume (vph)	40	546	52	501	338	385	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)		-9%		5%		-9%	
Storage Length (ft)	400		350		0	950	350
Storage Lanes	1		1		1	1	1
Taper Length (ft)	100		150			100	
Satd. Flow (prot)	1831	1891	1725	1731	1544	3553	1520
Flt Permitted	0.950		0.950			0.950	
Satd. Flow (perm)	1831	1891	1725	1731	1544	3553	1520
Right Turn on Red					No		No
Satd. Flow (RTOR)							
Link Speed (mph)		35		35		45	
Link Distance (ft)		1035		1129		2021	
Travel Time (s)		20.2		22.0		30.6	
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	5%	2%	7%	2%	3%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)		0%		0%		0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	44	607	58	557	376	428	32
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	1	6	4	4	5
Permitted Phases					6		4
Detector Phase	5	2	1	6	4	4	5
Switch Phase							
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	14.0	18.0	14.0	18.0	14.0	14.0	14.0
Total Split (s)	14.0	52.0	14.0	52.0	24.0	24.0	14.0
Total Split (%)	15.6%	57.8%	15.6%	57.8%	26.7%	26.7%	15.6%
Yellow Time (s)	3.3	4.6	3.0	4.6	3.3	3.3	3.3
All-Red Time (s)	3.4	2.7	3.3	2.7	3.5	3.5	3.4
Lost Time Adjust (s)	-1.7	-2.3	-1.3	-2.3	-1.8	-1.8	-1.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes
Recall Mode	None	Min	None	Min	None	None	None
Act Effct Green (s)	9.9	28.0	9.6	28.0	51.4	14.6	30.1
Actuated g/C Ratio	0.16	0.46	0.16	0.46	0.85	0.24	0.50
v/c Ratio	0.15	0.69	0.21	0.70	0.29	0.50	0.04
Control Delay	31.9	19.1	32.8	19.8	3.1	25.5	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	19.1	32.8	19.8	3.1	25.5	14.6
LOS	C	B	C	B	A	C	B
Approach Delay		20.0		14.2		24.7	
Approach LOS		C		B		C	
Queue Length 50th (ft)	16	195	21	182	44	79	7
Queue Length 95th (ft)	54	343	66	322	72	152	29
Internal Link Dist (ft)		955		1049		1941	
Turn Bay Length (ft)	400		350			950	350
Base Capacity (vph)	306	1475	289	1350	1343	1257	761
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.41	0.20	0.41	0.28	0.34	0.04

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 60.6

Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 18.3	Intersection LOS: B
Intersection Capacity Utilization 58.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: NC 146 & Clayton Road

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	31	421	693	39	296	428
Future Volume (vph)	31	421	693	39	296	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1525	0	1836	0	1725	1764
Flt Permitted	0.997				0.950	
Satd. Flow (perm)	1525	0	1836	0	1725	1764
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	2%	5%	2%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	502	0	813	0	329	476
Turn Type	Prot		NA		Prot	NA
Protected Phases	4		6		5	2
Permitted Phases						
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	47.0		63.0		30.0	93.0
Total Split (%)	33.6%		45.0%		21.4%	66.4%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	42.0		58.0		25.0	88.0
Actuated g/C Ratio	0.30		0.41		0.18	0.63
v/c Ratio	1.10		1.07		1.07	0.43
Control Delay	116.8		92.3		124.0	14.7
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	116.8		92.3		124.0	14.7
LOS	F		F		F	B
Approach Delay	116.8		92.3			59.4
Approach LOS	F		F			E
Queue Length 50th (ft)	~516		~818		~331	208
Queue Length 95th (ft)	#739		#1069		#525	285
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	457		760		308	1108
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	1.10		1.07		1.07	0.43

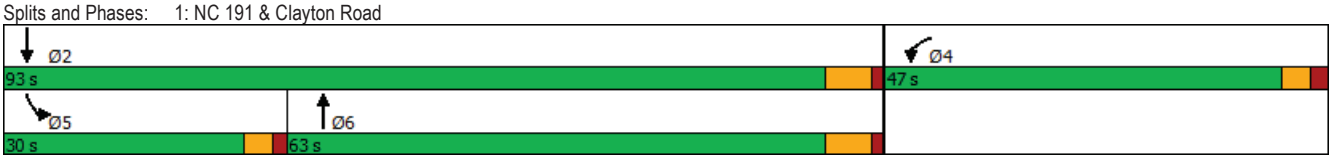
Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	

Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 85.6	Intersection LOS: F
Intersection Capacity Utilization 95.5%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: NC 191 & Clayton Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	31	421	693	39	296	428
Future Volume (vph)	31	421	693	39	296	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1525	0	1836	0	1725	1764
Flt Permitted	0.997				0.110	
Satd. Flow (perm)	1525	0	1836	0	200	1764
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	389		4			
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	2%	5%	2%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	502	0	813	0	329	476
Turn Type	Prot		NA		D.P+P	NA
Protected Phases	4		6		5	2
Permitted Phases					6	
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	22.0		48.0		20.0	68.0
Total Split (%)	24.4%		53.3%		22.2%	75.6%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	13.0		37.9		51.7	56.8
Actuated g/C Ratio	0.16		0.47		0.64	0.71
v/c Ratio	0.88		0.93		0.85	0.38
Control Delay	26.7		40.1		41.0	6.0
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	26.7		40.1		41.0	6.0
LOS	C		D		D	A
Approach Delay	26.7		40.1			20.3
Approach LOS	C		D			C
Queue Length 50th (ft)	57		402		118	90
Queue Length 95th (ft)	#235		#671		#271	144
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	637		1017		427	1390
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.79		0.80		0.77	0.34

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 80.2	

Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 29.4	Intersection LOS: C
Intersection Capacity Utilization 95.5%	ICU Level of Service F
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: NC 191 & Clayton Road

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	5	48	70	461	346	14
Future Volume (vph)	5	48	70	461	346	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	125	150			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		75			
Satd. Flow (prot)	1770	1583	1770	1845	1850	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1770	1583	1770	1845	1850	0
Link Speed (mph)	25			45	45	
Link Distance (ft)	1091			2021	1129	
Travel Time (s)	29.8			30.6	17.1	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	3%	2%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	53	78	512	400	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	48	70	461	346	14
Future Vol, veh/h	5	48	70	461	346	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	125	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	3	2	7
Mvmt Flow	6	53	78	512	384	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1060	392	400	0	-	0
Stage 1	392	-	-	-	-	-
Stage 2	668	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	248	657	1159	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	231	657	1159	-	-	-
Mov Cap-2 Maneuver	231	-	-	-	-	-
Stage 1	637	-	-	-	-	-
Stage 2	510	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1159	-	231	657	-	-
HCM Lane V/C Ratio	0.067	-	0.024	0.081	-	-
HCM Control Delay (s)	8.3	-	21	11	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	0.3	-	-

Lane Group	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	37	440	27	413	498	455	36
Future Volume (vph)	37	440	27	413	498	455	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)		-9%		5%		-9%	
Storage Length (ft)	400		350		0	950	350
Storage Lanes	1		1		1	1	1
Taper Length (ft)	100		150			100	
Satd. Flow (prot)	1747	1891	1725	1764	1529	3588	1592
Flt Permitted	0.950		0.950			0.950	
Satd. Flow (perm)	1747	1891	1725	1764	1529	3588	1592
Right Turn on Red					No		No
Satd. Flow (RTOR)							
Link Speed (mph)		35		35		45	
Link Distance (ft)		1035		1129		2021	
Travel Time (s)		20.2		22.0		30.6	
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	5%	2%	5%	3%	2%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)		0%		0%		0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	41	489	30	459	553	506	40
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	1	6	4	4	5
Permitted Phases					6		4
Detector Phase	5	2	1	6	4	4	5
Switch Phase							
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	14.0	18.0	14.0	18.0	14.0	14.0	14.0
Total Split (s)	14.0	48.0	14.0	48.0	28.0	28.0	14.0
Total Split (%)	15.6%	53.3%	15.6%	53.3%	31.1%	31.1%	15.6%
Yellow Time (s)	3.3	4.6	3.0	4.6	3.3	3.3	3.3
All-Red Time (s)	3.4	2.7	3.3	2.7	3.5	3.5	3.4
Lost Time Adjust (s)	-1.7	-2.3	-1.3	-2.3	-1.8	-1.8	-1.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes
Recall Mode	None	Min	None	Min	None	None	None
Act Effct Green (s)	9.9	26.0	9.5	23.5	48.4	16.1	31.6
Actuated g/C Ratio	0.17	0.45	0.16	0.41	0.84	0.28	0.55
v/c Ratio	0.14	0.57	0.11	0.64	0.43	0.50	0.05
Control Delay	30.2	16.6	30.6	20.4	4.2	21.9	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	16.6	30.6	20.4	4.2	21.9	11.2
LOS	C	B	C	C	A	C	B
Approach Delay		17.6		12.1		21.1	
Approach LOS		B		B		C	
Queue Length 50th (ft)	14	91	10	145	77	86	8
Queue Length 95th (ft)	50	287	40	274	126	158	28
Internal Link Dist (ft)		955		1049		1941	
Turn Bay Length (ft)	400		350			950	350
Base Capacity (vph)	308	1447	304	1349	1341	1618	881
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.34	0.10	0.34	0.41	0.31	0.05

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 57.6

Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 52.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: NC 146 & Clayton Road

Appendix G:
Synchro Output:
Build-Out (2025)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	44	269	492	66	265	493
Future Volume (vph)	44	269	492	66	265	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1505	0	1786	0	1692	1748
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1505	0	1786	0	1692	1748
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	7%	5%	4%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	348	0	620	0	294	548
Turn Type	Prot		NA		Prot	NA
Protected Phases	4		6		5	2
Permitted Phases						
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	28.0		40.0		22.0	62.0
Total Split (%)	31.1%		44.4%		24.4%	68.9%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	22.0		31.8		16.4	53.2
Actuated g/C Ratio	0.26		0.37		0.19	0.62
v/c Ratio	0.90		0.93		0.91	0.50
Control Delay	59.7		48.8		67.9	10.8
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	59.7		48.8		67.9	10.8
LOS	E		D		E	B
Approach Delay	59.7		48.8			30.7
Approach LOS	E		D			C
Queue Length 50th (ft)	192		323		166	150
Queue Length 95th (ft)	#353		#530		#317	226
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	409		739		340	1179
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.85		0.84		0.86	0.46

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 85.3	

Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 42.5	Intersection LOS: D
Intersection Capacity Utilization 76.1%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: NC 191 & Clayton Road

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	44	269	492	66	265	493
Future Volume (vph)	44	269	492	66	265	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1505	0	1786	0	1692	1748
Flt Permitted	0.993				0.185	
Satd. Flow (perm)	1505	0	1786	0	330	1748
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	299		10			
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	7%	5%	4%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	348	0	620	0	294	548
Turn Type	Prot		NA		D.P+P	NA
Protected Phases	4		6		5	2
Permitted Phases					6	
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	23.0		46.0		21.0	67.0
Total Split (%)	25.6%		51.1%		23.3%	74.4%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	10.3		24.9		34.5	39.9
Actuated g/C Ratio	0.17		0.41		0.57	0.65
v/c Ratio	0.69		0.85		0.73	0.48
Control Delay	14.4		28.4		21.5	6.9
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	14.4		28.4		21.5	6.9
LOS	B		C		C	A
Approach Delay	14.4		28.4			12.0
Approach LOS	B		C			B
Queue Length 50th (ft)	14		162		34	67
Queue Length 95th (ft)	110		418		143	184
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	683		1299		597	1593
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.51		0.48		0.49	0.34

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 61	

Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 76.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: NC 191 & Clayton Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	4	57	27	4	4	20	305	8	4	342	4
Future Volume (vph)	11	4	57	27	4	4	20	305	8	4	342	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		125	100		0	150		0	50		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			100			75			100		
Satd. Flow (prot)	0	1796	1583	0	1767	0	1770	1855	0	1770	1824	0
Flt Permitted		0.964			0.962		0.950			0.950		
Satd. Flow (perm)	0	1796	1583	0	1767	0	1770	1855	0	1770	1824	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		1091			1042			2021			1129	
Travel Time (s)		29.8			28.4			30.6			17.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	63	0	38	0	22	348	0	4	384	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	4	57	27	4	4	20	305	8	4	342	4
Future Vol, veh/h	11	4	57	27	4	4	20	305	8	4	342	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	125	-	-	-	150	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	4	2
Mvmt Flow	12	4	63	30	4	4	22	339	9	4	380	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	782	782	382	812	780	344	384	0	0	348	0	0
Stage 1	390	390	-	388	388	-	-	-	-	-	-	-
Stage 2	392	392	-	424	392	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	312	326	665	298	327	699	1174	-	-	1211	-	-
Stage 1	634	608	-	636	609	-	-	-	-	-	-	-
Stage 2	633	606	-	608	606	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	302	319	665	262	320	699	1174	-	-	1211	-	-
Mov Cap-2 Maneuver	302	319	-	262	320	-	-	-	-	-	-	-
Stage 1	622	606	-	624	597	-	-	-	-	-	-	-
Stage 2	613	594	-	544	604	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	19.4	0.5	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1174	-	-	306	665	289	1211	-	-
HCM Lane V/C Ratio	0.019	-	-	0.054	0.095	0.135	0.004	-	-
HCM Control Delay (s)	8.1	-	-	17.4	11	19.4	8	-	-
HCM Lane LOS	A	-	-	C	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.3	0.5	0	-	-

Lane Group	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	43	546	52	501	343	403	38
Future Volume (vph)	43	546	52	501	343	403	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)		-9%		5%		-9%	
Storage Length (ft)	400		350		0	950	350
Storage Lanes	1		1		1	1	1
Taper Length (ft)	100		150			100	
Satd. Flow (prot)	1849	1891	1725	1731	1544	3553	1563
Flt Permitted	0.950		0.950			0.950	
Satd. Flow (perm)	1849	1891	1725	1731	1544	3553	1563
Right Turn on Red					No		No
Satd. Flow (RTOR)							
Link Speed (mph)		35		35		45	
Link Distance (ft)		1035		1129		2021	
Travel Time (s)		20.2		22.0		30.6	
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	5%	2%	7%	2%	3%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)		0%		0%		0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	48	607	58	557	381	448	42
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	1	6	4	4	5
Permitted Phases					6		4
Detector Phase	5	2	1	6	4	4	5
Switch Phase							
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	14.0	18.0	14.0	18.0	14.0	14.0	14.0
Total Split (s)	14.0	52.0	14.0	52.0	24.0	24.0	14.0
Total Split (%)	15.6%	57.8%	15.6%	57.8%	26.7%	26.7%	15.6%
Yellow Time (s)	3.3	4.6	3.0	4.6	3.3	3.3	3.3
All-Red Time (s)	3.4	2.7	3.3	2.7	3.5	3.5	3.4
Lost Time Adjust (s)	-1.7	-2.3	-1.3	-2.3	-1.8	-1.8	-1.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes
Recall Mode	None	Min	None	Min	None	None	None
Act Effct Green (s)	9.8	31.0	9.5	28.0	50.4	14.9	30.3
Actuated g/C Ratio	0.15	0.48	0.15	0.44	0.79	0.23	0.47
v/c Ratio	0.17	0.66	0.23	0.74	0.31	0.54	0.06
Control Delay	32.7	18.4	33.8	22.7	3.8	27.1	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	18.4	33.8	22.7	3.8	27.1	14.6
LOS	C	B	C	C	A	C	B
Approach Delay		19.4		16.1		26.1	
Approach LOS		B		B		C	
Queue Length 50th (ft)	18	197	22	184	45	84	10
Queue Length 95th (ft)	58	343	66	322	73	159	35
Internal Link Dist (ft)		955		1049		1941	
Turn Bay Length (ft)	400		350			950	350
Base Capacity (vph)	289	1387	270	1270	1273	1175	744
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.44	0.21	0.44	0.30	0.38	0.06

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 64.1	

Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 19.4	Intersection LOS: B
Intersection Capacity Utilization 58.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: NC 146 & Clayton Road

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	31	423	693	39	299	428
Future Volume (vph)	31	423	693	39	299	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1525	0	1836	0	1725	1764
Flt Permitted	0.997				0.950	
Satd. Flow (perm)	1525	0	1836	0	1725	1764
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	2%	5%	2%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	504	0	813	0	332	476
Turn Type	Prot		NA		Prot	NA
Protected Phases	4		6		5	2
Permitted Phases						
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	47.0		63.0		30.0	93.0
Total Split (%)	33.6%		45.0%		21.4%	66.4%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	42.0		58.0		25.0	88.0
Actuated g/C Ratio	0.30		0.41		0.18	0.63
v/c Ratio	1.10		1.07		1.08	0.43
Control Delay	118.2		92.3		126.6	14.7
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	118.2		92.3		126.6	14.7
LOS	F		F		F	B
Approach Delay	118.2		92.3			60.7
Approach LOS	F		F			E
Queue Length 50th (ft)	~520		~818		~336	208
Queue Length 95th (ft)	#743		#1069		#533	285
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	457		760		308	1108
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	1.10		1.07		1.08	0.43

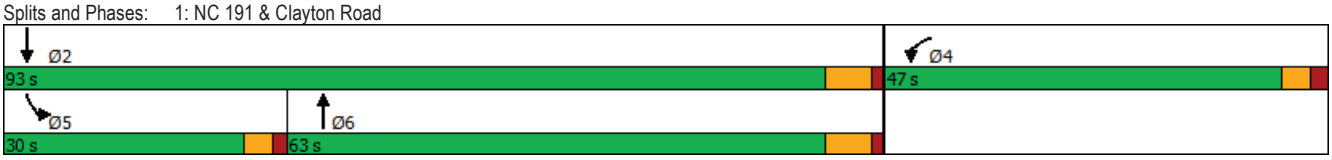
Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	

Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 86.4	Intersection LOS: F
Intersection Capacity Utilization 95.8%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: NC 191 & Clayton Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	31	423	693	39	299	428
Future Volume (vph)	31	423	693	39	299	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	12%		-4%			5%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				165	
Satd. Flow (prot)	1525	0	1836	0	1725	1764
Flt Permitted	0.997				0.109	
Satd. Flow (perm)	1525	0	1836	0	198	1764
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	377		4			
Link Speed (mph)	45		45			45
Link Distance (ft)	1186		1099			1026
Travel Time (s)	18.0		16.7			15.5
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	2%	5%	2%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	504	0	813	0	332	476
Turn Type	Prot		NA		D.P+P	NA
Protected Phases	4		6		5	2
Permitted Phases					6	
Detector Phase	4		6		5	2
Switch Phase						
Minimum Initial (s)	7.0		12.0		7.0	12.0
Minimum Split (s)	13.0		19.0		12.0	19.0
Total Split (s)	22.0		49.0		19.0	68.0
Total Split (%)	24.4%		54.4%		21.1%	75.6%
Yellow Time (s)	3.0		4.9		3.0	4.9
All-Red Time (s)	2.1		1.3		1.6	1.3
Lost Time Adjust (s)	-0.1		-1.2		0.4	-1.2
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		Min		None	Min
Act Effct Green (s)	13.6		38.3		52.1	57.2
Actuated g/C Ratio	0.17		0.47		0.64	0.71
v/c Ratio	0.88		0.94		0.86	0.38
Control Delay	28.6		40.1		44.0	6.2
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	28.6		40.1		44.0	6.2
LOS	C		D		D	A
Approach Delay	28.6		40.1			21.7
Approach LOS	C		D			C
Queue Length 50th (ft)	65		403		125	95
Queue Length 95th (ft)	#250		#658		#286	144
Internal Link Dist (ft)	1106		1019			946
Turn Bay Length (ft)					125	
Base Capacity (vph)	623		1023		399	1386
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.81		0.79		0.83	0.34

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 81.1	

Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 30.4	Intersection LOS: C
Intersection Capacity Utilization 95.8%	ICU Level of Service F
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: NC 191 & Clayton Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	4	48	16	4	4	70	461	24	4	346	14
Future Volume (vph)	5	4	48	16	4	4	70	461	24	4	346	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		125	100		0	150		0	50		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			100			75			100		
Satd. Flow (prot)	0	1809	1583	0	1763	0	1770	1831	0	1770	1848	0
Flt Permitted		0.971			0.967		0.950			0.950		
Satd. Flow (perm)	0	1809	1583	0	1763	0	1770	1831	0	1770	1848	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		1091			1042			2021			1129	
Travel Time (s)		29.8			28.4			30.6			17.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	53	0	26	0	78	539	0	4	400	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	4	48	16	4	4	70	461	24	4	346	14
Future Vol, veh/h	5	4	48	16	4	4	70	461	24	4	346	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	125	-	-	-	150	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	3	2	2	2	7
Mvmt Flow	6	4	53	18	4	4	78	512	27	4	384	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1086	1095	392	1111	1090	526	400	0	0	539	0	0
Stage 1	400	400	-	682	682	-	-	-	-	-	-	-
Stage 2	686	695	-	429	408	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	194	214	657	186	215	552	1159	-	-	1029	-	-
Stage 1	626	602	-	440	450	-	-	-	-	-	-	-
Stage 2	438	444	-	604	597	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	179	199	657	159	200	552	1159	-	-	1029	-	-
Mov Cap-2 Maneuver	179	199	-	159	200	-	-	-	-	-	-	-
Stage 1	584	600	-	411	420	-	-	-	-	-	-	-
Stage 2	401	414	-	549	595	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	27.3	1.1	0.1
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1159	-	-	187	657	188	1029	-	-
HCM Lane V/C Ratio	0.067	-	-	0.053	0.081	0.142	0.004	-	-
HCM Control Delay (s)	8.3	-	-	25.3	11	27.3	8.5	-	-
HCM Lane LOS	A	-	-	D	B	D	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.3	0.5	0	-	-

Lane Group	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	45	440	27	413	514	466	41
Future Volume (vph)	45	440	27	413	514	466	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)		-9%		5%		-9%	
Storage Length (ft)	400		350		0	950	350
Storage Lanes	1		1		1	1	1
Taper Length (ft)	100		150			100	
Satd. Flow (prot)	1763	1891	1725	1764	1529	3588	1607
Flt Permitted	0.950		0.950			0.950	
Satd. Flow (perm)	1763	1891	1725	1764	1529	3588	1607
Right Turn on Red					No		No
Satd. Flow (RTOR)							
Link Speed (mph)		35		35		45	
Link Distance (ft)		1035		1129		2021	
Travel Time (s)		20.2		22.0		30.6	
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	5%	2%	5%	3%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)		0%		0%		0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	50	489	30	459	571	518	46
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	1	6	4	4	5
Permitted Phases					6		4
Detector Phase	5	2	1	6	4	4	5
Switch Phase							
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	14.0	18.0	14.0	18.0	14.0	14.0	14.0
Total Split (s)	14.0	47.0	14.0	47.0	29.0	29.0	14.0
Total Split (%)	15.6%	52.2%	15.6%	52.2%	32.2%	32.2%	15.6%
Yellow Time (s)	3.3	4.6	3.0	4.6	3.3	3.3	3.3
All-Red Time (s)	3.4	2.7	3.3	2.7	3.5	3.5	3.4
Lost Time Adjust (s)	-1.7	-2.3	-1.3	-2.3	-1.8	-1.8	-1.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes
Recall Mode	None	Min	None	Min	None	None	None
Act Effct Green (s)	9.8	29.1	9.3	23.3	47.2	16.3	31.7
Actuated g/C Ratio	0.16	0.48	0.15	0.38	0.78	0.27	0.52
v/c Ratio	0.18	0.54	0.11	0.68	0.48	0.54	0.06
Control Delay	31.2	15.9	31.1	22.9	5.4	23.4	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	15.9	31.1	22.9	5.4	23.4	11.4
LOS	C	B	C	C	A	C	B
Approach Delay		17.4		13.7		22.4	
Approach LOS		B		B		C	
Queue Length 50th (ft)	17	93	10	146	81	88	9
Queue Length 95th (ft)	58	291	40	279	132	163	32
Internal Link Dist (ft)		955		1049		1941	
Turn Bay Length (ft)	400		350			950	350
Base Capacity (vph)	290	1330	284	1241	1304	1575	842
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.37	0.11	0.37	0.44	0.33	0.05

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 60.9	

Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: NC 146 & Clayton Road

Appendix H:
SimTraffic Queuing and Blocking Reports

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	259	657	234	258
Average Queue (ft)	131	354	130	117
95th Queue (ft)	216	586	202	209
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			10	4
Queuing Penalty (veh)			48	9

Intersection: 2: Clayton Road & Roberts Lake Circle

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	24	48	30
Average Queue (ft)	8	20	5
95th Queue (ft)	25	37	23
Link Distance (ft)	1048		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: NC 146 & Clayton Road

Movement	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	U	T	R	L	L	R
Maximum Queue (ft)	86	266	90	276	126	137	135	47
Average Queue (ft)	30	149	39	135	49	64	73	9
95th Queue (ft)	69	242	78	232	95	111	119	30
Link Distance (ft)		998		1089	1089		1936	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	400		350			950		350
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Network Summary

Network wide Queuing Penalty: 57

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	183	464	167	191
Average Queue (ft)	87	213	94	84
95th Queue (ft)	152	396	147	153
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			2	1
Queuing Penalty (veh)			10	3

Zone Summary

Zone wide Queuing Penalty: 14

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	761	1092	290	657
Average Queue (ft)	484	939	232	307
95th Queue (ft)	832	1260	325	684
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)	0	35		2
Queuing Penalty (veh)	0	0		0
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			51	7
Queuing Penalty (veh)			215	21

Intersection: 2: Clayton Road & Roberts Lake Circle

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	24	48	48
Average Queue (ft)	3	18	18
95th Queue (ft)	15	38	43
Link Distance (ft)	1048		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: NC 146 & Clayton Road

Movement	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	U	T	R	L	L	R
Maximum Queue (ft)	80	238	69	251	181	113	130	50
Average Queue (ft)	29	116	20	117	77	64	79	10
95th Queue (ft)	64	196	53	197	139	104	122	33
Link Distance (ft)		998		1089	1089		1936	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	400		350			950		350
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 236

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	492	701	237	235
Average Queue (ft)	258	430	124	94
95th Queue (ft)	510	633	206	176
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			10	1
Queuing Penalty (veh)			43	4

Zone Summary

Zone wide Queuing Penalty: 47

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	275	592	238	239
Average Queue (ft)	131	353	135	123
95th Queue (ft)	222	561	210	212
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			12	4
Queuing Penalty (veh)			58	9

Intersection: 2: Clayton Road & Roberts Lake Circle

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	28	50	30
Average Queue (ft)	7	20	5
95th Queue (ft)	26	40	23
Link Distance (ft)	1048		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: NC 146 & Clayton Road

Movement	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	U	T	R	L	L	R
Maximum Queue (ft)	86	300	91	300	130	150	150	53
Average Queue (ft)	31	158	38	139	50	68	76	9
95th Queue (ft)	68	262	75	239	99	121	129	33
Link Distance (ft)		998		1089	1089		1936	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	400		350			950		350
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Network Summary

Network wide Queuing Penalty: 67

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	199	425	178	195
Average Queue (ft)	88	208	94	88
95th Queue (ft)	159	377	155	164
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			3	2
Queuing Penalty (veh)			15	5

Zone Summary

Zone wide Queuing Penalty: 20

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	872	1088	290	785
Average Queue (ft)	583	914	238	345
95th Queue (ft)	1035	1263	330	757
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)	2	33		2
Queuing Penalty (veh)	0	0		0
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			52	9
Queuing Penalty (veh)			224	25

Intersection: 2: Clayton Road & Roberts Lake Circle

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	24	47	48
Average Queue (ft)	3	18	17
95th Queue (ft)	17	38	42
Link Distance (ft)	1048		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: NC 146 & Clayton Road

Movement	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	U	T	R	L	L	R
Maximum Queue (ft)	78	229	70	266	169	130	144	49
Average Queue (ft)	32	115	21	126	75	65	81	10
95th Queue (ft)	69	187	54	214	135	111	124	33
Link Distance (ft)		998		1089	1089		1936	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	400		350			950		350
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Network Summary

Network wide Queuing Penalty: 249

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	525	785	255	300
Average Queue (ft)	270	494	130	105
95th Queue (ft)	509	777	220	227
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)		1		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			13	2
Queuing Penalty (veh)			56	6

Zone Summary

Zone wide Queuing Penalty: 62

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	307	608	246	256
Average Queue (ft)	146	378	136	123
95th Queue (ft)	251	578	218	221
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			12	4
Queuing Penalty (veh)			60	11

Intersection: 2: Clayton Road & Roberts Lake Circle/Site Driveway

Movement	EB	EB	WB	NB	NB	SB
Directions Served	LT	R	LTR	L	TR	L
Maximum Queue (ft)	31	49	58	25	1	9
Average Queue (ft)	9	18	21	4	0	1
95th Queue (ft)	26	37	47	17	1	6
Link Distance (ft)	1047		1005		1922	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		125		150		50
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: NC 146 & Clayton Road

Movement	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	U	T	R	L	L	R
Maximum Queue (ft)	84	313	99	286	131	135	144	56
Average Queue (ft)	33	159	38	143	55	67	76	11
95th Queue (ft)	70	265	79	244	105	116	120	34
Link Distance (ft)		998		1089	1089		1922	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	400		350			950		350
Storage Blk Time (%)		0		0				
Queuing Penalty (veh)		0		0				

Network Summary

Network wide Queuing Penalty: 70

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	218	444	183	207
Average Queue (ft)	91	226	91	89
95th Queue (ft)	166	409	150	170
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			2	2
Queuing Penalty (veh)			12	5

Zone Summary

Zone wide Queuing Penalty: 16

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	870	1091	290	803
Average Queue (ft)	574	965	245	365
95th Queue (ft)	1013	1260	333	757
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)	4	43		1
Queuing Penalty (veh)	0	0		0
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			55	9
Queuing Penalty (veh)			236	26

Intersection: 2: Clayton Road & Roberts Lake Circle/Site Driveway

Movement	EB	EB	WB	NB	SB	SB
Directions Served	LT	R	LTR	L	L	TR
Maximum Queue (ft)	20	52	44	42	20	2
Average Queue (ft)	4	16	17	13	2	0
95th Queue (ft)	18	34	43	33	11	2
Link Distance (ft)	1047		1005			1081
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		125		150	50	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: NC 146 & Clayton Road

Movement	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	U	T	R	L	L	R
Maximum Queue (ft)	101	240	65	264	169	131	145	53
Average Queue (ft)	35	119	21	122	80	67	82	11
95th Queue (ft)	76	204	54	209	141	115	124	36
Link Distance (ft)		998		1089	1089		1922	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	400		350			950		350
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Network Summary

Network wide Queuing Penalty: 262

Intersection: 1: NC 191 & Clayton Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	555	730	240	215
Average Queue (ft)	282	462	133	98
95th Queue (ft)	549	668	214	186
Link Distance (ft)	1131	1043		1010
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			125	
Storage Blk Time (%)			14	2
Queuing Penalty (veh)			61	5

Zone Summary

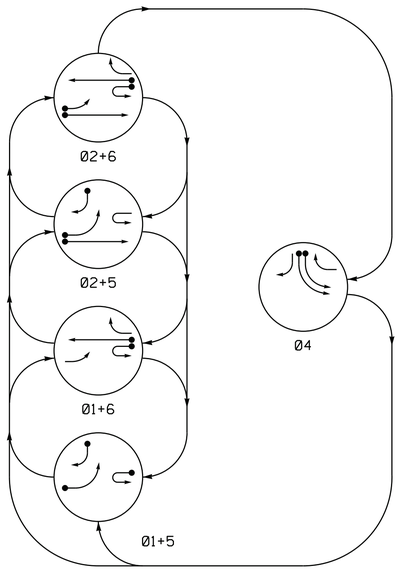
Zone wide Queuing Penalty: 66

Appendix I:
Signal Plans

PROJECT REFERENCE NO.	SHEET NO.
N/A	Sig. 1.0

5 Phase
Fully Actuated
Asheville Signal System

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

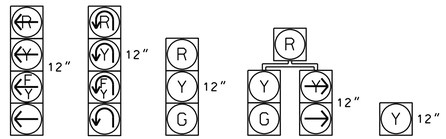
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	04	FLASH
11			(R) (Y)	(R) (Y)	(R)	(Y)
21, 22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	←	(R) (Y)	←	(R) (Y)	R	Y
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2A	6X6	70	5	-	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	70	5	-	6	Y	Y	-	-	-	-	-
S1	6X6	+200	5	-	-	-	-	-	-	-	Y	-
S2	6X6	+200	5	-	-	-	-	-	-	-	Y	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Renumber existing signal heads 62 and 63, to 61 and 62, respectively.
5. Set all detector units to presence mode.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Flash beacons 23 and 24 during Phase 2 Yellow and Phase 2 Red intervals. (See electrical details)

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
	Metal Pole with Mastarm	
	Type II Signal Pedestal	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	"BE PREPARED TO STOP" Sign (W3-4) (See Figure 1)	Ⓒ
Ⓓ	"WHEN FLASHING" Sign (W16-3P) (See Figure 1)	Ⓓ

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green 1 *	7	10	7	7	10
Extension 1 *	2.0	3.0	2.0	2.0	3.0
Max Green 1 *	15	60	25	15	60
Yellow Clearance	3.0	4.6	3.3	3.3	4.6
Red Clearance	3.3	2.7	3.5	3.4	2.7
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

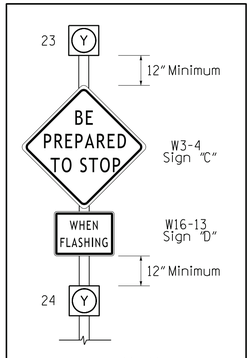


FIGURE 1

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	2
23	ON	OFF
24	OFF	ON

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

NC 146 (Long Shoals Rd.) at SR 3501 (Clayton Rd.)

Division 13 Buncombe County Asheville

PLAN DATE: May 2019 REVIEWED BY: T.J. Williams

PREPARED BY: R.N. Zinser REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R. N. Zinser F138897347224BF... 7/8/2019 DATE

SIG. INVENTORY NO. I3-0729

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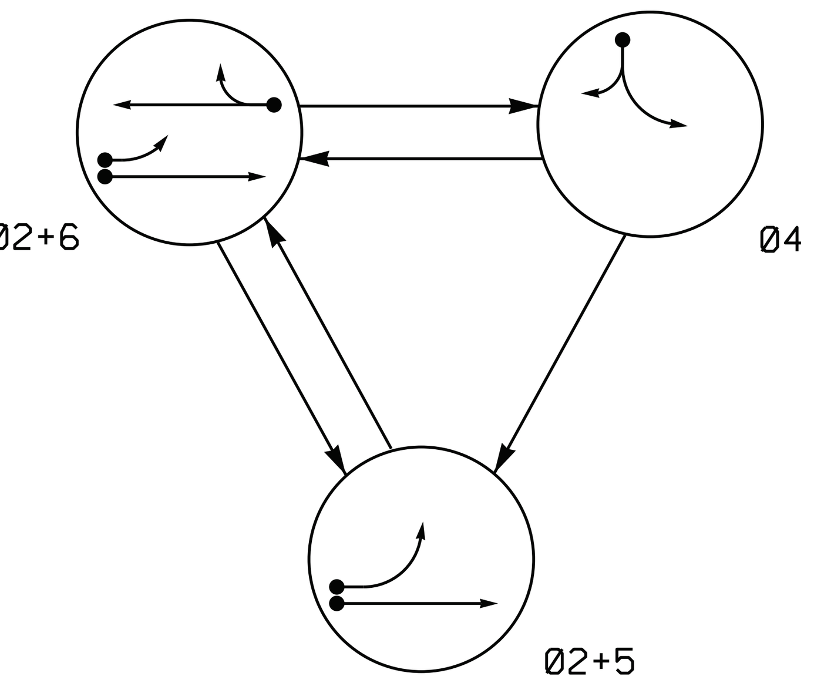
rnzinser

PROJECT REFERENCE NO.	SHEET NO.
N/A	Sig. 1.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

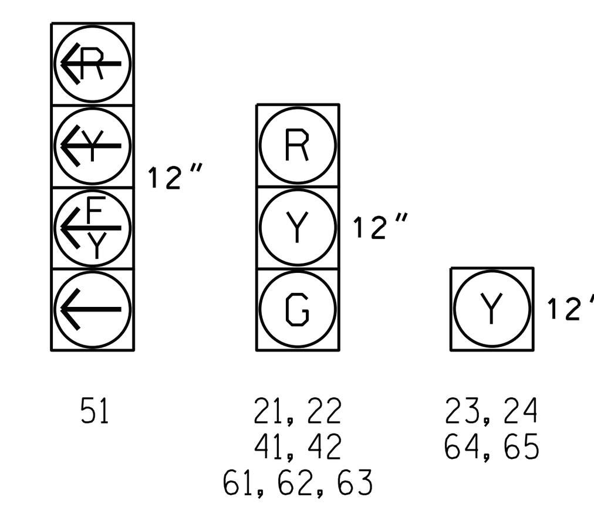
SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø4	FLASH
21, 22	G	G	R	Y
41, 42	R	R	G	R
51	←	←F/Y	←R	←Y
61, 62, 63	R	G	R	Y

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	2
23	ON	OFF
24	OFF	ON
64	ON	OFF
65	OFF	ON

SIGNAL FACE I.D.

All Heads L.E.D.

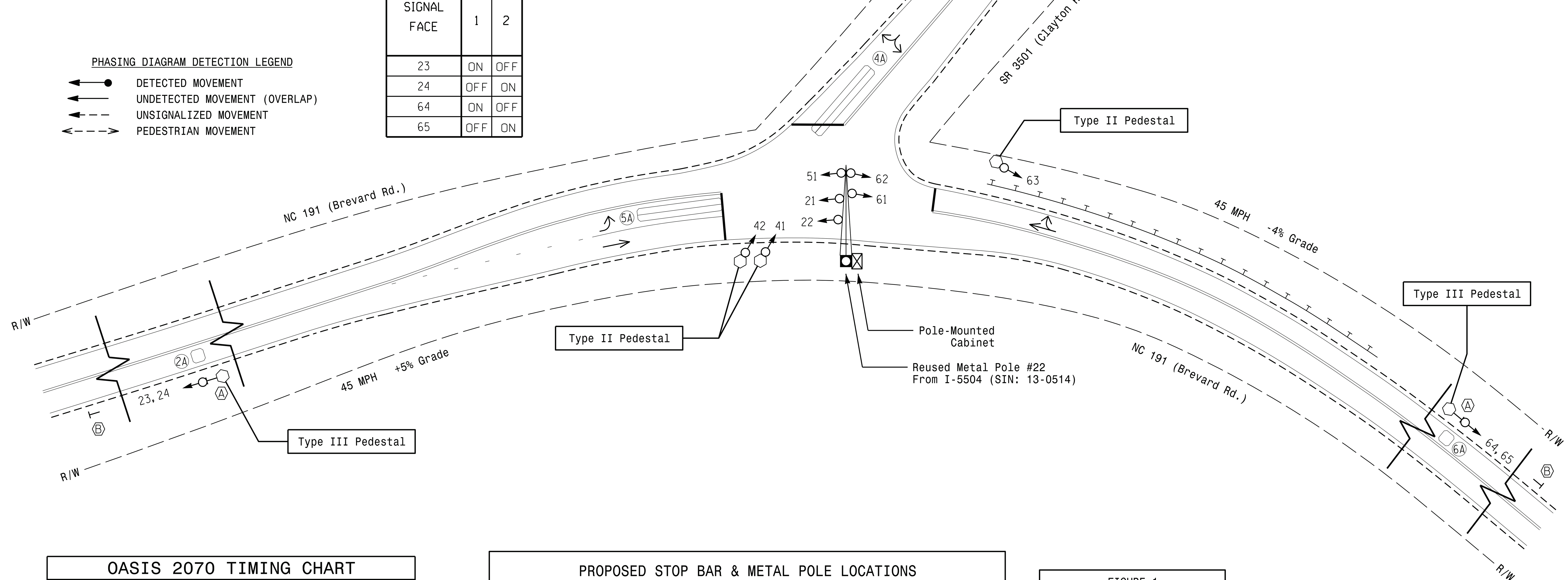


OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH PHASE	CALLING	EXTENSION	FULL TIME DELAY	SWITCHING DETECTION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	300	4	Y	2	-	Y	Y	-	-	-	-	-	Y
4A	6X40	+5	2-4-2	Y	4	-	Y	Y	-	-	-	5	-	Y
5A	6X40	0	2-4-2	Y	5	-	Y	Y	-	-	-	15	-	Y
					2	-	Y	Y	Y	-	-	3	-	Y
6A	6X6	300	4	Y	6	-	Y	Y	-	-	-	-	-	Y

(INDUCTIVE LOOPS: LOOP through NEW LOOP; DETECTOR PROGRAMMING: PHASE through DELAY TIME)

3 Phase
Fully Actuated
Isolated



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Program Controller to operate in FYA Compact Mode.
7. Locate Signs "A" 300 ft. +/- from the stop bar.
8. Flash beacons 23 and 24 three (3) seconds prior to the end of phase 2 Green Interval.
9. Flash beacons 64 and 65 three (3) seconds prior to the end of phase 6 Green Interval.
10. Backplates shall not be permitted for this location.

OASIS 2070 TIMING CHART

FEATURE	PHASE 2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	3.0	2.0	6.0
Max Green 1 *	90	30	15	90
Yellow Clearance	4.9	3.0	3.0	4.9
Red Clearance	1.3	2.1	1.6	1.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5
Max Variable Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

PROPOSED STOP BAR & METAL POLE LOCATIONS

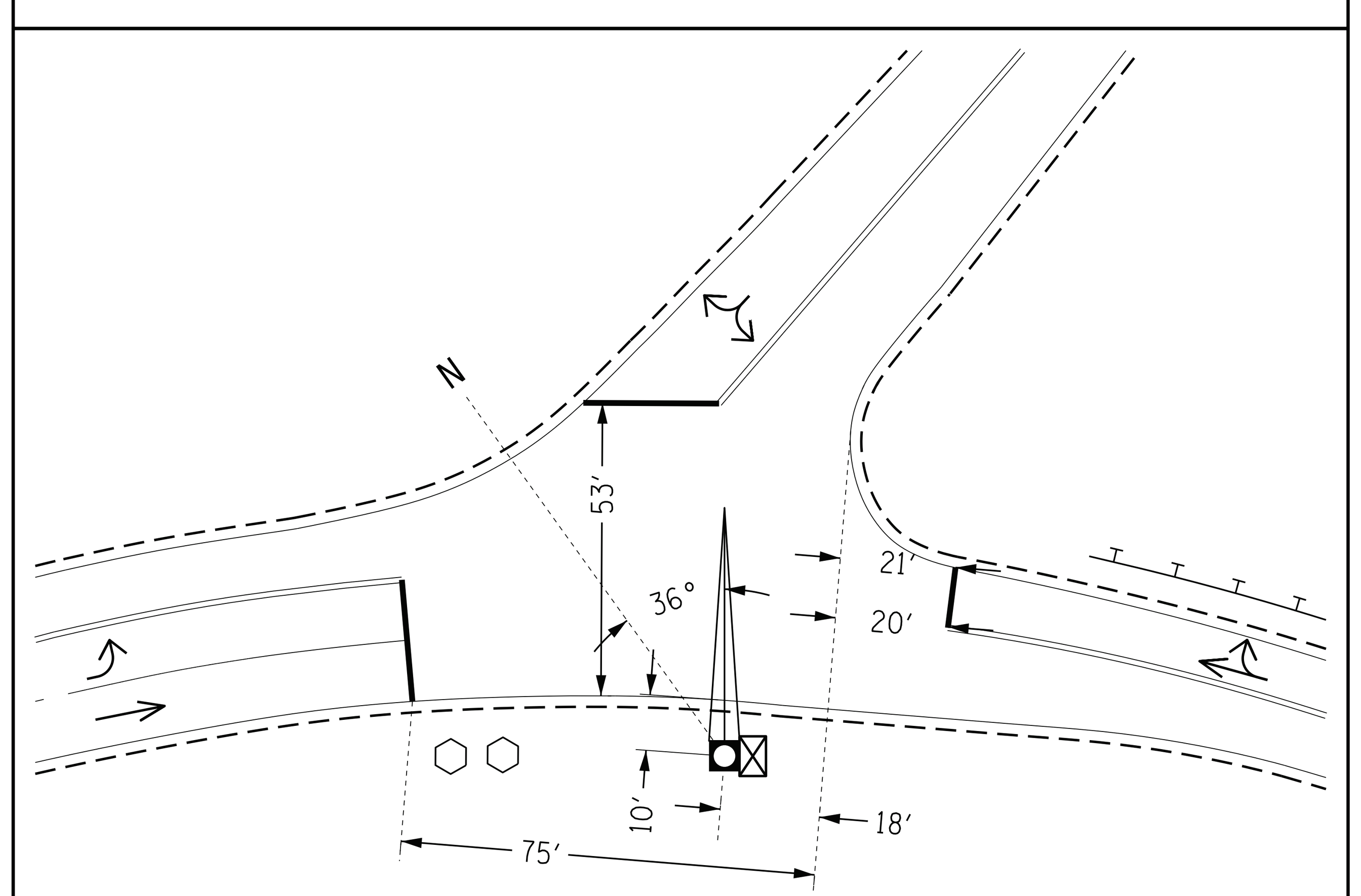
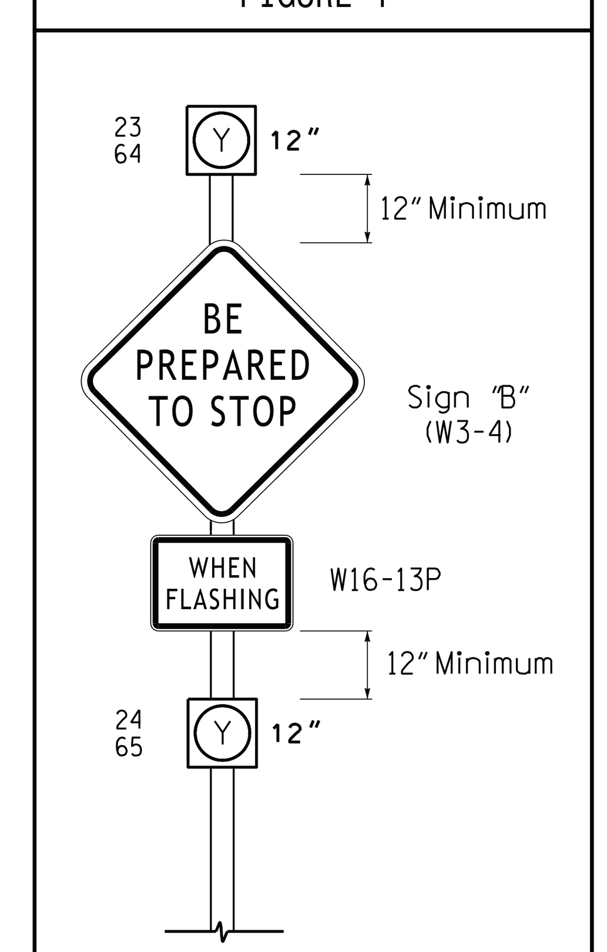


FIGURE 1



This plan supersedes the one signed and sealed on 12/17/2021.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
	Type II Signal Pedestal	
A	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-13P) See Figure 1	A
B	Signal Ahead Sign (W3-3)	B

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

NC 191 (Brevard Rd.) at SR 3501 (Clayton Rd.)

Division 13 Buncombe County Arden

PLAN DATE: January 2022	REVIEWED BY: T.J. Williams
PREPARED BY: R.N. Zinser	REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043914 RICHARD N. ZINSER

DocuSigned by: R. N. Zinser F1388973472248F... 01/04/2022
DATE

SIG. INVENTORY NO. 13-1312

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Appendix J:
Turn-Lane Warrants

Clayton Road at Site Driveway - AM Peak hour

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

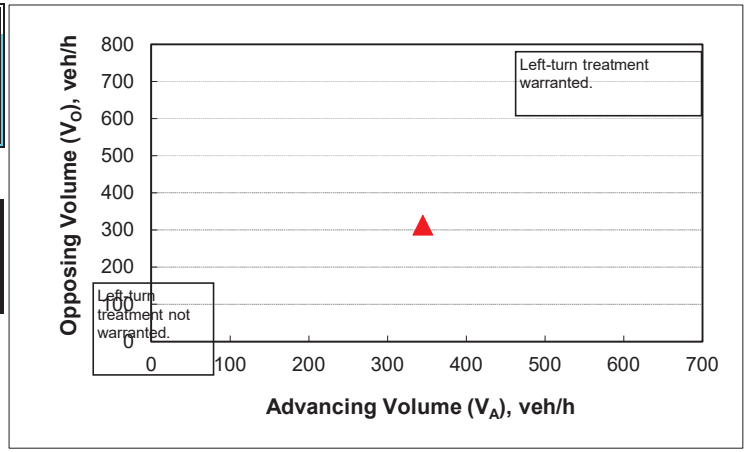
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	0%
Advancing volume (V_A), veh/h:	345
Opposing volume (V_O), veh/h:	313

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	2108
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Clayton Road at Site Driveway - PM Peak hour

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

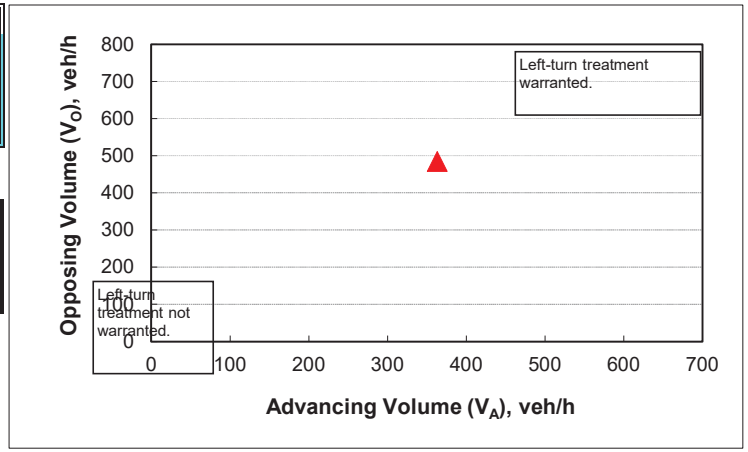
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	363
Opposing volume (V_O), veh/h:	485

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	1039
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Clayton Road at Site Driveway - AM Peak hour

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

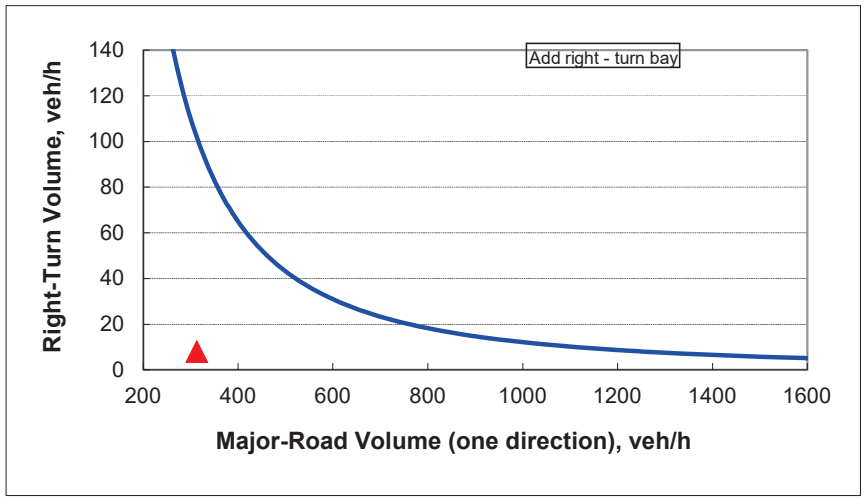
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	313
Right-turn volume, veh/h:	8

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	102
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Clayton Road at Site Driveway - PM Peak hour

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	485
Right-turn volume, veh/h:	24

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	46
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.